Australia Pacific LNG

Volume 4: LNG Facility

Chapter 24: Environmental Management Plan

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24.1 Introduction

24.1.1 Objectives and scope

This environmental management plan (EM Plan) has been developed from the findings of Volume 4 of the environmental impact statement (EIS) for the construction, operation and decommissioning of the Australia Pacific LNG facility proposed for near Laird point, Curtis Island. It has been developed in accordance with the terms of reference issued for the Project and aims to meet the requirements for the EM Plans as specified in section 310D of the *Environmental Protection Act 1994 (*EP Act). It has been designed to be read as a stand-alone document and in doing so:

- Summarises all of the environmental values, potential impacts and management strategies for the LNG facility identified in the EIS
- Details the proposed performance criteria and implementation strategies to prevent or minimise environmental impacts
- Provides the government authorities and stakeholders with evidence that the environmental management for the Project is acceptable through demonstrating how Australia Pacific LNG environmental protection commitments will be achieved.

24.1.2 Environmental management plan format

Three EM Plans have been developed as part of the Australia Pacific LNG EIS: gas fields (Volume 2 Chapter 24), gas pipeline (Volume 3 Chapter 24) and LNG facility. This chapter details the EM Plan for the construction, operation and decommissioning (including rehabilitation) of the LNG facility.

The EM Plan is separated into the following components:

- Land management
- Terrestrial ecology
- Aquatic ecology
- Marine ecology
- Surface water
- Groundwater
- Coastal environment
- Air quality
- Greenhouse gases
- Noise and vibration
- Waste management
- Traffic and transport
- Indigenous cultural heritage

- Shared cultural heritage
- Safety
- Social.

Each component follows the structure as per Table 24.1. In instances where there are overlaps between the monitoring and auditing requirements these rows have been combined.

Table 24.1 Environmental plan structure

Element/issue	Aspect of construction or operation to be managed (as it affects environmental values)
Operational policy	The operational policy or management objective that applies to the element
Performance criteria	Measurable performance criteria (outcomes) for each element of the operation
Implementation strategy	The strategies, tasks or action program (to nominated operational design standards) that would be implemented to achieve the performance criteria
Monitoring	The monitoring requirements to measure actual performance (i.e. specified limits to pre-selected indicators of change)
Auditing	The auditing requirements to demonstrate implementation of agreed construction and operation environmental management strategies and compliance with agreed performance criteria
Reporting	Format, timing and responsibility for reporting and auditing of monitoring results
Corrective action	The action (options) to be implemented in case a performance requirement is not reached and the person(s) responsible for action (including staff authority and responsibility management structure)

24.1.3 Environmental management plan implementation

The elements of the EM Plan will be updated to incorporate further information, changes in environmental management measures in the light of ongoing monitoring results, new techniques and relevant legislative requirements. Implementation strategies may include a wide range of measures. Such measures must be directed to achieving the performance criteria set out in the EM Plan and statutory requirements. They may include the implementation strategies contained in the EM Plan or may include other measures, provided those other measures achieve the performance criteria and statutory requirements.

24.2 Project description and petroleum activities

Australia Pacific LNG proposes to develop a world scale long-term coal seam gas (CSG) to liquid natural gas (LNG) project in Queensland. The 30 year project will involve:

- Development of the Walloons gas fields in the Surat and Bowen Basins in the Queensland Western Downs region with up to 10,000 CSG wells
- Construction and operation of a 450km high pressured underground gas transmission pipeline to connect the Walloons gas fields with the LNG facility

- Construction and operation of an LNG facility near Laird Point, Curtis Island for export of approximately 18 million tonnes per annum (Mtpa) of LNG.

The LNG facility will be constructed and operated by ConocoPhillips Australia Pty Ltd (ConocoPhillips) on behalf of Australia Pacific LNG.

24.2.1 LNG facility

Australia Pacific LNG's proposed LNG facility is intended to be developed in stages to a nominal capacity of approximately 18Mtpa. The ultimate configuration of the LNG facility is yet to be determined, but is currently expected to comprise four LNG trains, each nominally producing 4.5Mtpa of LNG. To produce 4.5Mtpa of LNG, each train will require approximately 270 Petajoules of CSG per annum which is roughly equivalent to 11 million m^3 of LNG per annum. Initially, it is proposed to construct two LNG trains. The timing of construction of subsequent trains will depend on the LNG market and gas field development. The ultimate gas requirements and train configuration will be determined during the front end engineering and design (FEED) phase of the Project.

The LNG facility (refer Figure 24.1) will be located on Curtis Island (in the area of the Curtis Island Industry Precinct, GSDA) and in the adjacent marine area of Port Curtis. Curtis Island is approximately 10km northwest of Gladstone on the Central Queensland coast.

The site for the LNG facility will cover approximately 270ha which includes a reclamation area of approximately 39ha needed for facility infrastructure. A seabed lease of approximately 325ha is also proposed. The LNG facility footprint covers approximately 156ha of the project site on Curtis Island

The study area is comprised of Lot 3 on SP225924 and the north-western portion of Lot 4 on SP225924, which are situated within the mid-west corner of Curtis Island adjacent to Laird Point and bound by Graham Creek to the north and Targinie Passage to the west. Note that Lot 3 is the approximate location of the LNG plant and Lot 4 has been designated as the Curtis Island Infrastructure Corridor which will be a shared area for gas pipelines to all the Curtis Island LNG projects.

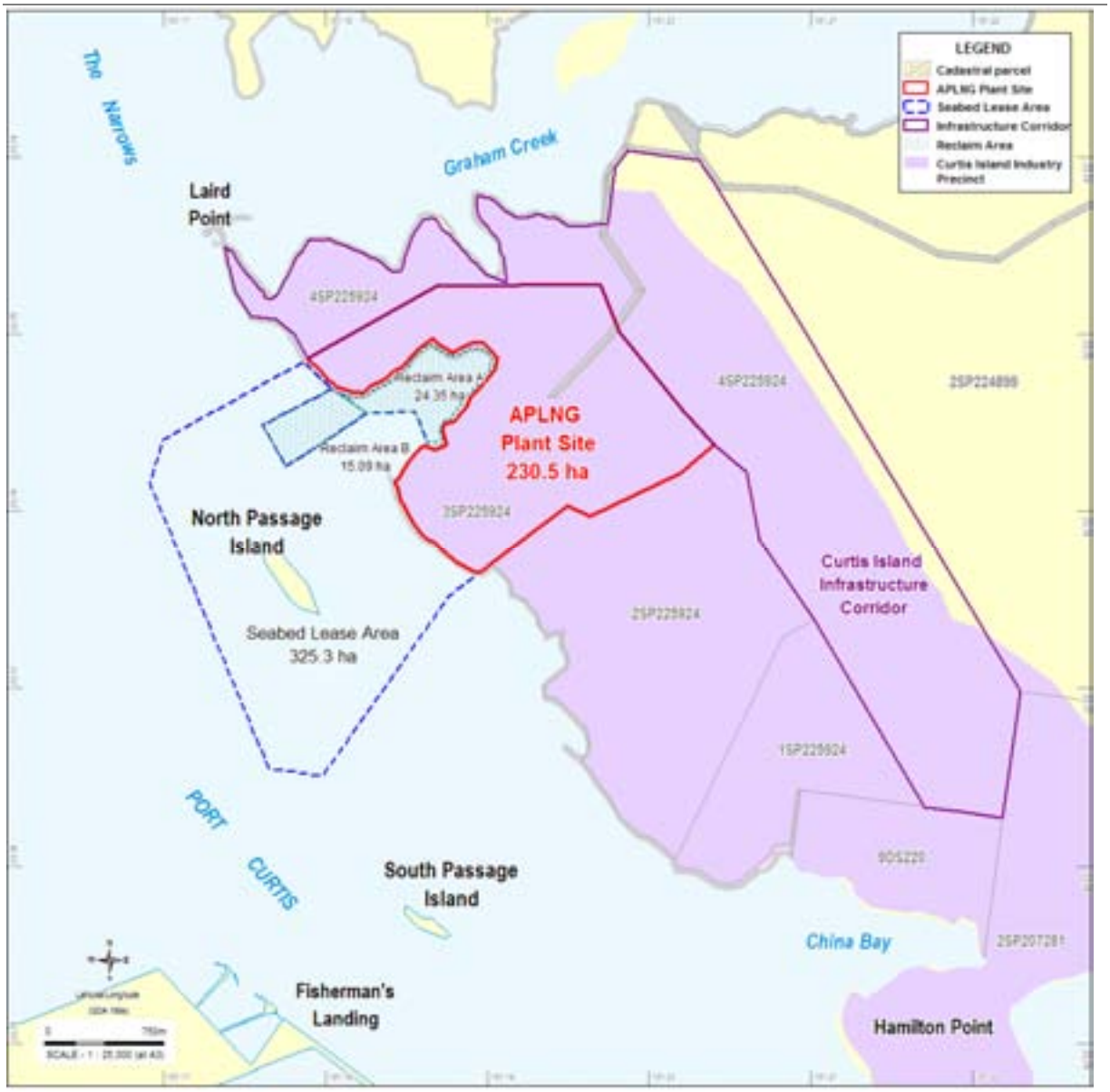


Figure 24.1 LNG facility study area

The LNG facility is planned to operate 24 hours per day, seven days a week and will utilise ConocoPhillips' proprietary Optimized Cascade® technology which is a proven and reliable technology well suited to CSG application. The Darwin LNG facility, which was developed by ConocoPhillips and its joint venture partners, utilises this technology and is of similar design to that being planned by Australia Pacific LNG for this development. Each LNG train will utilise six turbines to drive the primary refrigeration compressors.

It is anticipated that the LNG facility will consist of the following major components:

- Processing facilities (4 x 4.5Mtpa LNG trains)
- LNG storage tanks (3)
- LPG storage tanks (2)
- Marine infrastructure:

  - Loading jetty and wharfs to transfer LNG product to tankers for shipping to market or receipt of shipments of LPG
  - A materials offloading facility, which will also serve as a ferry terminal, for the transfer of construction materials and heavy equipment to/from the Project site
  - A temporary “rock dock” to facilitate early transfer of bulk aggregate and waste
- Flares - process gas, wet /dry gas and marine
- Sewage treatment plant
- Seawater desalination plant
- LNG facility site infrastructure (including the workshops, offices and warehouses, laboratory, fuel and chemical storage facilities, access roads, laboratory)
- Construction workforce offices and warehouses and temporary accommodation facilities
- Mainland facilities for the transport of materials, equipment and personnel to Curtis Island.

Dredging required for shipping access to the LNG facility will be provided for by the Gladstone Ports Corporation (GPC), as part of the Western Basin Dredging and Disposal Project for which the GPC is currently undertaking an EIS process.

24.3 Health, safety and environmental management system

The EM Plan is a document within the health, safety and environment management system (HSEMS) of the operator. As ConocoPhillips is the Australia Pacific LNG joint venture partner responsible for the construction and operation of the LNG facility on behalf of Australia Pacific LNG, this EM Plan has been developed to be consistent with other documents within ConocoPhillips’ HSEMS. This EM Plan summarises the environmental values, potential impacts and management strategies for the construction, operation and decommissioning of the Australia Pacific LNG facility. Throughout project implementation, other environmental and social management plans will be required to specifically address management strategies for specific activities or environmental aspects. These will be developed to be consistent with this EM Plan as well as the overall HSEMS.

The HSEMS outlines the systematic identification, prioritisation and control of operational health, safety and environmental risks on a continual basis. In addition, the HSEMS provides guidance and health, safety and environmental roles and responsibilities for the line organisation’s managers, employees and contractors and is a primary tool and source of information on managing HSE requirements.

The framework for the HSEMS is based on the continual improvement methodology of plan-do-assess-adjust and consists of 15 individual elements. The phases of the continual improvement loop are executed through a set of elements that interpret, support and provide further details to the requirements of the health, safety and environment policy and are illustrated in Figure 24.2.

