Australia Pacific LNG Project

Volume 1: Overview

Chapter 5: Cumulative Impact Assessment

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5. Cumulative impacts

5.1 Introduction

Section 7 of the Terms of Reference for the Australia Pacific LNG Project (the Project) requires the environmental impact statement (EIS) to provide a summary of the cumulative impacts of other known, existing or proposed projects, where the details have been provided by the Department of Infrastructure and Planning or which are otherwise published.

With respect to Gladstone in particular, the terms of reference state that the EIS should consider the likelihood of cumulative impacts arising due to LNG facilities co-located within the Curtis Island Industry Precinct. Similarly, the EIS should also consider the socio-economic impacts from large construction workforce requirements, especially where overlapping development timeframes are proposed.

The objective of the cumulative impact assessment is to take into account the potential impacts of the Project, combined with other existing or proposed projects in the area that may have a significant impact on a range of environmental, social and economic values.

Existing projects are those projects that have commenced development but have one or more components that are not part of the current or baseline environmental values. For example, the cumulative impact of land clearing for the construction phase of the Project may form part of the existing environment, but air emissions from the operational phase will not form part of the air-shed until after the Project has been commissioned.

This chapter summarises the methodology Australia Pacific LNG has applied to assess these cumulative impacts. It also describes the methodology used to identify which projects to include in the cumulative assessment, and the subsequent assessment of impacts.

5.2 Methodology

5.2.1 Project selection rationale

Within the vicinity of the Project's three components, there are currently a number of existing, approved or proposed projects which could contribute to cumulative impacts. Identification of other projects suitable for inclusion in the cumulative impact assessment was based on whether:

- The project is within the Australia Pacific LNG Project's area of potential influence
- The Coordinator-General has declared the project significant, for which an EIS is required under the *State Development and Public Works Organisation Act 1971*. The EIS is either completed or in progress; or the project's initial advice statement has been released
- The project is being assessed under *Environmental Protection Act 2004* or *Sustainable Planning Act 2009* for which an EIS is required. The EIS is either completed or in progress; or the project's initial advice statement has been released.

Projects which satisfied the above criteria, and could reasonably and practically be assessed for impacts, were included in the cumulative impact assessment. A total of 30 projects, which include the Australia Pacific LNG Project, were agreed to in consultation with the Department of Infrastructure and Planning in October 2009.

These projects are described in Table 5.1. This table also summarises the relationship of the projects to the Australia Pacific LNG Project and where the likely cumulative impacts could occur, such as pressure on available skilled labour during construction. The locations of the projects within the gas fields and gas pipeline area are shown in Figure 5.1 and the locations within the Gladstone district are shown in Figure 5.2.

It should be noted that the status and potentially other details of these projects are subject to ongoing change. The cumulative impact assessment described in this EIS represents the status of the various projects as at December 2009.

5.2.2 Approach to assessing cumulative impacts

Available information on each project was reviewed at a high level to determine the nature, location and timing of possible cumulative impacts. The proposed projects were considered in terms of their contribution to:

- Competition for workforce, materials or equipment, where timing of construction and operations overlap
- Cumulative environmental and social impacts
- Cumulative impacts on existing infrastructure, traffic and or transport and other resources and services
- Co-location and or geographic overlap.

The physical/biological, social, cultural, economic and built environment values potentially affected due to cumulative impacts were identified for each proposed project, taking into account geographic and scheduling overlaps with the Australia Pacific LNG Project. Potential impacts were assigned an overall level of assessed risk (low, moderate, or high), to guide the type and level of assessment.

The assessment of impacts was based on the best information available at the time of the EIS preparation. In cases where other projects are only at the early stage of development, the availability of relevant information was generally limited. Where the available data permitted, a semi-quantitative approach was undertaken to assess the cumulative impact of other existing or proposed projects. Depending on the impact assessed, this involved determining cumulative totals or modelling of impacts. In the absence of detailed information or limited access to data, a qualitative approach was adopted. This drew on the knowledge of the technical specialists involved in development of the relevant chapters of the EIS.

The significance of cumulative impacts to physical/biological, social, cultural, economic and built environment values was evaluated drawing on the methodologies detailed in the relevant chapters of Volume 2, Volume 3 and Volume 4 of the EIS that correspond with the relevant environmental or other values.

Table 5.1 Other projects included in the cumulative impact assessment

Project and proponent	Project description	Location	Project status as at December 2009	Relationship to the Australia Pacific LNG Project
Boulder Steel – Boulder Steel Limited	Construction and operation of an integrated steel-making plant at a site within the Aldoga Precinct of the Gladstone State Development Area (GSDA).	Gladstone	Under investigation	Gas pipeline, LNG facility. Potentially overlapping construction phase
Boyne Island Smelters Expansion – Boyne Smelters Limited	Proposed extension of all three reduction lines to the west of the existing plant. The project will contribute 173,000 tonnes per annum (tpa) to the smelter's total capacity of 733,000 tpa of aluminium.	Boyne Island, Gladstone	Approved 2003, project currently deferred	LNG facility. Construction could commence during Australia Pacific LNG Project timeframes.
Cameby Downs Expansion Project – Syntech Resources Pty Ltd	Expansion of Cameby Downs Coal Mine in the Surat Basin. Proposing to increase the current extraction of thermal coal from 1.8 million tonnes per year (Mtpa) to 25 Mtpa.	16km north-east of Miles	Under investigation	Gas fields. Mining tenures may overlap in some areas with the Australia Pacific LNG gas fields, construction likely to be substantially completed prior to the commencement of Australia Pacific LNG construction.
Central Queensland Gas Pipeline – Arrow Energy and AGL Energy (50:50 joint venture)	Construction of an underground, high pressure, 440km pipeline to transport coal seam methane (natural gas) from coal mining regions in northern Bowen Basin to customers in Gladstone and also to connect with south east Queensland's existing gas pipeline network.	Moranbah to Gladstone, Central Queensland	Approved, pending development decision	Gas pipeline, LNG facility. Potentially overlapping construction phase and geographic location at the Gladstone end.
Dawson South Stage 2 Coal Project – Anglo Coal Australia Pty Ltd	Proposed open cut coal mine to extend the existing Dawson South Stage 1 Coal Project. The predominant product will be a high quality thermal coal to be exported out of Gladstone over the 20-year life of the mine.	55km south-west of Biloela	Under construction	Gas pipeline. Construction likely to be completed prior to commencement of Australia Pacific LNG construction.
East End No.5 Mine	Proposed expansion of existing mine west of Gladstone to	7km south-west	Under investigation	Gas pipeline, LNG facility. Close proximity

Project and proponent	Project description	Location	Project status as at December 2009	Relationship to the Australia Pacific LNG Project
Project – Cement Australia	2.5Mtpa that provides limestone to the cement kilns, commenced EIS process and will require additional workforce during expansion stage.	of Mt Larcom, Gladstone		to the Australia Pacific LNG pipeline at the Gladstone end. Construction timeframes not specified for the Project, but could potentially overlap with Australia Pacific LNG project development.
Fisherman's Landing Port Expansion – Central Queensland Port Authority	A six-berth extension of 153ha of reclamation adjacent to existing Fisherman's Landing wharf facilities. The six berths would cater to panamax-sized vessels (80,000 DWT).	Gladstone	EIS released	LNG facility. Potentially overlapping construction phase. Close geographic proximity.
Gladstone – Fitzroy Water Pipeline – Gladstone Area Water Board	Development of a 115km pipeline from the Fitzroy River to the Gladstone Region.	Fitzroy River to Gladstone	EIS released	Gas pipeline, LNG facility. Limited geographic overlap with Australia Pacific LNG Project, except around the Gladstone area, where pipeline routes may intersect. Potentially overlapping construction phase.
Gladstone LNG (GLNG) – Santos Limited and PETRONAS (60:40 joint venture)	A large-scale coal seam gas to liquefied natural gas project. GLNG involves exploring and producing CSG in the Surat and Bowen Basins, a 425km pipeline from the gas fields to Gladstone, and a gas liquefaction and export facility on Curtis Island for up to 10 million tonnes of LNG per year.	Curtis Island, Gladstone and Surat and Bowen Basin Coalfields	EIS released	Gas fields, gas pipeline, LNG facility. There is likely to be some overlap in the construction period with the Australia Pacific LNG Project. The projects will be constructed and operated within close proximity to each other at each project component.
Gladstone LNG (Fisherman's Landing) – Arrow Energy Limited	Proposed development of a mid–scale LNG facility at Fisherman's Landing Wharf near Gladstone. The proposal has an expected life of 25 years and the first stage would produce up to 1.6Mtpa of LNG per year. A proposed	Gladstone	EIS released	LNG facility. Potentially overlapping construction phase. Close geographic proximity.