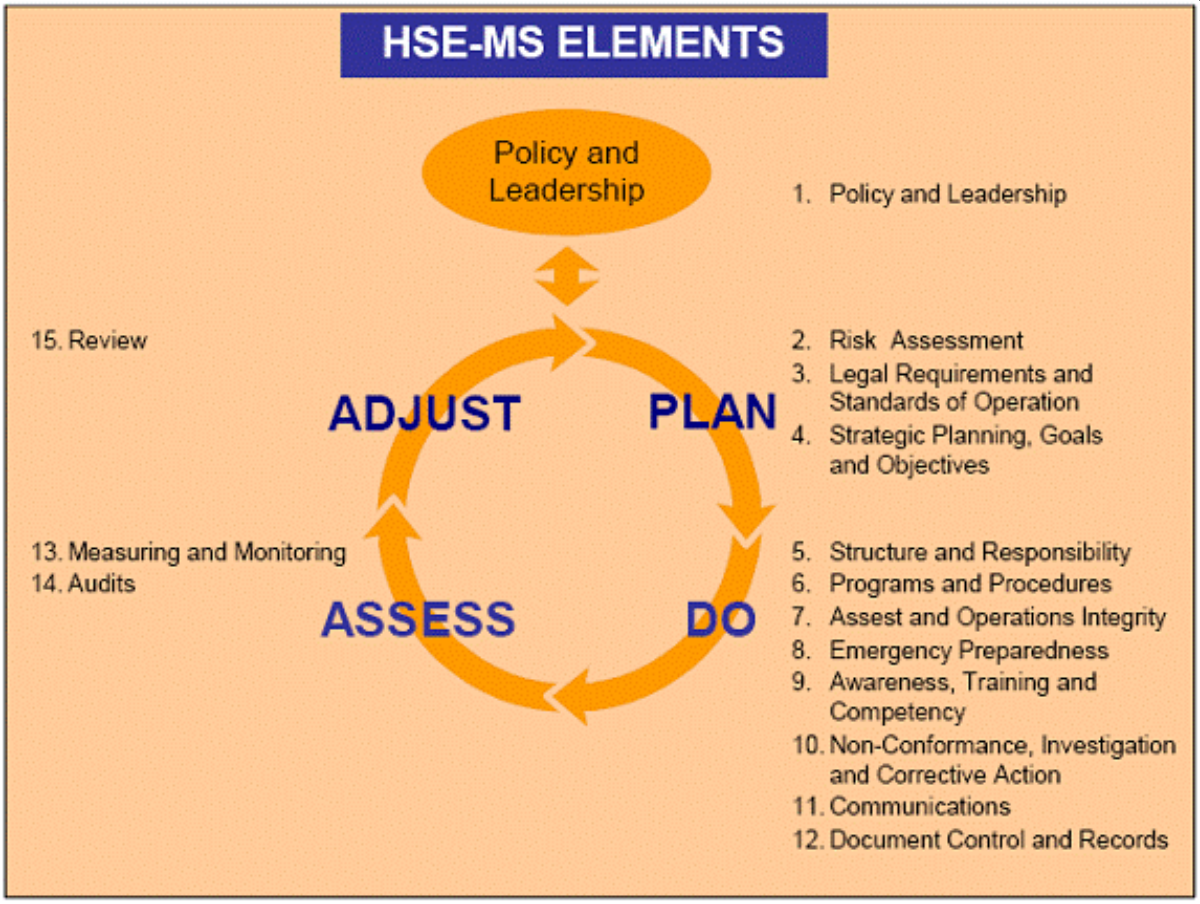


Figure 24.2 HSEMS elements and continual improvement cycle

24.3.1 Policy and leadership

ConocoPhillips has developed a health safety and environment policy that governs their efforts to improve health and safety performance as well as environmental stewardship and is shown in Figure 24.3.

ConocoPhillips was recognised by the Northern Territory Minerals Council Resource Awards of Excellence, in the category of Environmental Management for its Darwin LNG plant in 2007. This was awarded as a result of the following:

- Minimisation of greenhouse gas emissions
- Wickham Point management of heritage values, terrestrial vegetation including mapping
- Darwin Harbour conservation values.

ConocoPhillips

Health, Safety and Environment Policy

Our Commitment …

ConocoPhillips is committed to protecting the health and safety of everybody who plays a part in our operations, lives in the communities in which we operate or uses our products. Wherever we operate, we will conduct our business with respect and care for both the local and global environment and systematically manage risks to drive sustainable business growth. We will not be satisfied until we succeed in eliminating all injuries, occupational illnesses, unsafe practices and incidents of environmental harm from our activities.

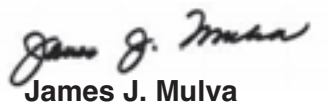
Our Plan …

To meet our commitment, ConocoPhillips will:

- Demonstrate visible and active leadership that engages employees and service providers and manage health, safety and environmental (HSE) performance as a line responsibility with clear authorities and accountabilities.
- Ensure that all employees and contractors understand that working safely is a condition of employment, and that they are each responsible for their own safety and the safety of those around them.
- Manage all projects, products and processes through their life-cycles in a way that protects safety and health and minimizes impacts on the environment.
- Provide employees with the capabilities, knowledge and resources necessary to instill personal ownership and motivation to achieve HSE excellence.
- Provide relevant safety and health information to contractors and require them to provide proper training for the safe, environmentally sound performance of their work.
- Measure, audit and publicly report HSE performance and maintain open dialogue with stakeholder groups and with communities where we operate.
- Work with both governments and stakeholders where we operate to develop regulations and standards that improve the safety and health of people and the environment.
- Maintain a secure work environment to protect ourselves, our contractors and the company's assets from risks of injury, property loss or damage resulting from hostile acts.
- Communicate our commitment to this policy to our subsidiaries, affiliates, contractors and governments worldwide and seek their support.

Our Expectations …

Through implementation of this policy, ConocoPhillips seeks to earn the public's trust and to be recognized as the leader in HSE performance.



James J. Mulva
Chairman and Chief Executive Officer
ConocoPhillips

John Carrig
President and Chief Operating Officer
ConocoPhillips

24.3.2 Risk assessment

Risk assessment is a process that evaluates the likelihood (probability and exposure) and consequences (magnitude) of positive and negative environmental effects occurring as a result of exposure to one or more hazards. Risk is defined in Australia/New Zealand Standard ISO 31000:2009 Risk management - Principles and guidelines (AS/NZS ISO 31000) as an effect of uncertainty on objectives. AS/NZS ISO 31000 provides the following additional notes to assist in understanding risk:

- Risk can be characterised by reference to potential events and consequences, or a combination of these
- Risk is often expressed as a combination of the consequence of an event and the associated likelihood of occurrence

Consistent with Australia Pacific LNG's approach to risk management, risk-based assessments have been undertaken as an essential element for all the EIS studies. Mitigation and management measures documented in this EM Plan have been developed with reference to the risks identified and assessed.

24.3.3 Legal requirements and standards of operation

The systems and procedures behind the construction activities and eventual operations are to comply with regulation and code. In addition, there are expected industry standards of care to be utilised and followed in each the construction and operations phases. These may apply to building standards and codes for health practices and requirements, such as for water quality, food service and accommodation.

24.3.4 Strategic planning, goals & objectives

During the construction and operation phases of the Project, there will be regular and periodic development of goals and objectives in a strategic planning format. These planning efforts will be focused on continuous improvement and will apply across all of the HSEMS elements.

24.3.5 Structure and responsibility

All personnel (including contractors and visitors) involved in the Project are required to adhere to the general environmental duty as specified under Section 319 of the EP Act, "A person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm (the general environmental duty)". Personnel responsibilities include:

- Complying with the requirements of environmental legislation
- Undertaking all activities in an environmentally responsible manner
- Complying with specific requirements of the development assessment approvals, and supporting documentation
- Conducting their activities in accordance with the requirements of this EM Plan
- Participating in training related to environmental awareness

Specific roles and responsibilities for the Project are provided in Table 24.2.

Table 24.2 Roles and responsibilities

Responsible Party	Responsibilities
Australia Pacific LNG	• Nominate roles and responsibilities – e.g. Environment Manager (or similar role title) • Ensure the Project is executed in accordance with the Company's environmental goals • Formulate general environmental management strategies to be detailed and implemented by the relevant contractors/operators • Develop the EM Plan for the EIS • Liaise with relevant organisations in relation to issues associated with the Project such as overall approvals and permits • Obtain relevant licences and permits associated with the construction and operation of the LNG facility • Report environmental complaints and incidents to regulatory agencies
Construction Contractor	• Nominate a Construction Manager and Environmental Manager (or similar role title) • Develop, implement, monitor and maintain effectiveness of EM Plan • Ensure the necessary resources and processes are in place to implement the construction component of the EM Plan • Ensure non-conformances are identified, recorded, reported if required and rectified • Investigate and report complaints and environmental incidents to Australia Pacific LNG • Complete EM Plan audits and provide regular communication to Australia Pacific LNG on the results
Operator (ConocoPhillips)	• Nominate an Operations Manager and Environmental Manager (or similar role title) • Develop, implement, monitor and maintain effectiveness of EM Plan • Ensure the necessary resources and processes are in place to implement the operation component of the EM Plan • Ensure non-conformances are identified, recorded, reported if required and rectified • Investigate and report complaints and environmental incidents to Australia Pacific LNG • Complete EM Plan audits and provide regular communication to Australia Pacific LNG on the results
Corporate environmental group (ConocoPhillips, on behalf of Australia Pacific LNG)	• Provide expert advice on environmental matters and corrective actions as requested • Assist with corporate environmental auditing, monitoring and training • Knowledge sharing and transfer of good practices

24.3.6 Programs and procedures

The application of various HSE programs, be it recycling, safety improvement and self-audit programs all come under this element of the HSEMS. Thorough procedures against which measures of performance and compliance can be applied and audited are important in the HSEMS.

24.3.7 Asset and operations integrity

Integration of operations and operations integrity, inclusive of maintenance procedures and regiment, into the design, quality control, construction and commissioning phases of a project all serve to support the HSEMS element of asset & operations integrity. Accounting for operations requirements and maintenance requirements, borne out of operations excellence, in the design phase, and then assuring that these are carried through to the final installation, are critical.

24.3.8 Emergency preparedness

Regardless of the phase of the Project, being in a constant state of preparedness to respond to the unexpected, in a trained and prepared manner, reduces the impact of the emergency and hastens the return of the project or operations to normal business. Developing emergency response procedures, insuring that assets and resources are in place to respond and address the emergency and that personnel are trained in both the procedures and the various plausible emergency scenarios, are all part of this HSEMS element.

24.3.9 Awareness, training and competency

All personnel involved in the Project (including contractors and visitors) will be required to undergo environmental training and induction programs that are appropriate to their level of involvement. Managers and supervisors will be responsible for ensuring that personnel under their control have the necessary skills and training to conduct their activities in accordance with the requirements of this EM Plan. They will also be responsible for identifying additional training and competency that their personnel may require.

Ongoing awareness of the EM Plan will be conducted through regular toolbox meetings with personnel.

24.3.10 Non-conformity, investigation and preventive action

Non-conformances are identified through a variety of processes including audits, inspections, complaints and incidents or emergencies.

All non-conformances are recorded, assessed for significance, investigated based on its significance, corrective actions established and tracked through to completion. Non-conformances include incidents and/or injury and may also include near misses, procedure breaches, deficiencies or other items. It is the significance or the potential risk of the non-compliance that drives the processes.

Element 10 of the ConocoPhillips HSEMS outlines the processes involved in the tracking of non-conformities, investigation and preventative actions and will be used for this EM Plan.

24.3.11 Communications

Communications incorporate both internal and external parties. Procedures will be developed by the Construction Contractor and Operator to ensure that matters relating to the implementation of the EM

Plan are communicated to all personnel. In particular, communication of complaints and environmental incidents/emergencies will be handled in the follow manner.

Complaint handling

The Construction Contractor (construction stage) and Operator (operation stage) will be responsible for the investigation and resolution of all complaints received at the site.

It is the responsibility of the Construction Contractor (construction stage) and Operator (operation stage) to develop a complaint logging and handling procedure. Complaints will be logged as follows:

- Name, address and contact number for complainant
- Time and date of complaint
- Reasons for the complaint as stated by the complainant
- Investigations undertaken in response to the complaint
- Conclusions formed
- Actions taken to resolve complaint
- Any abatement measures implemented to mitigate the cause of the complaint
- Name and contact details of the person responsible for resolving the complaint.