Project and proponent	Project description	Location	Project status as at December 2009	Relationship to the Australia Pacific LNG Project
	second stage to 3Mtpa. CSG from Arrow CSG.			
Gladstone Pacific Nickel Refinery – Gladstone Pacific Nickel Limited	The Gladstone refinery will process ore from Gladstone Pacific Nickel Limited's two mine sites located at Marlborough and New Caledonia. Stage 1 will produce 60,000 tonnes of nickel and 6,000 tonnes of cobalt per year. During the first few years of operation, rail will transport ore from Marlborough to Gladstone but, later, a dedicated 175km ore slurry pipeline will transport the ore	Gladstone	Approved, pending development decision	LNG facility. Close geographic proximity, potentially overlapping construction phases.
Linc Energy Underground Coal Gasification – Linc Energy	Development of a commercial underground coal gasification and gas-to-liquids synthetic fuel project. Currently under-going pilot development of 20 bbl/day demonstration plant. Full scale production could be 20,000bbl/day of synthetic diesel and 200MW of power generation.	20km south-west of Chinchilla	Under investigation	Gas fields. Project site is within the Australia Pacific LNG gas fields study area. Could potentially overlap during construction phase. Close geographic proximity.
Moura Link Aldoga Rail – Queensland Rail	Construction of new rail maintenance and provisioning facilities in Aldoga in the Gladstone State Development Area. This will link the existing Moura coal rail line and upgrade the rail link to the new Wiggins Island Coal Terminal at the Port of Gladstone.	Gladstone	EIS released	Gas pipeline, LNG facility. Limited overlap with the Australia Pacific LNG Project, except where the pipeline route may intersect the rail route around Gladstone. Potential overlap in construction phases.
Nathan Dam and Pipelines – SunWater	Construction and operation of either a mass concrete or roller compacted concrete dam, with at least one water distribution pipeline terminating at Dalby.	Dawson River near Nathan Gorge about 35km north-east of Taroom	Under investigation	Gas pipeline. Potential geographic overlap with the Nathan to Dalby water pipeline with the Australia Pacific LNG pipeline and overlapping construction periods.
Queensland Curtis LNG	Expanding the Surat Basin gas fields and constructing a	Curtis Island,	EIS released	Gas fields, gas pipeline, LNG facility. There

Project and proponent	Project description	Location	Project status as at December 2009	Relationship to the Australia Pacific LNG Project
– BG International Limited and Queensland Gas Company Limited	12 million tonnes per year LNG production facility on Curtis Island, near Gladstone. The project includes a 380km pipeline to connect the gas fields to Curtis Island, 400km of pipeline network in the gas fields, a three-train LNG facility, and wharf facilities in Port Curtis to ship the product.	Gladstone and Surat Basin Coalfields		is likely to be some overlap in the construction period with the Australia Pacific LNG Project. The projects will be constructed and operated within close proximity to each other at each project component.
Queensland Hunter Gas Pipeline – Hunter Gas Pipeline Pty Ltd	The pipeline is mainly in NSW, but will source gas from the Wallumbilla gas hub in south-east Queensland as well as gas fields further to the south in Queensland and NSW for markets in NSW. Approximately 200km of the 850km pipeline is in Queensland. The Queensland Government granted the project Pipeline Licence Number 124 for the Queensland section. The pipeline is currently proceeding through the NSW environmental approval process and has been declared a 'critical infrastructure' project in NSW.	Wallumbilla QLD to Newcastle NSW	Under investigation (NSW legislation)	Gas fields. There is no geographic overlap with the Australia Pacific LNG Project, but there could be some overlap in the construction period.
Shell LNG – Shell CSG (Australia) Pty Ltd	Development of a 16Mpta LNG facility on Curtis Island and a high pressure gas transmission pipeline from the Gladstone City Gate to the LNG facility site.	Gladstone	Under investigation	LNG facility. Located within the Curtis Island Industry Precinct in close proximity to the Australia Pacific LNG facility. Potentially overlapping construction phases.
Surat Basin Railway – Surat Basin Rail Pty Ltd	Development of a 210km railway between Banana and Wandoan as part of a new 700km export focused rail corridor between Toowoomba and Gladstone. It will open up the Surat Basin's 6.3 billion tonne of thermal coal resources for export via Gladstone.	Banana to Wandoan	EIS released	Gas pipeline. Potential overlapping construction phase and close geographic proximity along the pipeline alignment.

Project and proponent	Project description	Location	Project status as at December 2009	Relationship to the Australia Pacific LNG Project
Surat Gas Project – Arrow Energy Ltd	A CSG exploration, development and production project to expand on Arrow Energy's current operations in the Surat Basin. Initially, the project will involve the staged development of approximately 1,500 production wells and associated infrastructure. Further development is planned as domestic and export expansion opportunities arise in the energy market.	Dalby	EIS released	Gas fields. Mining tenures in close proximity to Australia Pacific LNG. Potentially overlapping construction phases leading to competition for resources.
Surat Gladstone Pipeline	Construction of a 470km x 660mm diameter buried pipeline to deliver CSG from the Surat Basin near Dalby to the Fisherman's Landing LNG facility, Gladstone.	Dalby to Gladstone	EIS released	Gas pipeline, LNG facility. Close proximity and potential geographic overlap with the Australia Pacific LNG pipeline, particularly in the Cracow, Camboon and Gladstone areas. Potentially overlapping construction phases.
Wandoan Coal Project – Xstrata Coal Queensland	Proposed development of a large, open-cut mine to supply export and possibly domestic markets. Associated with the project is the development of the Surat Basin Railway to transport the product coal approximately 390km to the Port of Gladstone for export.	West of Wandoan in the Surat Basin	EIS released	Gas fields, gas pipeline. Close geographic proximity to Australia Pacific LNG gas field tenements. Construction likely to be largely complete prior to commencement of the Australia Pacific LNG Project's construction phase.
Western Basin Dredging and Disposal Project – Gladstone Ports Corporation	Undertake dredging and land reclamation activities associated with the development of port infrastructure for LNG industry and other port industry.	Gladstone	EIS released	LNG facility. Close proximity, potentially overlapping construction phases.
Wiggins Island Coal Terminal – Gladstone	Development of a 25Mtpa coal terminal on the western side of the Calliope River. Construct and operate an	North-west of Gladstone	Approved, pending development	LNG facility. Will operate in close proximity to the Australia Pacific LNG Project.

Project and proponent	Project description	Location	Project status as at December 2009	Relationship to the Australia Pacific LNG Project
Ports Corporation and Queensland Rail	electrified rail access from the north and west and supporting infrastructure. Stage 1 25Mtpa, ultimate proposed capacity 70Mtpa.		decision	Potentially overlapping construction phases.
Woori Coal Mine – Surat Coal Pty Ltd (Cockatoo Coal Limited)	Proposed development of an open cut coal mine to product 3-6Mtpa of thermal coal for export.	Surat Basin, 15km south of Wandoan	Under investigation	Gas fields. Close geographic proximity to the Australia Pacific LNG gas field tenements, main gas transmission pipeline and lateral pipelines. Potentially overlapping construction phases.
Yarwun Alumina Stage 2 – Rio Tinto Aluminium	Stage 2 of the alumina production project is located within the Gladstone State Development Area at Yarwun precinct and involves the construction of a gas-fired cogeneration facility. Estimated production output is expected to increase to 2Mtpa from 1.4Mtpa in Stage 1.	Yarwun	Under construction	LNG facility. Construction is likely to be substantially completed prior to the commencement of the Australia Pacific LNG Project's construction phase.