The Construction Contractor (construction stage) and Operator (operation stage) will be responsible for forwarding the details of the complaint, including any corrective actions undertaken, to Australia Pacific LNG.

Environmental incidents and emergencies

Environmental incidents and emergencies will be reported to the appropriate regulatory agency, as required. In the event of an incident, an environmental incident report form will be completed. The report will record the following, as a minimum:

- The name and telephone number of the designated contact person
- The location of the emergency or incident
- The date and time of the release
- The time the authority holder became aware of the emergency or incident
- The estimated quantity and type of any substances involved in the incident
- The actual or potential suspected cause of the release
- A description of the effects of the incident including any environmental harm that has occurred or may occur as a result of the release
- Any sampling conducted or proposed, relevant to the emergency or incident
- Actions taken to prevent any further release and mitigate any environmental harm caused by the release

An environmental incident register will be maintained in accordance with record control procedures.

24.3.12 Document control and records

All relevant persons/organisations involved in environmental management will maintain a document control system for recording environmental management activities, monitoring data (water sampling, etc) and relevant events (complaints, environmental incidents, etc). The system will be as simple as practicable, maintained in a legible condition and be readily interpretable by a third party.

24.3.13 Measuring and monitoring

Monitoring will occur during all stages of the Project to ensure that activities associated with the LNG facility meet the operational policy and performance criteria within each component of the EM Plan. Monitoring will be conducted by suitably qualified personnel in accordance with required sampling methodologies.

Specific monitoring requirements for the different components are detailed within each management plan. Results from all monitoring undertaken as part of this EM Plan will be maintained and be available within the timeframes required under environmental licensing requirements for the Project.

24.3.14 Audits

The Construction Contractor and Operator are responsible for monitoring and auditing the environmental performance of all persons/organisations involved in their respective stage of the Project. This auditing is separate from the auditing requirements listed under each of components of the EM Plan and is designed to evaluate whether the entire EM Plan is being implemented and maintained.

The Construction Contractor and Operator will prepare audit reports detailing the outcome of each audit.

All personnel will be encouraged to report minor events to act as an alert to environmental risks and to maintain a program of continual improvement.

24.3.15 Review

The elements of the EM Plan will be regularly reviewed and revised to reflect Project changes and new developments. Reviews, at varying levels of detail, as appropriate, will include assessing opportunities for improvement and the need for changes to the EM Plan and will be conducted at the following frequencies:

- Annually
- When feedback is received from regulatory agencies
- When conditions arising from the Project's approval and subsequent permits, authorities and/or licenses are issued
- When changes to or new operating methods are proposed for the LNG facility.

During the review of the element of the EM Plan the following items will be considered:

- Summary of complaints/incidents and response actions
- Summary of results of monitoring and auditing conducted under the EM Plan
- Assessment of the performance criteria for each component within the EM Plan

- Assessment of opportunities for improvement of environmental performance
- Suggested amendments required to the EM Plan.

24.4 Rehabilitation program and financial assurance

This EM Plan incorporates a rehabilitation program for land that is proposed to be disturbed as part of the construction and operation of the LNG facility. Table 24.33 outlines the rehabilitation program for the LNG facility.

As part of the rehabilitation program, a financial assurance for the LNG facility must also be determined and provided. This financial assurance is held as a security to cover the likely costs and expenses associated with rehabilitation of disturbed areas.

During the application stage for the environmental authority, Australia Pacific LNG will calculate the financial assurance for the construction and operation of the LNG facility. The calculation will be in accordance with the Department of Environment and Resource Management's guidelines at the time. The assurance of responsibility may be part of the land purchase agreement for the LNG facility site.

24.5 Land management

24.5.1 Environmental values

Geology

Three geologic units occur within the general area of the LNG facility. These are the Palaeozoic-age Wandilla Formation of the Curtis Island group, Quaternary alluvium and Holocene miscellaneous unconsolidated sediments.

The Holocene miscellaneous sediments ('mudflats, salt pans or swamp deposits') overlie the Wandilla Formation bedrock in the flat central western area of the LNG facility and northern areas of the LNG pipeline corridor. The Wandilla Formation has been subjected to regional metamorphism and deformation (thrust faulting) and is comprised of mudstone, quartz greywacke, pale grey chert and lithic sandstone (locally containing silicified oolites), siltstone, jasper, chert and slate and local schist. This faulting and associated metamorphism accounts for the northwest trending ridges and areas of rock outcrop within the study area.

The Quaternary alluvium, located to the east and south of the LNG facility is typically comprised of clay, silt, sand or gravel.

Holocene miscellaneous sediments comprise the estuarine channels and banks, intertidal and supratidal flats and coastal grasslands and typically comprise mud, sandy mud, muddy sand and minor gravel. By nature, these materials are often potentially acid sulfate soils and are located in the central to western portion of the study area.

Topography and geomorphology

The topography of Curtis Island is comprised of level to undulating terrain with intertidal mud flats and supratidal salt pans on the coast rising to steeply graded (>30% slope) low round hills. The LNG facility, located in a small embayment on the south western corner of Curtis Island near Laird Point, is surrounded by steeply sloping low round hills (commonly >20% slope) to the north, south and east, but the LNG facility site is predominantly comprised of gently undulating flats (<2%). The western

foreshore flats within the study area extend approximately 200m to 400m from the shore. Several small drainage lines traverse these flats.

Soils

Soils within the study area consist of hydrosols derived from Holocene aged miscellaneous unconsolidated sediments with some deposits of Quaternary alluvium material sodosols (with some chromosols and kurosols) derived from the Wandilla Formation and comprising gravely texture contrast soils located mainly at the western low round hills and rudosols derived from the Wandilla Formation and comprising unconsolidated material located at the eastern low round hills and gently undulating flats.

Land contamination

The LNG facility is generally anticipated to be free from adverse concentrations of contaminants. Based on the site history and soil analyses, the following findings have been reported:

- No development has occurred within the study area
- No notifiable activities have been conducted within the study area
- The land use was primarily bushland with some cattle grazing
- Soil and groundwater investigations indicated that hazardous contaminants were not present.

Landscape and visual amenity

The area proposed for the LNG facility comprises enclosed forested hills and valleys and intertidal land systems, such as mangroves, salt marsh and mudflats, contributing to a unique coastal landscape character. These landscape patterns are a major influence on the visual quality of the landscape.

There are extensive open views from the proposed site across the water to heavy industry and port facilities and mountain ranges to the west, and views north and east of a tree covered Curtis Island. These views visually dominate the character of the landscape.

Chapter 3 of the Curtis Coast Regional Coastal Management Plan identifies the key values of the south western portion of Curtis Island. From this, environmental values relevant to landscape and visual amenity are listed below:

- Protection of coastal landscape values
- Protection of biodiversity values and fauna habitats
- Protection of cultural heritage values
- Protection of outdoor recreational values.

24.5.2 Potential impacts

The potential impacts are as follows:

- Changes to topography
- Changes to local drainage patterns
- Degraded downstream water quality

- Contamination of soil and groundwater
- Degraded soil structure
- Destabilisation of soils
- Localised slope instability
- Increased salinity leading to poor rehabilitation and corrosion of civil structures
- Loss of topsoil quality and quantity
- Undermining of structures (roads, buildings, fencing)
- Visual intrusions on the landscape
- Displacement of aquatic and terrestrial fauna due to lighting

24.5.3 Land management

Table 24.3 Geology, topography, geomorphology, soils and land contamination management – construction

Element/issue	Geology, topography, geomorphology, soils and land contamination management – construction
Operational policy	Minimise environmental impacts caused by soil loss and erosion Minimise environmental impact arising from disturbance of acid sulfate soils No contamination of soils from construction of the LNG facility Manage any pre-existing contaminated soils such that the extent of contamination is not exacerbated
Performance criteria	LNG facility not added to the Queensland contaminated land register No contamination of land from construction activities All pre existing contaminated sites are identified prior to construction No failures of erosion and sediment control measures
Implementation strategy	**Geology** Undertake a geotechnical assessment of the main areas requiring excavation during the front end engineering and design phase. This will include identifying the type of equipment required and assessing the associated environmental effects in relation to noise and dust Reuse excavated material on-site, where practicable. A crusher may be engaged to render any excavated rock suitable for reuse on site, including use as rip-rap If rock breaking and/or blasting is required, consideration will be given to any surrounding land use which is sensitive to vibration **Seismicity** Design structures in accordance with Australian Standard AS1170.4:2007 **Extractive resources**

Element/issue	Geology, topography, geomorphology, soils and land contamination management – construction
	Consider use of mobile crushers on the Project so excess rock excavated can be utilised to minimise the need to quarry materials Reuse materials used during construction, where feasible, to reduce the need for quarried materials **Topography and geomorphology** Set proposed site levels to reduce the need to create significant cut and fill areas Reuse construction materials to reduce the volume required from off-site sources Conduct slope stability assessment on areas where clearing works are required on steep and very steep slopes **Soils** Direct stripped topsoil to areas where a similar soil is required. Where this is not practicable the topsoil will be stockpiled and kept separate from vegetation and subsoil stockpiles Manage topsoil stockpiles to maintain viability Seed topsoil stockpiles where required **Salinity** Undertake geotechnical investigations to assess suitable corrosion protection requirements. Soil will be managed to minimise potential blending between non-saline and highly saline soils **Land contamination** Store and handle chemicals and fuels (including wastes) in accordance with relevant Australian standards (e.g. AS1940:2004, AS3833:2007, AS3780:1994 etc.) Conduct refuelling of plant and vehicles in designated areas away from sensitive receptors Strategically locate spill clean up kits throughout the construction site Train staff in use of spill kits and response to spills Locate tank storage above ground Locate spray irrigation of treated waters away from sensitive receptors Undertake weed control by suitably trained contractors **Investigation procedure for contamination incidents** During construction, commissioning, operation and decommissioning, confirmed and potential contamination of land will be immediately reported to the LNG facility supervisor. The LNG facility supervisor will determine if further actions are needed in regard to fulfilling corporate and legislative responsibilities. Further actions may

Element/issue	Geology, topography, geomorphology, soils and land contamination management – construction

include, but not be limited to:

- An investigation into the cause(s) of the incident
- A qualitative assessment of the extent and severity of the incident and any impacts to environmental values
- Notification and cooperation with DERM in accordance the provisions of the EP Act
- Undertaking a detailed contamination investigation in accordance with relevant regulatory guidelines
- Where necessary, the detailed contamination investigation will determine the need for subsequent remediation and validation to retain the environmental values of the affected area

Erosion and sediment control

Develop and implement a sediment and erosion control plan for the site

Divert uncontaminated water around the construction site. Within the site, divert water around excavations and stockpiles

Stabilise diversion structures with rip-rap or equivalent to minimise erosion risk

Install appropriate erosion control measures around the stockpile areas in accordance with Engineers Australia, Queensland Division guidelines; "*Soil Sediment and Erosion Control Engineering Guidelines for Queensland Construction Sites (Sections A5 – A6)*"

Construct erosion control measures and, if required, sediment detention structures on the downhill side of the excavation areas

Use contour banks at appropriate intervals where tracks go down slopes to produce sheet flow rather than concentrated flow and directed to discharge at multiple locations at low velocities and volumes

Create stable slopes and where appropriate revegetate soon after disturbance

Use chemical surface stabilisers or physical alternatives (crushed rock) to treat stockpiles and/or exposed soil areas, such as unsealed access tracks, which are exposed for prolonged periods or have been identified as problem soils (erosive/dispersive)

Acid sulfate soils

Undertake geotechnical investigations pre-construction to assess design and construction techniques prior to construction

Undertake a detailed acid sulfate soil investigation and develop an acid sulfate management plan prior to construction

Dust control

Select on-site roads to minimise road length

Element/issue	Geology, topography, geomorphology, soils and land contamination management – construction
	Surface on-site roads with stone and/or geotextile or using surface additives Potentially resurface on-site roads with crushed rock, diverting traffic and rehabilitating bulldust areas where it is necessary to maintain access Consider applying crushed rock and diverting traffic where soils occur that are likely to generate bulldust **Drainage line management** Install temporary earth banks/contour banks, diversion channels and / or silt fences along the slope on approaches to drainage lines at the boundary between soil groups 1 and 2 and soil groups 3, 4, 5 and adjacent to Port Curtis, immediately following vegetation clearing Install temporary culvert or pipes where access roads cross drainage lines and continuity of flow is required
Monitoring and auditing	Inspect drainage lines and areas of concentrated water flow within proximity to the major facilities regularly to assess whether erosion is occurring and whether remedial action is required Inspect sediment and erosion control measures on a regular basis, replace where damaged and empty following rainfall events, if required Undertake monthly inspections of the integrity of chemical and fuel storage facilities Conduct regular water quality monitoring of pH, electrical conductivity, dissolved oxygen, temperature and turbidity around the site
Reporting	Environmental Manager will provide monthly updates to the Construction Manager on routine monitoring and auditing results Construction Manager to provide Australia Pacific LNG with regular updates on routine monitoring and auditing results Non-routine monitoring and auditing results will be communicated to the Construction Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

Table 24.4 Geology, topography, geomorphology, soils and land contamination management – operation

Element/issue	Geology, topography, geomorphology, soils and land contamination management – operation
Operational policy	Minimise environmental impacts caused by soil loss and erosion No contamination of soils from operation of the LNG facility
Performance criteria	LNG facility not added to the contaminated land register

Element/issue	Geology, topography, geomorphology, soils and land contamination management – operation
	No contamination of soils from operation activities
Implementation strategy	**Land contamination** Store and handle chemicals and fuels (including wastes) in accordance with relevant Australian standards (e.g. AS1940:2004, AS3833:2007, AS3780:1994 etc.) Strategically locate spill clean up kits throughout the LNG facility Train staff in use of spill kits and response to spills Locate tank storage above ground Direct stormwater to sediment ponds to hold and settle out suspended particles. **Investigation procedure for contamination incidents** During construction, commissioning, operation and decommissioning, confirmed and potential contamination of land will be immediately reported to the LNG facility supervisor. The LNG facility supervisor will determine if further actions are needed in regard to fulfilling corporate and legislative responsibilities. Further actions may include, but not be limited to: • An investigation into the cause(s) of the incident • A qualitative assessment of the extent and severity of the incident and any impacts to environmental values • Notification and cooperation with DERM in accordance the provisions of the EP Act • Undertaking a detailed contamination investigation in accordance with relevant regulatory guidelines • Where necessary, the detailed contamination investigation will determine the need for subsequent remediation and validation to retain the environmental values of the affected area
Monitoring and auditing	Undertake monthly inspections of the integrity of chemical and fuel storage facilities Conduct regular water quality monitoring of pH, electrical conductivity, dissolved oxygen, temperature and turbidity around the site
Reporting	Environmental Manager to provide annual reports to the Operation Manager on routine monitoring and auditing activities and results Operation Manager to provide annual reports to Australia Pacific LNG on routine monitoring and auditing activities and results Non-routine monitoring and auditing results will be communicated to the Operation Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and

Element/issue	Geology, topography, geomorphology, soils and land contamination management – operation
	corrective actions

Table 24.5 Landscape and visual management – construction

Element/issue	Landscape and visual management – construction
Operational policy	Minimise any potential impacts on visual amenity associated with the construction of the LNG facility
Performance criteria	<3 complaints per annum during construction from sensitive receptors regarding visual amenity
Implementation strategy	Reduce as far as practical the cleared areas needed to support the construction of the LNG facility Reduce mangrove clearing at the MOF to the essential width to accommodate the water interface facility Landscape the banks of cut and fill areas to reduce colour contrast with adjoining vegetation Adopt a sensitive lighting approach to reduce light spill. Measures may include providing directional or shielded lighting, minimising light pole elevations, motion sensors, timers etc.
Monitoring and auditing	Monitor the number of complaints regarding visual amenity and investigate
Reporting	Environmental Manager will provide monthly updates to the Construction Manager on routine monitoring and auditing results Construction Manager to provide Australia Pacific LNG with periodic updates on routine monitoring and auditing results Non-routine monitoring and auditing results will be communicated to the Construction Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

Table 24.6 Landscape and visual management – operation

Element/issue	Landscape and visual management – operation
Operational policy	Minimise any potential impacts on visual amenity associated with the operation of the LNG facility
Performance criteria	No complaints from sensitive receptors regarding visual amenity
Implementation strategy	Reduce as far as practical the cleared areas needed to support the operation of the LNG facility Paint buildings that are not compromised by heat absorption to lessen the contrast between these elements and the adjoining bushland

Element/issue	Landscape and visual management – operation
	Ensure that the adjoining bushland is managed and resembles the typical bushland features of the area Adopt a sensitive lighting approach to reduce light spill. Measures may include providing directional or shielded lighting, minimising light pole elevations, motion sensors, timers etc. Utilise a ground flare for flaring activities as opposed to a conventional elevated stack
Monitoring and auditing	Monitor the number of complaints regarding visual amenity and investigate
Reporting	Environmental Manager to provide annual reports to the Operation Manager on routine monitoring and auditing activities and results Operation Manager to provide annual reports to Australia Pacific LNG on routine monitoring and auditing activities and results Non-routine monitoring and auditing results will be communicated to the Operation Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

24.6 Terrestrial ecology

24.6.1 Environmental values

The LNG facility site does not transect or lie adjacent to any National or Conservation Park, State Forest or Timber Reserve, nature refuges, critical habitat areas or Ramsar listed wetlands of international significance.

The LNG facility site lies wholly within the Great Barrier Reef World Heritage Area and the intertidal area in the central and western portions of the site form part of the Port Curtis Marine Park and wetland area. The Port Curtis wetland area is listed under the directory of important wetlands and is recognised for its diverse, structured mangrove communities, seagrass populations and importance as wader bird habitat. This area also contains marine plant populations afforded protection under the Queensland *Fisheries Act 1994*.

The biodiversity planning assessment has identified special biodiversity values on site including wildlife refuges and vegetation with distinct species composition associated with geomorphology and other environmental variables.

Flora

The LNG facility site does not transect or lie adjacent to any threatened ecological communities listed under the *Environment Protection and Biodiversity Conservation Act 1999*, endangered regional ecosystems or regrowth vegetation listed under the *Vegetation Management Act 1999* (VMA) or any regional ecosystem with an endangered biodiversity status as recognised by the Department of Environment and Resource Management. The Project area is entirely covered with remnant

vegetation and of the six regional ecosystems present on site, two are considered of concern and four are considered least concern under the VMA and all are not considered at threshold under the regional vegetation management code

The LNG facility site is well vegetated with 121 flora species recorded within the site during the field survey across 51 families and 100 genera

The LNG facility site contains approximately 73.4ha of concern regional ecosystem including 28.5ha of regional ecosystem 12.3.11 and 44.9ha of regional ecosystem 12.11.14, which represents 2.4% and 1.0% of the total extent of these systems in the subregion, respectively.

24.6.2 Potential impacts

The potential impacts on terrestrial ecology are as follows:

- Decrease in total area of remnant vegetation in the bioregion and subregion
- Disturbance and/or degradation of vegetation communities
- Loss and/or disturbance of coastal wetland areas
- Loss or harm to EVR and regionally significant flora species and populations
- Disturbance and/or degradation of EVR and regionally significant flora habitat areas
- Introduction and/or spread of weed species
- Unearthing of burrowing fauna species during construction
- Removal of mature vegetation and hollow bearing trees
- Edge effects associated with a development adjoining natural areas
- Disorientation of fauna due to artificial lighting
- Disturbance of migratory shorebird habitats.

24.6.3 Terrestrial ecology management

Table 24.7 Terrestrial ecology – construction

Element/issue	Terrestrial ecology – construction
Operational policy	Minimise the impacts on abundance and distribution of terrestrial fauna and flora as a result of construction activities
Performance criteria	No clearing of native vegetation without relevant and necessary approvals No outbreaks of declared weeds as a result of LNG facility construction activities No outbreaks of pest species as a result of LNG facility construction activities
Implementation strategy	**Flora** Develop a biosecurity management plan for weed species and plant pests that includes the following as a minimum: • Training and awareness programs on weed species and plant pests and diseases

Element/issue	Terrestrial ecology – construction
	• Vehicle wash down procedures • Quarantine measures • Procedures developed in anticipation of potential outbreaks of weeds or plant pests and diseases • Management procedures for the control of weed infestations and plant pest and diseases Receive certification (if required) for vehicles and plant that they are weed free prior to commencement of works at the LNG facility site Undertake pre-clearing surveys prior to all clearing activities within remnant vegetation on site to identify the presence of endangered, vulnerable, rare and other significant flora species Locate where practicable construction infrastructure such as site offices and store construction machinery in proposed cleared areas or existing tracks and open areas with little understorey and not in retained vegetated areas Fell trees into construction areas or in natural slots between stands of trees to minimise damage to other trees during clearing activities. Machinery contact with standing trees on vegetated margins and in retained vegetation areas will be avoided where practicable Restrict vegetation clearing and construction activities where practicable to dry weather conditions to reduce the potential for erosion and sediment runoff/loss of topsoil Implement erosion control measures to reduce sediment/top soil loss through run-off. Topsoil will be retained where practicable and along with mulch and discarded vegetation debris, be spread in retained vegetated areas to ensure there is no net loss of soil quality and habitat value on site Water cleared construction areas and vehicle tracks regularly to reduce dust emissions Store, handle and dispose of hazardous substances and materials including fuels, oils and chemicals in accordance with standard procedures to minimise potential leakage to adjacent vegetated areas Equip vehicles with spark arresters (on diesel engines) and fire extinguishers and personnel will be trained in basic fire fighting Create and maintain fire breaks around infrastructure and train selected personnel in fire-fighting techniques Provide sufficient fire fighting equipment and trained personnel to respond to local fires within the LNG facility site Manage designated retained vegetated areas throughout the Project's life to promote the native biodiversity and recruitment, encourage fauna use and reduce weed invasion

Element/issue	Terrestrial ecology – construction
	Develop and implement a vegetation management offset strategy **Fauna** Conduct pre-clearing inspections by a qualified fauna spotter to identify potential nesting, roosting or refuge sites. If significant nesting sites are located, clearing operation will where practicable be timed to avoid the breeding season of the identified species Develop clearing procedures that allows mobile fauna to move away from the construction area. Engage a suitably trained fauna spotter/catcher to be present during clearing operations to provide direction on the clearing procedures, to capture and relocate fauna and to treat injured fauna found during the clearing program Minimise the clearing of hollow bearing trees where practical. The clearing plan will allow time for mobile species potentially utilising these hollows to move away from the clearing operation Undertake inspections of all hollows prior to removal of the tree. Tree sections containing hollows will be retained and placed in the designated retained vegetation for utilisation by ground dwelling fauna Develop a biosecurity management plan. This will include the participation in programs for the control of other known feral populations (like cats, foxes, cane toads, cattle, horses and pigs), prevention of new species being introduced to the area and the eradication of a new feral species outbreak associated with Project activities Adopt a sensitive lighting approach to reduce light spill. Measures may include providing directional or shielded lighting, minimising light pole elevations, motion sensors, timers etc. Limit access to the tidal mudflat to only those activities which are essential to the construction of the facility to minimise impacts of migratory fauna **Mosquito and midges** Develop a biosecurity management plan for mosquitos and midges that includes the following strategies: • Draining stagnant pools of water (where practical) to minimise breeding sites • Filling depressions created during the construction or operation of the facility as soon as practical • Storing items, including waste materials, in such a manner as to avoid ponding water • Monitoring and controlling site drainage to prevent the formation of water pooling sites in drains and water courses within the project area • Providing insect repellent as required

Element/issue	Terrestrial ecology – construction
	• Incorporating mosquito and midge barriers such as fly screens or utilise air conditioning where practical in facilities
Monitoring and auditing	Monitor and map clearance of vegetation by appropriately qualified personnel Undertake visual monitoring for any injured fauna during clearing operations Undertake regular visual inspections of the construction site for evidence of introduced weed or pest species and manage same Undertake regular inspections of the construction site for evidence of mosquito and midge breeding sites Maintain weed free certification records for vehicles and plant
Reporting	Environmental Manager will provide monthly updates to the Construction Manager on routine monitoring and auditing results Construction Manager to provide Australia Pacific LNG with periodic updates on routine monitoring and auditing results Non-routine monitoring and auditing results will be communicated to the Construction Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