Note: refer to the References section for a list of the sources used.

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HERVEY BAY
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Taroom
Injune
Roma - Taroom Road
Wandoan
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GYMPIE
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Wondai
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Mitchell
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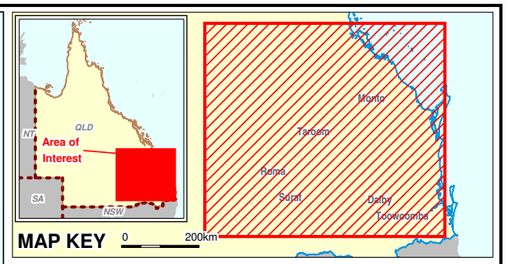

MAP KEY 0 200km

LEGEND

- Nathan dam (Proposed)
- Pipeline licence (Granted)
- Major road
- Pipeline licence (Application)
- Railway
- Major watercourse

Rail and Pipelines

- QCLNG pipeline
- Queensland Hunter Gas pipeline (Proposed)
- Surat - Gladstone pipeline
- Gladstone - Fitzroy water pipeline
- Nathan Dam pipeline
- Gas pipeline route
- Surat Basin railway (Proposed)
- GLNG pipeline
- Moura link rail (Proposed)
- Gladstone Pacific pipeline (sea water & slurry)
- Central Queensland gas pipeline

Production Areas

- Wandoan coal mine
- Linc Energy UCG
- Dawson South stage 2
- East End mine expansion
- Woori coal mine
- Cameby Downs coal mine
- Boulder Steel

Principal Holders

- Origin Energy
- Santos
- Queensland Gas Company

Production Plants

- Darling Downs power station (Proposed)
- GLNG production plant
- Shell LNG processing plant
- Boyne Island aluminium production plant
- QCLNG production plant
- Yarwun alumina refinery

Source Information

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Geocentric Datum of Australia 1994

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Figure 5.1 Cumulative impacts - gas pipeline route and gas fields