Table 24.8 Terrestrial ecology – operation

Element/issue	Terrestrial ecology – operation
Operational policy	To minimise the impacts on abundance and distribution of terrestrial fauna and flora as a result of LNG facility's operational activities
Performance criteria	No outbreaks of declared weeds as a result of LNG facility operation activities No outbreaks of pest species as a result of LNG facility operation activities
Implementation strategy	Develop a biosecurity management plan. This will include the participation in programs for the control of other known feral populations (like cats, foxes, cane toads, cattle, horses and pigs), prevention of new species being introduced to the area and the eradication of a new feral species outbreak associated with Project activities Develop protocols for the cleaning and washing of vehicles and plant Receive certification, if required, for vehicles and plant that they are weed free prior to attending the Project site Restrict vehicle access to sensitive areas Undertake weed identification and flora/fauna protection measures as part of site induction

Element/issue	Terrestrial ecology – operation
Monitoring and auditing	Undertake quarterly monitoring of weeds and pests incursion at the LNG facility Maintain a register of listed weeds, including surveyed northing and easting position coordinates of known infestations and status of treatment Maintain weed free certification records for vehicles and plant
Reporting	Environmental Manager to provide annual reports to the Operation Manager on routine monitoring and auditing activities and results Operation Manager to provide annual reports to Australia Pacific LNG on routine monitoring and auditing activities and results Non-routine monitoring and auditing results will be communicated to the Operation Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

24.7 Aquatic ecology

24.7.1 Environmental values

The *Environmental Protection (Water) Policy 2009* (EPP Water) was established to achieve the objectives of the EP Act in relation to Queensland waters and provides the framework for establishing environmental values and water quality objectives for Queensland waters. No specific environmental values have been established for the freshwater areas around Port Curtis. Table 24.9 provides the environmental values scheduled under the EPP Water and the respective environmental values applicable to Port Curtis marine waters as an indication of receiving waterway values.

Table 24.9 Environmental values

EPP Water environmental values	Port Curtis environmental values
Aquatic ecosystems	Local – aquatic ecosystems within Port Curtis Regional– Great Barrier Reef Marine Park
Aquaculture use	Commercial fishing.
Primary recreation	Swimming, water sports and recreational fishing
Secondary recreation	Wading, boating
Drinking water	NA
Industrial purposes	LNG facility site water usage, cooling water for other industries, export of resources from Central Queensland
Cultural and spiritual values	Cultural significance of Port Curtis and Graham Creek, Indigenous Traditional Owners

24.7.2 Potential impacts

The potential impacts on aquatic ecology are as follows:

- Loss of low value, aquatic habitats
- Increased risk of local flooding from interruption to flows as a result of sedimentation and infilling of drainage lines
- Release of contaminants that may be attached to the soils that enter drainage lines and flow into Port Curtis
- Disturbance of acid sulfate soils which could impact the pH of the receiving environment
- Creation of mosquito breeding habitats

24.7.3 Aquatic ecology management

Table 24.10 Aquatic ecology – construction

Element/issue	Aquatic ecology – construction
Operational policy	Minimise the impacts on abundance and distribution of aquatic fauna and flora during construction of the LNG facility
Performance criteria	No unauthorised release of contaminants directly or indirectly into drainage lines
Implementation strategy	Consideration will be given to managing the impact on transient aquatic fauna when scheduling construction over the melaleuca wetlands Manage fauna found in the wetlands during construction in accordance with Table 24.7 Direct sediment laden surface water to sediment ponds prior to discharge Direct stormwater contaminated by fuel, chemicals, waste, or other hazardous or toxic materials from storage areas to a dedicated treatment facility Divert uncontaminated stormwater around the construction site Construct erosion control devices as identified in Table 24.3 or diversion drains around spoil stockpiles. Long term stockpiles will be vegetated or mulched Stabilise and rehabilitate cleared areas as soon as practicable after removal of vegetation Store and handle chemicals and fuels (including wastes) in accordance with relevant Australian standards (e.g. AS1940:2004, AS3833:2007, AS3780:1994 etc.) Strategically locate spill clean up kits throughout the construction site Design open water storage areas to be deeper than 0.6m to prevent waterborne insects breeding
Monitoring and auditing	Undertake visual integrity inspections of fuels, chemical and waste storage facilities and pollution control devices on a monthly basis Undertake quality monitoring for the parameters listed in Table 24.14 in the hydrotest pond and sediment basins in accordance with the following schedule: • Prior to release

Element/issue	Aquatic ecology – construction
	• Monthly • Within 24 hours of a rainfall event that exceeds 25mm of rainfall
Reporting	Environmental Manager will provide monthly updates to the Construction Manager on routine monitoring and auditing results Construction Manager to provide Australia Pacific LNG with periodic updates on routine monitoring and auditing results Non-routine monitoring and auditing results will be communicated to the Construction Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

Table 24.11 Aquatic ecology – operation

Element/issue	Aquatic ecology – operation
Operational policy	Minimise the impacts on abundance and distribution of aquatic fauna and flora as a result of LNG facility operation
Performance criteria	No unauthorised release of contaminants directly or indirectly into drainage lines
Implementation strategy	Direct sediment laden surface water to sediment ponds prior to discharge Direct stormwater contaminated by fuel, chemicals, waste, or other hazardous or toxic materials from storage areas to a dedicated treatment facility Divert uncontaminated stormwater around the construction site Store and handle chemicals and fuels (including wastes) in accordance with relevant Australian standards (e.g. AS1940:2004, AS3833:2007, AS3780:1994 etc.) Strategically locate spill clean up kits throughout the construction site Design open water storage areas to be deeper than 0.6m to prevent waterborne insects breeding
Monitoring and auditing	Undertake visual integrity inspections of fuel, chemical and waste storage facilities on a monthly basis Undertake quality monitoring for the parameters listed in Table 24.15 in the hydrotest pond and sediment basins in accordance with the following schedule: • Prior to discharge • Quarterly • Within 24 hours of a rainfall event that exceeds 25mm of rainfall
Reporting	Environmental Manager to provide annual reports to the Operation Manager on routine monitoring and auditing activities and results Operation Manager to provide annual reports to Australia Pacific LNG on routine

Element/issue	Aquatic ecology – operation
	monitoring and auditing activities and results Non-routine monitoring and auditing results will be communicated to the Operation Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

24.8 Marine ecology

24.8.1 Environmental values

Marine parks, wetlands and World Heritage areas

The LNG facility is situated within the Gladstone Port Limits, however all of the Port waters below the mean low water mark lie within the Great Barrier Reef World Heritage Area. The LNG facility is near the southern boundary of The Narrows section of the Great Barrier Reef Coast Marine Park, but no construction activities for the LNG facility will occur within this marine park.

Ramsar wetlands are not located within or adjacent to the proposed development site. The closest Ramsar wetlands are Corio Bay and Shoalwater Bay, which are approximately 150 km north of the site. The proposed location for the LNG facility is in part within the Curtis Island Nationally Important Wetland.

The nearest declared fish habitat areas are the Fitzroy River which includes large parts of the northern and north-western parts of Curtis Island, Colosseum Inlet and Rodds Harbour which are respectively approximately 23km, 35km and 50km from the proposed LNG facility.

Marine flora and fauna

The Port Curtis region contains extensive wetland habitats including saltmarsh, saltpan and mangroves, and extensive seagrass beds. These habitats support species of conservation significance including dugong and marine turtles, as well as fisheries production. The Port Curtis region including the proposed location of the LNG Facility is within a dugong protection area. Various marine turtle species utilise seagrass and bare sedimentary habitats for foraging. The endemic flatback turtle nests on the eastern beaches of Curtis Island in the vicinity of the South End township.

24.8.2 Potential impacts

The potential impacts on marine ecology are as follows:

- Death and/or injury of marine life through boat strikes and contamination
- Entrainment of plankton in desalination seawater intake
- Exposure of marine animals to high level noise and vibration during underwater piling
- Introduction of marine pests
- Disorientation of marine fauna due to artificial lighting
- Reduction in suitable nesting sites for turtles due to artificial lighting

- Marine animal habitat loss
- Recreational fishing access loss.

24.8.3 Marine ecology management

Table 24.12 Marine ecology – construction

Element/issue	Marine ecology – construction
Operational policy	Minimise the impacts on abundance and distribution of marine fauna and flora as a result of LNG facility construction activities
Performance criteria	No boat strikes of turtles or dugongs attributable to Project marine vessels No unplanned or unapproved removal of marine flora
Implementation strategy	Develop a marine habitat offset strategy in conjunction with relevant stakeholders Limit Project marine vessel speeds in areas where dugong and turtles are known to frequent Adopt a sensitive lighting approach to reduce light spill. Measures may include providing directional or shielded lighting, minimising light pole elevations, motion sensors, timers etc. Minimise reflective surfaces through use of matt paints where practical Develop a dredge management plan for the construction of the MOF consistent with the plan for the Western Basin Dredging and Disposal Project and including: • Dredging operation within safe weather conditions (as defined by the Harbour Master) to prevent spills • Management of tailwater decant to maintain water quality within background levels. Place geo-textile fabric on the inner face before commencement of infilling to minimise the transport of fine sediments from within the MOF Deploy silt curtains during dredging where practical to prevent migration of turbidity plumes Develop a fishing access offset strategy in conjunction with relevant stakeholders No fishing from marine facilities is permitted Optimise the position of the intake pipe in the water column for the desalination plant to minimise marine plankton intake Screen the desalinated water intake to minimise the intake of marine animals Collect waste materials off screens and filters from the desalination process and transfer to land fill, rather than into the brine stream discharged into the marine environment Store treated sewage in a tank for dechlorination purposes, as required, prior to being discharged to Port Curtis.

Element/issue	Marine ecology – construction
	Investigate and utilise noise suppression technologies (such as air-bubble curtain system, cushion block and "soft" starts) during piling of the LNG loading jetty
Monitoring and auditing	Monitor the usage of the area adjacent to the LNG facility by dolphins prior, during and after construction to determine if animals are displaced from habitat and whether this impact persists through time Develop a marine monitoring program in consultation with stakeholders and implemented during construction activities
Reporting	Environmental Manager will provide monthly updates to the Construction Manager on routine monitoring and auditing results Construction Manager to provide Australia Pacific LNG with periodic updates on routine monitoring and auditing results Non-routine monitoring and auditing results will be communicated to the Construction Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

Table 24.13 Marine ecology – operation

Element/issue	Marine ecology – operation
Operational policy	Minimise the impacts on abundance and distribution of marine fauna and flora as a result of the LNG facility operation
Performance criteria	No unplanned or unapproved removal of marine flora or fauna No sightings or evidence of introduced marine pests
Implementation strategy	Limit Project marine vessel speeds in areas where dugong and turtles are known to frequent Project marine vessels to follow pre-defined routes to reduce the spatial scale of disturbance No fishing from marine facilities is permitted Optimise the position of the intake pipe in the water column for the desalination plant to minimise marine plankton intake Screen the desalinated water intake to minimise the intake of marine animals Collect waste materials off screens and filters from the desalination process and transfer to land fill, rather than into the brine stream discharged into the marine environment Store treated sewage in a tank for dechlorination purposes, as required, prior to being discharged to Port Curtis Adopt a sensitive lighting approach to reduce light spill. Measures may include providing directional or shielded lighting, minimising light pole elevations, motion

Element/issue	Marine ecology – operation
	sensors, timers etc. All international ships must obtain a quarantine clearance from the Australian Quarantine and Inspection Service (AQIS) Compliance with all AQIS ballast water management standards
Monitoring and auditing	Develop a marine monitoring program in consultation with stakeholders and implemented during operation activities Records of quarantine clearances for ships will be maintained and verified by monthly audits
Reporting	Environmental Manager to provide annual reports to the Operation Manager on routine monitoring and auditing activities and results Operation Manager to provide annual reports to Australia Pacific LNG on routine monitoring and auditing activities and results Non-routine monitoring and auditing results will be communicated to the Operation Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

24.9 Surface water

24.9.1 Environmental values

The surface water environmental values are similar to those for aquatic ecology and can be found in Section 24.7.

Additionally, no further environmental values have been established for the Port Curtis area within the Queensland Water Quality Guidelines 2009.

There are no declared Wild Rivers within the LNG facility site.

24.9.2 Potential impacts

The potential impacts on surface water are as follows:

- Changes in flood flow distributions, possible increased flow onto adjoining properties and damage to buildings, personal injury
- Increase runoff scouring sediment from site causing increase sedimentation of watercourses
- Spills degrading the aquatic habitat and water quality
- Increased volumes of contaminated stormwater.

24.9.3 Surface water management

Table 24.14 Surface water – construction

Element/issue	Surface water – construction
Operational policy	Minimise the release of contaminants that may adversely impact on downstream surface water quality during construction of the LNG facility
Performance criteria	No failures of erosion and sediment control devices Water discharged from the hydrotest pond and sediment basins is to be equal to or better than the below parameters: pH 7 – 8.5 suspended solids <30mg/L dissolved oxygen >80% saturation turbidity <20NTU
Implementation strategy	Continue support of programs with the Port Curtis Integrated Monitoring Program Design sediment ponds in accordance with relevant guidelines and standards Direct stormwater contaminated by fuel, chemical and waste from storage areas to a dedicated treatment facility Divert natural watercourses around the construction site Implement erosion and sediment controls identified in Table 24.3 Direct runoff from construction works areas to sediment ponds for treatment prior to discharge Locate bypass drains outlets above highest astronomical tide (HAT) level in order to prevent mangrove intrusion into the lowest sections – the outlets are to include rock energy dissipation works to prevent scour and erosion downstream of the outlets that will be designed in accordance with Brisbane City Council's creek erosion control guidelines or similar. Retain hydrotest water in the hydrotest pond for further reuse - once reuse is finished the hydrotest water will be treated (if necessary) prior discharge offshore at a point with adequate flushing for rapid dispersal Store and handle chemicals and fuels (including wastes) in accordance with relevant Australian standards (e.g. AS1940:2004, AS3833:2007, AS3780:1994 etc.) Strategically locate spill clean up kits throughout the construction site
Monitoring and auditing	Undertake monthly visual integrity inspections of fuel, chemical and waste storage facilities Undertake monthly monitoring of erosion and sediment control devices Undertake daily observations of the sedimentation pond and hydrotest pond for colour, turbidity, odour, surface crusts, floating material, visible spills and rubbish Undertake quality monitoring for the parameters listed in the performance criteria in the hydrotest pond and sediment basins in accordance with the following schedule:

Element/issue	Surface water – construction
	• Prior to discharge • Monthly • Within 24 hours of a rainfall event that exceeds 25mm of rainfall
Reporting	Environmental Manager will provide monthly updates to the Construction Manager on routine monitoring and auditing results Construction Manager to provide Australia Pacific LNG with periodic updates on routine monitoring and auditing results Non-routine monitoring and auditing results will be communicated to the Construction Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

Table 24.15 Surface water – operation

Element/issue	Surface water – operation
Operational policy	Minimise the release of contaminants that may adversely impact on downstream surface water quality during operation of the LNG facility
Performance criteria	No failures of erosion and sediment control devices Water discharged from the hydrotest pond and sediment basins is not to exceed the below parameters: pH 7 – 8.5 suspended solids <30mg/L dissolved oxygen >80% saturation turbidity <20NTU
Implementation strategy	Separate spills and stormwater runoff associated with plant process areas from surface runoff and treat separately. This treated water will be used to the extent practical for on-site irrigation with treated sewage effluent Direct clean surface water runoff into swale drains to sediment basins prior to discharge from site Direct stormwater contaminated by fuel, chemical and waste from storage areas to a dedicated treatment facility Divert runoff from upstream areas around the site to prevent flooding of the LNG plant by surface runoff. Direct runoff from the LNG train, storage tank areas and southern sector of the plant to the hydrotest pond prior to reuse on-site or discharge Locate bypass drains outlets above HAT level at RL 3.0m AHD in order to prevent mangrove intrusion into the lowest sections - the outlets are to include rock energy dissipation works to prevent scour and erosion downstream of the outlets that will be designed in accordance with Brisbane City Council creek erosion control guidelines or similar.

Element/issue	Surface water – operation
	Store and handle chemicals and fuels (including wastes) in accordance with relevant Australian standards (e.g. AS1940:2004, AS3833:2007, AS3780:1994 etc.) Strategically locate spill clean up kits throughout the LNG facility
Monitoring and auditing	Undertake monthly visual integrity inspections of fuel, chemical and waste storage facilities Undertake monthly monitoring of erosion and sediment control devices Undertake daily observations of the sedimentation pond and hydrotest pond for colour, turbidity, odour, surface crusts, floating material, visible spills and rubbish Undertake quality monitoring for the parameters listed in the performance criteria in the hydrotest pond and sediment basins in accordance with the following schedule: • Prior to release • Quarterly • Within 24 hours of a rainfall event that exceeds 25mm of rainfall
Reporting	Environmental Manager to provide annual reports to the Operation Manager on routine monitoring and auditing activities and results Operation Manager to provide annual reports to Australia Pacific LNG on routine monitoring and auditing activities and results Non-routine monitoring and auditing results will be communicated to the Operation Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

24.10 Groundwater

24.10.1 Environmental values

The ground water environmental values are similar to those for the aquatic ecology and can be found in Section 24.7.

Additionally, no further environmental values have been established for the Port Curtis area within the Queensland Water Quality Guidelines 2009.

24.10.2 Potential impacts

It is not proposed to utilise the groundwater as a source of supply during construction, operational or decommissioning phases of the LNG facility. Therefore, it is not expected that there will be an impact on groundwater quality or quantity under normal operating circumstances.

24.10.3 Groundwater management

Table 24.16 Groundwater – construction

Element/issue	Groundwater – construction
Operational policy	To protect the quality of the existing groundwater resources
Performance criteria	No observable impacts to groundwater quality (baseline) as a result of construction activities
Implementation strategy	Groundwater is not proposed to be extracted as part of construction activities If dewatering of foundation excavations are required, extracted water will be directed to the on-site sediment ponds Store and handle chemicals and fuels (including wastes) in accordance with relevant Australian standards (e.g. AS1940:2004, AS3833:2007, AS3780:1994 etc.) Strategically locate spill clean up kits throughout the LNG facility Install a test groundwater bore (s) to establish a baseline of groundwater quality prior to construction
Monitoring and auditing	Conduct groundwater monitoring quarterly Undertake monthly visual integrity inspections of fuel, chemical and waste storage facilities
Reporting	Environmental Manager will provide monthly updates to the Construction Manager on routine monitoring and auditing results Construction Manager to provide Australia Pacific LNG with periodic updates on routine monitoring and auditing results Non-routine monitoring and auditing results will be communicated to the Construction Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

Table 24.17 Groundwater – operation

Element/issue	Groundwater – operation
Operational policy	To protect the quality of the existing groundwater resources
Performance criteria	No observable impacts to groundwater quality (baseline) as a result of operational activities
Implementation strategy	Groundwater is not proposed to be extracted as part of operational activities Store and handle chemicals and fuels (including wastes) in accordance with relevant Australian standards (e.g. AS1940:2004, AS3833:2007, AS3780:1994 etc.) Strategically locate spill clean up kits throughout the LNG facility

Element/issue	Groundwater – operation
Monitoring and auditing	Conduct groundwater monitoring quarterly Undertake monthly visual integrity inspections of fuel, chemical and waste storage facilities
Reporting	Environmental Manager to provide annual reports to the Operation Manager on routine monitoring and auditing activities and results Operation Manager to provide annual reports to Australia Pacific LNG on routine monitoring and auditing activities and results Non-routine monitoring and auditing results will be communicated to the Operation Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

24.11 Coastal environment

24.11.1 Environmental values

The Curtis Coast region includes areas of high conservation value as well as areas of State significance, which include strategic port land and State development areas. Areas of conservation include wetlands, seagrass beds, turtle nesting beaches, shore bird roosting areas, coral cays, and planar reefs.

The proposed development site and the Western Basin lie within the Great Barrier Reef World Heritage Area. Marine parks of State significance also border the Western Basin. The proposed site for the LNG plant coincides with a scenic coastal landscape and significant coastal wetland that is listed as an area of State significance under the Regional Coastal Management Plan.

24.11.2 Potential impacts

The potential impacts on the coastal environment are as follows:

- Receding shorelines due to increased current velocities
- Removal of intertidal area and mangroves. The intertidal area of approximately 15ha where the MOF facility is proposed would require removal of 260m of shoreline including mangroves
- Erosion of inter-tidal areas, shoals and North Passage Island shoreline
- Highly visible marine structures protruding into the coastal zone
- Restriction of recreational craft in North Passage Channel
- Release of contaminants into marine waters (e.g. hyper saline, alkalinity, metals)
- Temporary water quality decline and affect on marine ecology.

24.11.3 Coastal environment management

Table 24.18 Coastal environment – construction

Element/issue	Coastal environment – construction
Operational policy	Minimise the impacts on abundance and distribution of fauna and flora as a result of LNG facility construction activities
Performance criteria	No unplanned or unapproved disturbance to marine fauna No unplanned or unapproved removal of marine flora
Implementation strategy	Include allowance for sea level rise in design of reclamations and rock protection Ensure that dredging equipment and vessels are matched to the task Minimise reclamation footprint and maintain tidal creek and mangrove vegetation to the extent practical Utilise approved reclamation areas for disposal rather than marine environment Utilise silt curtains for inshore work where feasible Development of a dredge management plan in accordance with the Department of Environment and Resource Management's document titled "Approval of a dredge management plan guideline" Over-dredge swing basin and approaches to provide siltation storage Manage water quality associated with surface water runoff and ground water seepage through clean fill material and geotextile fabric or similar
Monitoring and auditing	Undertake sediment sampling and analysis within the swing basin Develop a marine and coastal monitoring program in consultation with stakeholders and implement during construction activities Coordinate a regional monitoring with the Port Curtis Integrated Monitoring Program
Reporting	Environmental Manager will provide monthly updates to the Construction Manager on routine monitoring and auditing results Construction Manager to provide Australia Pacific LNG with periodic updates on routine monitoring and auditing results Non-routine monitoring and auditing results will be communicated to the Construction Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

Table 24.19 Coastal environment – operation

Element/issue	Coastal environment – operation
Operational policy	Minimise the impacts on abundance and distribution of fauna and flora as a result

	of LNG facility operation
Performance criteria	No unplanned or unapproved disturbance to marine fauna No unplanned or unapproved removal of marine flora
Implementation strategy	Optimise dilution of desalination concentrate discharge through diffuser design and monitor salinity in surrounding waters Manage water quality associated with surface water runoff and ground water seepage through clean fill material and geotextile fabric or similar Minimise vessel wave wash through development and implementation of operational procedures Undertake maintenance dredging to provide vessel access
Monitoring and auditing	Develop a marine and coastal monitoring program in consultation with stakeholders and implement during operational activities.
Reporting	Environmental Manager to provide annual reports to the Operation Manager on routine monitoring and auditing activities and results Operation Manager to provide annual reports to Australia Pacific LNG on routine monitoring and auditing activities and results Non-routine monitoring and auditing results will be communicated to the Operation Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

24.12 Air quality

24.12.1 Environmental values

The air quality environmental values to be enhanced or protected are:

- The health and biodiversity of ecosystems
- Human health and wellbeing
- The aesthetics of the environment, including the appearance of buildings structures and other property
- Agricultural use of the environment.

Wind speed and direction are important parameters for the transport and dispersion of air pollutants. The predominant annual wind flows at Gladstone are from between the northeast and south-southeast with 62.0% of winds blowing from this direction. In summary the meteorological data shows the following:

- The site is dominated by moderate winds typical of a costal location, with an average wind speed of 3.7m/s. This provides for relatively good dispersion conditions for stack sources.
- The prevailing wind direction at the site is from the east to south sector.

- Winds likely to carry emissions from the LNG facility over the population centre of Gladstone occur very infrequently.