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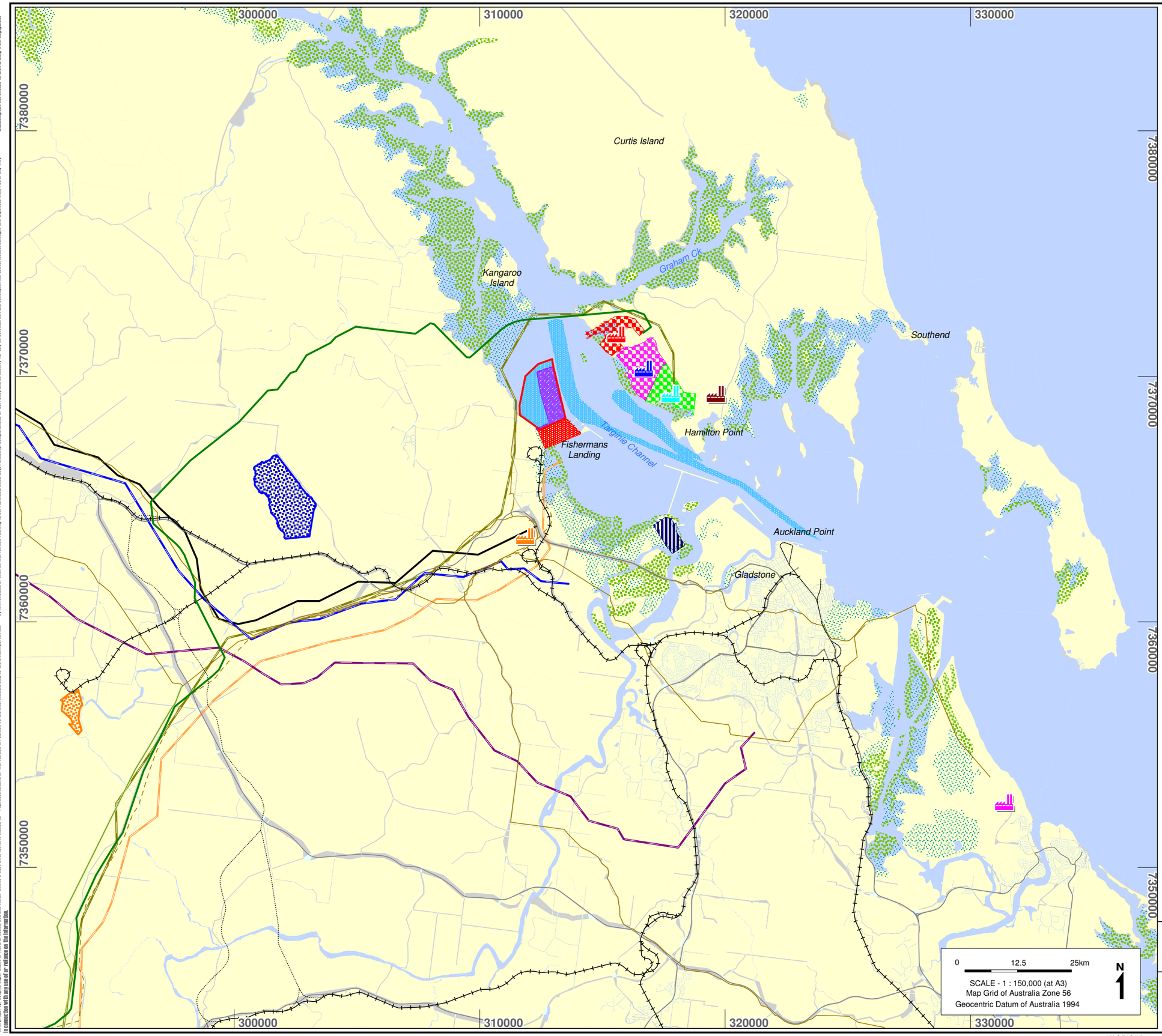

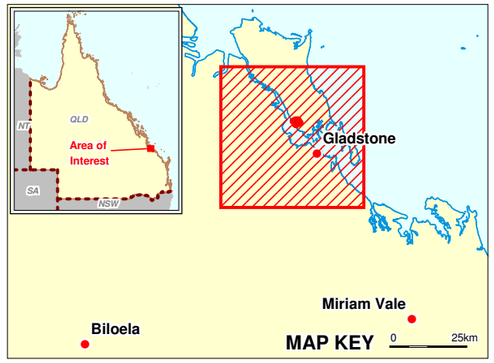

LEGEND

- Pipeline licence (Application)
- Pipeline licence (Granted)
- Railway
- Major Road
- Mangroves
- Saline coastal flats

Rail and Pipelines

- QCLNG pipeline
- Surat Basin railway (Proposed)
- Queensland Hunter Gas pipeline (Proposed)
- GLNG pipeline
- Surat - Gladstone pipeline
- Moura link rail (Proposed)
- Gladstone - Fitzroy water pipeline
- Gladstone Pacific pipeline (sea water & slurry)
- Central Queensland gas pipeline
- Gas pipeline route

Production Areas

- Boulder Steel
- East End mine expansion
- Fisherman's Landing Port expansion
- Western Basin dredging
- Wiggins Island coal terminal
- GLNG facility
- QCLNG facility
- GPC dredging
- Fisherman's Landing
- Australia Pacific LNG facility

Production Plants

- Boyne Island aluminium production plant
- GLNG production plant
- QCLNG production plant
- Shell LNG processing plant
- Yarwun alumina refinery
- Australia Pacific LNG facility

Source Information

Gas pipeline route
Supplied by Origin Energy on 03/11/2009
Boulder steel making facility
http://www.dip.qld.gov.au/resources/project/gladstone-steel-making/gladstone-steel-making-ias.pdf
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Gladstone - Fitzroy water pipeline
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Gladstone Pacific Nickel Limited nickel and cobalt laterite mine
http://gladstonepacific.com.au/index.php?submenu=environment&src=gendocs&link=environment&category=environment