There are a number of industries currently operating within the Gladstone regional airshed including a coal-fired power station, two large alumina refineries, an aluminium smelter, an ammonium nitrate facility, coal handling and port facilities and a cement manufacturing facility. Emissions from industry include NO_X, CO, PM_{10}, SO_2 and various hydrocarbons. Further sources of air pollution include vehicle traffic and shipping bushfires, landfills, trains and dust as a result of construction activities.

24.12.2 Potential impacts

The potential impacts on air quality are as follows:

- Emissions exceed air quality objectives
- Excessive contribution to greenhouse gas emissions
- Impacts to aviation safety from flare plumes.

24.12.3 Air quality management

Table 24.20 Air quality – construction

Element/issue	Air quality – construction
Operational policy	To minimise impacts on ambient air quality as a result of construction of the LNG facility
Performance criteria	<3 complaints per annum during construction from sensitive receptors regarding dust
Implementation strategy	Periodically communicate plans and status of construction activities to the community Maintain and fit vehicles and equipment with appropriate emission control devices (e.g. vehicle exhaust system, filters etc) Sealed/revegetate exposed ground surfaces as soon as possible Treat stockpiles and / or exposed soil areas, such as unsealed access tracks, which are exposed for prolonged periods or have been identified as problem soils (erosive / dispersive) with chemical surface stabilisers or physical alternatives (crushed rock) Water construction site (including roads) on an as required basis to minimise dust generation Select on-site roads to minimise road length Surface on-site roads with stone and/or geotextile or using surface additives Potentially resurface on-site roads with crushed rock, diverting traffic and rehabilitating bulldust areas where it is necessary to maintain access Consider applying crushed rock and diverting traffic where soils occur that are likely to generate bulldust Limit vehicle speeds on site to minimise dust generation
Monitoring and auditing	Undertake visual monitoring of the construction site during potential dust generating activities Undertake monthly visual monitoring of dust deposition on vegetation

Element/issue	Air quality – construction
	Undertake monthly inspections on emission control devices to ensure they are fitted and working correctly Undertake quantitative air quality monitoring upon the receipt of complaints or at the request of a regulatory agency Monitor the number of complaints regarding air quality and investigate
Reporting	Environmental Manager will provide monthly updates to the Construction Manager on routine monitoring and auditing results Construction Manager to provide Australia Pacific LNG with periodic updates on routine monitoring and auditing results Non-routine monitoring and auditing results will be communicated to the Construction Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

Table 24.21 Air quality – operation

Element/issue	Air quality – operation
Operational policy	Minimise impacts on ambient air quality as a result of operations of the LNG facility
Performance criteria	The following ground level air quality trigger levels are:

Parameter	Averaging period	Maximum concentration (µg/m³)	Number of exceedances allowed per year
NO_2	1 hour	250	1
	Annual	62	NA
PM_{10}	24 hour	50	5
$PM_{2.5}$	24 hour	25	NA
	Annual	8	NA
CO	8 hour	11,000	1

Note: ground level concentration are impacted by ambient conditions, including impacts of other facilities, therefore investigation will be carried out if these triggers are exceeded.

No complaints from sensitive receptors regarding odour

Implementation strategy	Use CSG as the fuel source where practicable, in preference to liquid or solid fuels Install waste heat recovery units on gas turbine exhausts Use dry low-NO_x technology in refrigeration compressors and power generation turbines to reduce NO_x emissions Capture and re-liquefy excess gas generated during ship loading in the LNG process rather than being flared Capture and return of boil-off gas generated during ship loading

Element/issue	Air quality – operation
	Install monitoring points on exhaust stacks to enable continuous emission monitoring
	Implement a preventative maintenance program aimed at ensuring equipment is operating efficiently to minimise emissions to the atmosphere and the need for flaring
	Provide a ground flare instead of an elevated flare for the main vapour relief system
	Continue investigation of incorporating the marine flare in the ground flare enclosure
	Consult with CASA and Gladstone Regional Council Airport Services to determine an appropriate course of action to manage any potential impact to aviation safety
Monitoring and auditing	Undertake point source air quality monitoring annually for parameters list in the performance criteria. Modelling of the monitoring results at sensitive receptors will also be performed
	Review monitoring results for emission level triggers for National Pollution Inventory reporting
	Monitor number of complaints regarding odour and investigate
Reporting	Environmental Manager to provide annual reports to the Operation Manager on routine monitoring and auditing activities and results
	Operation Manager to provide annual reports to Australia Pacific LNG on routine monitoring and auditing activities and results
	Non-routine monitoring and auditing results will be communicated to the Operation Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

24.13 Greenhouse gases

24.13.1 Environmental values

Emissions of greenhouse gases (GHG) like carbon dioxide, methane and nitrous oxide have been strongly linked to climate change. Australia's net GHG emissions across all sectors in 2007 were reported as 597Mt CO_2-e (approximately 2% of global GHG emissions).

The scopes of GHG emissions are:

- Scope 1 GHG emissions are produced directly from combustion and fugitive sources within the LNG facility.
- Scope 2 GHG emissions arise from purchased electricity, heat and steam. These emissions are generated outside of the LNG facility. Note that the LNG facility will purchase negligible amounts of electricity, heat or steam therefore scope 2 GHG emissions are negligible.

- Scope 3 GHG emissions are related to the activities of the reporting entity but arising from sources beyond the reporting boundary – for example, extraction, processing and transport of purchased fuels.

24.13.2 Potential impacts

During 4-train operations, the peak scope 1 GHG emissions from the LNG plant are projected to be ~5.54 million tonnes CO_2-e/yr. In terms of global GHG emissions the LNG plant is forecast to increase global GHG emissions by ~0.02%. In terms of Australian national GHG emissions for 2007 (597.2 million tonnes CO_2-e), the LNG plant could increase GHG emissions by ~0.93%. Queensland's emissions in 2007 were 181.6 million tonnes CO_2-e, with the Project potentially increasing emissions by ~3%.

The Project will result in modest increases in the Queensland, Australian and global GHG emissions inventories. However, when the perspective is broadened to consider the combustion of liquefied natural gas is included, the Project could potentially reduce global GHG emissions quite substantially by displacing coal fired power generation

24.13.3 Greenhouse gas management

Table 24.22 Greenhouse gases – construction and operation

Element/issue	Greenhouse gases – construction and operation
Operational policy	Minimise greenhouse gas emissions from the construction and operation of the LNG facility
Performance criteria	Tonnes CO_2-e/tonne LNG produced are less than other LNG facilities within Australia
Implementation strategy	**Construction** Optimise transport logistics to reduce energy consumption, and use fuel efficient vehicles and machinery where practicable Develop biodiversity offset strategy which will generate greenhouse gas offsets **Operation** Recover boil-off gas generated from the LNG tanks and export vessels during LNG loading Install waste heat recovery units on the gas turbine exhaust stacks to meet process heat duty requirements Utilise aero-derivative gas turbines Utilise ground flare instead of elevated flare
Monitoring and auditing	Monitor greenhouse gas emissions in accordance with the *National Greenhouse and Energy Reporting Act 2007* Conduct fugitive greenhouse gas surveys Comparison of publicly available greenhouse gas intensity records for other LNG facilities within Australia

Element/issue	Greenhouse gases – construction and operation
Reporting	Environmental Manager to provide an annual report to the Construction/Operation Manager on routine monitoring and auditing activities and results Construction/Operation Manager to provide annual report to Australia Pacific LNG on routine monitoring and auditing activities and results Non-routine monitoring and auditing results will be communicated to the Construction/Operation Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

24.14 Noise and vibration

24.14.1 Environmental values

The environmental values to be enhanced or protected for noise are:

- The health and biodiversity of ecosystems
- Human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to sleep, study or learn, be involved in recreation, relax and converse
- The amenity of the community.

The environmental values in relation to vibration to be protected are the same as for noise.

The environmental value in relation to marine noise to be protected is to ensure that no significant behavioural disturbance occurs for marine life. The impact is deemed significant if the behavioural response may impact the long-term survival chances of the individual or species.

24.14.2 Potential impacts

The potential impacts of noise and vibration are as follows:

- Annoyance may result from an increase in heavier vehicles such as buses and trucks along the public roads leading to the mainland facilities
- Piling of the jetty and LNG/LPG tank foundations could produce sleep disturbance in the Targinie area, at Fisherman's Road and at the temporary accommodation facility and adjoining project construction camps, if conducted at night
- Noise from piling of the LNG/LPG tank foundations may also be found to be excessive at the construction camp and at adjoining project construction camps, during the evening or night
- Isolated dwellings on Tide Island and Witt Island on the east side of the north to south shipping channel may be affected by increased vessel traffic associated with construction and operation phases of the LNG facility
- Exposure of marine animals to high level noise and vibration during underwater piling

- Short term major ground flaring events may result in noise disturbance at the temporary accommodation facility or adjoining projects

24.14.3 Noise and vibration management

Table 24.23 Noise and vibration – construction

Element/issue	Noise and vibration – construction
Operational policy	Minimise excessive noise and vibration emissions during construction of the LNG facility
Performance criteria	No noise/vibration complaints from the local community as a result of the works Compliance with project specific noise criteria at noise sensitive receptors Compliance with project specific vibration criteria at sensitive receptors
Implementation strategy	**Noise – airborne** Undertake construction work hours between 6:30am-6:30pm, Monday to Saturday where practicable Periodically communicate plans and status of construction activities to the community Service equipment in accordance with manufacturer's specification to ensure they are maintained in good working order Fit noise suppression devices to equipment where appropriate If blasting is found to be required then the blasting will be designed to comply with the *Environmental Protection Act 1994* criteria **Noise – marine** Investigate and utilise noise mitigation technology for marine piling activities for the LNG loading jetty, **Vibration – marine** Strategies implemented for noise will address vibration impacts Implement measures for reducing noise which may include bubble-curtains, cushion blocks, soft starts
Monitoring and auditing	Undertake periodic qualitative noise monitoring at selected sensitive receptors Undertake quantitative monitoring when qualitative monitoring has identified a potential noise nuisance Undertake quantitative noise monitoring at the source of a noise complaint when requested by the regulatory authority to investigate a noise complaint. Monitoring will be undertaken in accordance with the latest edition of DERM Noise Management Manual or AS1055
Reporting	Environmental Manager to provide monthly reports to Construction Manager on monitoring and auditing

Element/issue	Noise and vibration – construction
	Construction Manager to provide periodic reports to Australia Pacific LNG on results of monitoring and auditing Non-routine monitoring and auditing results will be communicated to the Construction Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

Table 24.24 Noise and vibration – operation

Element/issue	Noise and vibration – operation
Operational policy	Minimise excessive noise and vibration emissions during operation of the LNG facility
Performance criteria	No noise/vibration complaints from the local community as a result of the works Compliance with project specific noise criteria at noise sensitive receptors Compliance with project specific vibration criteria at sensitive receptors
Implementation strategy	Enclose gas turbines and electricity generators and fit silencers to gas turbine inlet air paths and exhausts Install acoustic insulation lagging on large centrifugal compressor inlet, discharge and recycle piping Install acoustic blankets or equivalents on refrigerant compressor casings Install noise hoods on refrigeration compressor gearboxes
Monitoring and auditing	Noise monitoring will occur at the source of the noise complaint as directed by the regulatory authority to investigate a noise complaint. Monitoring will be undertaken in accordance with the latest edition of DERM Noise Management Manual or AS1055
Reporting	Environmental Manager to provide annual reports to the Operation Manager on routine monitoring and auditing activities and results Operation Manager to provide annual reports to Australia Pacific LNG on routine monitoring and auditing activities and results Non-routine monitoring and auditing results will be communicated to the Operation Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

24.15 Waste

24.15.1 Environmental values

The environmental values to be protected and enhanced are:

- Life, health and wellbeing of people
- Diversity of ecological processes and associated ecosystems
- Land use capability, having regard to economic considerations
- Management of finite resources.

Liquid, solid and gaseous wastes will be generated throughout the construction, operation, decommissioning and rehabilitation phases of the LNG facility. Generated wastes include regulated, general, recyclable and inert waste.

24.15.2 Potential impacts

Environmental impacts from waste will only occur as a result of poor management. The potential impacts include the following:

- Land and water (surface water and groundwater) contamination from inappropriate storage, handling and disposal of solid and liquid wastes
- Land and water (surface water and groundwater) contamination from spills during handling and transportation
- Land and water contamination (surface water and groundwater) from spills/overflows from extreme rainfall events
- Increased populations of vermin from inappropriate storage and handling of waste
- Visual amenity impacts due to poor housekeeping
- Inefficient use of resources
- Adverse effects to flora and fauna.