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SCALE - 1 : 150,000 (at A3)
Map Grid of Australia Zone 56
Geocentric Datum of Australia 1994

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AUSTRALIA PACIFIC LNG PROJECT

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Figure 5.2 Cumulative Impacts Gladstone Area

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The cumulative assessment is discussed under the following environmental categories, which generally follow those described in the EIS:

- Land
- Landscape charter and visual amenity
- Terrestrial ecology
- Aquatic ecology
- Marine ecology
- Coastal environment
- Surface water and watercourses
- Groundwater
- Associated water
- Air quality
- Greenhouse gas emissions
- Noise and vibration
- Traffic and transport
- Waste
- Hazard and risk
- Heritage
- Social
- Economic.

In some cases, assessment of the above environmental categories involved only those projects located directly within Australia Pacific LNG's EIS project study areas for the gas fields, gas pipeline and LNG facility. This is because the cumulative effect of the particular environmental impact does not extend beyond the study area. For example, noise and vibration emissions for the gas fields do not accumulate with those in the region of the LNG facility. However, other environmental categories are such that all 30 projects must be addressed in relation to each project element as the impacts extend beyond the immediate project study area, such as greenhouse gas emissions.

The large scale of proposed developments in central and south-central Queensland also means that the cumulative social and economic impacts have to be considered for all 30 projects on a regional basis, in the context of each of the three individual cumulative assessments for the Project's gas fields, gas pipeline and the LNG facility.

5.3 Cumulative impact assessment outcomes

The nature and significance of potential cumulative impacts on the physical/biological, social, cultural, economic and built environmental values for each of the Project's main elements are discussed in:

- Volume 2 Chapter 25 – gas fields
- Volume 3 Chapter 25 – gas pipeline
- Volume 4 Chapter 25 – LNG facility.

These chapters describe the potential cumulative impacts for both the construction and operational phases associated with each of the Project's elements. Impacts on these values may arise through geographic overlap of project areas, scheduling overlap, or using the same infrastructure, services and resources.

Whilst the 30 assessed projects identified (above) represent a diverse range of project types, they can be categorised under three broad groups, as follows:

- Petroleum and mining projects
- Manufacturing projects (including mineral processing projects)
- Infrastructure and transport projects.

The summary tables presented in each chapter (above) show the values affected due to these different categories of projects on the basis that they could be constructed or operated in close proximity to, or at a similar time as, the relevant component of the Australia Pacific LNG project. Where this occurs, the cumulative impacts could be an exacerbation of adverse impacts or enhancement of beneficial impacts.

For the purposes of this assessment it has been assumed that the construction phase of all of the proposed projects and other components of the Australia Pacific LNG Project coincide, unless otherwise stated, particularly for those projects that have commenced development. This has ensured a conservative evaluation of potential adverse cumulative impacts.

For many of the environmental values (e.g. land, surface water, noise, heritage and hazard and risk), the impacts arising from the various projects are localised and mitigation strategies are required at the local level, following well established practices and complying with regulatory requirements. As a result, it is considered that the cumulative level of risk is not significantly compounded by the effects from other projects and a 'low' summary rating has been assigned to these environmental categories.

Some other values (e.g. landscape and visual, terrestrial ecology, waste and traffic and transport) have been given a 'moderate' rating because the pre-mitigation impacts may collectively be considered to represent regional-scale or basin-wide impacts rather than representing clear localised impacts. Despite the broader scale of the impact, these impacts can be mitigated by well established procedures and/or regulated approaches.

Finally, other environmental values, (e.g. groundwater and associated water – gas fields, marine ecology, coastal environment, social, economic and greenhouse gas emissions) for which one or more of the following factors has led to a 'high' rating in terms of impact significance and/or risk:

- There is a relatively high degree of complexity in relation to the characteristics of the values in question
- There is a relatively high degree of complexity in relation to the project-related cumulative impact mechanisms
- The available mitigation approaches are not well established and/or regulated and may require the ongoing cooperation of multiple parties.

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