24.15.3 Waste management

Table 24.25 Waste management – construction

Element/issue	Waste management – construction
Operational policy	To manage construction waste so as to adhere to the waste management hierarchy and to minimise the potential for environmental harm during the construction of the LNG facility
Performance criteria	No contamination of land, air or water as a result of inappropriate waste management practices No complaints from community regarding inappropriate waste disposal practices Recycled effluent quality to be in accordance with legislative recycled water criteria
Implementation strategy	Develop and implement a waste management plan

Element/issue	Waste management – construction

Establish contracts with companies (for the supply of materials) encouraging sustainable waste management practices

Preference is to be given to materials that produce no or low amounts of waste (e.g. prefabricated etc.)

Reuse wastes on site where practicable, including:

- Mulching/chipping green waste for erosion control and landscaping
- Designated area for surplus concrete and concrete washouts with a concrete recycler to be engaged to crush the concrete for reuse on-site

Segregate wastes in separate designated areas to maximise reuse and recycling, including:

- Scrap ferrous metal
- Scrap non-ferrous metal
- Lead acid batteries
- Surplus concrete
- Paper, cardboard, glass, plastics
- Oily rags and cleaning cloths in mobile garbage bins
- Timber and green waste
- Waste oils, solvents and other chemicals
- General waste (putrescible and non putrescible)

Design waste staging and storage areas to prevent leaching or wind blown contamination

Transport and dispose of wastes by appropriately licensed contractors to licensed landfills/disposal facilities

Consult with local Councils with regards to landfill capacity and capability to receive wastes

Regularly review marketability of wastes to maximise recycling

Mill merchantable timber if viable and where there is demand

Utilise portable amenities (showers, toilets etc.) until the sewage treatment plant is operational. Effluent from these facilities will be held in holding tanks prior to disposal by a licensed contractor

No waste to be disposed of or burnt on site

Discharge of desalination concentrate will be sufficiently far offshore to prevent stagnant hyper-saline areas close inshore. The design of the out-fall will include measures for diffusion dispersion

Retain hydrotest water in the hydrotest pond and reuse for further testing. Once

Element/issue	Waste management – construction
	testing is finished the hydrotest water will be treated prior to discharge offshore at a point with adequate flushing for rapid dispersal Locate vehicle/equipment wash down area at least 20m from a watercourse with water collected and passed through an interceptor before release to the stormwater system Strategically locate spill kits throughout the construction site
Monitoring and auditing	Maintain regulated waste tracking records Record quantities of waste being sent for reuse, recycling and disposal Monitor treated effluent quality for compliance with recycled water criteria Undertake monthly visual inspections of the waste storage areas for evidence of contamination
Reporting	Environmental Manager to provide monthly reports to Construction Manager on monitoring and auditing Construction Manager to provide periodic reports to Australia Pacific LNG on results of monitoring and auditing Non-routine monitoring and auditing results will be communicated to the Construction Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

Table 24.26 Waste management – operation

Element/issue	Waste management – operation
Operational policy	To manage operational waste so as to adhere to the waste management hierarchy and to minimise the potential for environmental harm
Performance criteria	No contamination of land, air or water as a result of inappropriate waste management practices All waste disposal to be conducted by an appropriately licensed waste contractor Recycled effluent quality to be in accordance with legislative recycled water criteria
Implementation strategy	Develop and implement a waste management plan Preference is to be given to materials that produce no or low amounts of waste (e.g. prefabricated etc.) Segregate wastes in separate designated areas to maximise reuse and recycling, including: • Scrap ferrous metal • Scrap non-ferrous metal • Lead acid batteries

Element/issue	Waste management – operation
	• Surplus concrete • Paper, cardboard, glass, plastics • Oily rags and cleaning cloths in mobile garbage bins • Timber and green waste • Waste oils, solvents and other chemicals • General waste (putrescible and non putrescible) Design waste staging and storage areas to prevent leaching or wind blown contamination Transport and dispose of wastes by appropriately licensed contractors to licensed landfills/disposal facilities Direct oily wastewater to a corrugated plate interceptor (CPI). Solids from the CPI will be held in a sludge tank. Oils from the process will be directed to a waste oil storage tank. The treated water from the CPI will be sent to the dissolved air flotation unit and effluent filter to remove any remaining oil. The treated effluent will be used as irrigation water and/or will be discharged to the harbour via an outfall Strategically locate spill kits throughout the LNG facility Use treated sewage effluent for irrigation, dust suppression or discharged to the marine environment Discharge of desalination concentrate will be sufficiently far offshore to ensure good mixing and dilution with ambient marine waters. The discharge location will consider vessel and ship traffic, maintenance dredging requirements, and inter-tidal areas that are dry at low tides
Monitoring and auditing	Regulated waste tracking records Record quantities of waste being sent for reuse, recycling and disposal Treated effluent quality to be monitored for compliance with recycled water criteria Undertake periodic audits to ensure correct materials are being reused and/or recycled Undertake monthly visual inspections of the waste storage areas for evidence of contamination
Reporting	Environmental Manager to provide annual reports to the Operation Manager on routine monitoring and auditing activities and results Operation Manager to provide annual reports to Australia Pacific LNG on routine monitoring and auditing activities and results Non-routine monitoring and auditing results will be communicated to the Operation Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and

Element/issue	Waste management – operation
	corrective actions

24.16 Traffic and transport

24.16.1 Environmental values

The traffic and transport environmental values to be protected and enhanced are:

- Wellbeing of the local community and businesses
- Efficient, sustainable and supportive transport network for all members of the local and business community
- Protection of flora and fauna habitat.

There are seven key state and local government controlled link roads within the study area that will service the LNG facility during the construction and operational phases. Of these seven link roads, two are considered to have a high risk for traffic incidents.

The Gladstone Airport is the only airport that may be impacted by the construction and operation of the LNG facility. The airport is currently operated by the Gladstone Regional Council and services are currently provided by QantasLink primarily utilising Dash 8 Series Q400 aircraft that can accommodate 74 passengers.

Gladstone Port lies within a large natural harbour and is administered by Gladstone Ports Corporation. The port includes six wharf centres, which together, have 15 wharves located along the coastline. The Port of Gladstone is a major commodities' export port which had a throughput in 2007/08 of 75.5 million tonnes of cargo, which generated 1,368 ship visits.

24.16.2 Potential impacts

Traffic and transport associated with the construction and operation of the LNG facility may have the following impacts:

- Increased road congestion and delay
- Damage and increased wear and tear on the existing transport infrastructure
- Increased risk of collision or accidents for shipping, road, rail and air transport
- Reduced overall safety for users of the transport network
- Increased air quality emissions
- Increased noise, dust, land take, loss of habitat, run-off, pest and weed spread impacts.

24.16.3 Traffic and transport management

Table 24.27 Traffic and transport – construction

Element/issue	Traffic and transport – construction
Operational policy	Minimise potential impacts associated with traffic generated by the construction of the LNG facility

Element/issue	Traffic and transport – construction
Performance criteria	>80% of Project personnel use company provided transportation to commute to the ferry terminal No traffic related incidents attributable to Project activities
Implementation strategy	**Road** Provide company transportation (e.g. shuttle buses) with designated pick up and drop off points made available for construction personnel Work with federal, state, local government and industry in regard to infrastructure alterations which may be required to meet the increased demands on the regional and local transport network which may include and intersection and road alterations Work with federal, state, local government and industry in regard to infrastructure alterations which may be required to meet the increased demands on the regional and local transport network which may include pavement rehabilitation and road maintenance Development of a traffic management, transport and logistic plan during the FEED phase that includes: • Routes to be used by the heavy vehicles, with routes generally restricted to existing heavy haul routes, particularly through the Gladstone region • Restriction of heavy vehicle movements during certain time of day/week (e.g. on routes which traverse school zones, etc) • Restriction of vehicle speeds near residences • Installation of temporary/permanent signage to warn road users of increased heavy vehicle activity • Access for emergency vehicles and measures to be taken to prevent public access to project sites • Speed controls on project vehicles, management of night-time traffic along roads adjacent to residential or other sensitive land uses • Identification of alternative routes should existing routes become impassable • Fatigue management **Sea** Any vessel contracted by, or on behalf of, Australia Pacific LNG will have a structured and documented safety management system. All systems shall demonstrate that quality management and quality system elements meet the requirements of the International Maritime Organisation's regulations on the International Safety Management Code for the Safe Operation of Ships and for Pollution Prevention (MARPOL) Develop shipping operations protocols in consultation with regulatory agencies **Air**

Element/issue	Traffic and transport – construction
	Australia Pacific LNG will work with the Gladstone Regional Council and relevant government agencies and service providers to determine the most appropriate options for the use of Gladstone Regional Airport
Monitoring and auditing	Record and investigate incidents and complaints received in relation to construction traffic Record number of Project personnel who utilise company provided transportation
Reporting	Environmental Manager will provide monthly updates to the Construction Manager on routine monitoring and auditing results Construction Manager to provide Australia Pacific LNG with periodic updates on routine monitoring and auditing results Non-routine monitoring and auditing results will be communicated to the Construction Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

Table 24.28 Traffic and transport – operation

Element/issue	Traffic and transport – operation
Operational policy	Minimise potential impacts associated with traffic generated by the operation of the LNG facility
Performance criteria	No traffic related incidents attributable to Project activities
Implementation strategy	**Road** Development of a traffic management, transport and logistic plan for operations that includes: • Access for emergency vehicles and measures to be taken to prevent public access to project sites • Speed controls on project vehicles, management of night-time traffic along roads adjacent to residential or other sensitive land uses • Identification of alternative routes should existing routes become impassable • Fatigue management **Sea** Maintain an exclusion zone around the berth whilst it is unoccupied (subject to finalisation in consultation with the Regional Harbour Master) Declare a security and safety zone whilst a vessel is berthed (subject to finalisation in consultation with the Regional Harbour Master) around the vessel through which other craft should not transit. A standby tug will also be deployed to patrol the edge of the zone and to alert other craft

Element/issue	Traffic and transport – operation
	Provide navigational aides on the MOF and marine facilities
	Develop shipping operations protocols in consultation with regulatory agencies
	Comply with the draft LNG vessel operating parameters that GPC and Maritime Safety Queensland have developed
	Train pilots through shipping simulation, in co-operation with the Harbour Master, will be ongoing and as required throughout the life of the LNG facility. Pilots will be trained on LNG ship handling characteristics and emerging scenarios in the simulation
	Undertake harbour transit during daylight hours only for the first six months of operation, to allow tug masters, pilots and LNG vessel captains to gain familiarity with operation of LNG vessels in Gladstone harbour before 24-hour shipping operations commence
	Utilise the Gladstone Ports Corporation LNG proposed anchorages
	Bunkering (refuelling) will not be conducted while LNG loading or LPG unloading is in progress
	Use LNG ships with double hull protection around the forward and aft bunker fuel tanks or utilise ships powered by gas turbines that carry no or very limited quantities of bunker fuel
Monitoring and auditing	Record and investigate incidents and complaints received in relation to shipping traffic
Reporting	Environmental Manager to provide annual reports to the Operation Manager on routine monitoring and auditing activities and results
	Operation Manager to provide annual reports to Australia Pacific LNG on routine monitoring and auditing activities and results
	Non-routine monitoring and auditing results will be communicated to the Operation Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

24.17 Indigenous cultural heritage

24.17.1 Environmental values

Under Queensland's *Aboriginal Cultural Heritage Act 2003*, assessment of Indigenous cultural heritage significance is a matter solely for the Aboriginal Parties involved. Significant Indigenous sites and places in the LNG facility will be addressed in cultural heritage management plans (CHMP) negotiated with each Aboriginal Party.

A small number of Indigenous cultural heritage sites located within the LNG facility site are listed on local, State and Federal heritage registers.

24.17.2 Potential impacts

The Project will not cause any impacts to registered Indigenous cultural heritage. However, a preliminary survey of the proposed LNG facility area identified widespread Indigenous cultural heritage traces, particularly along the coastline, around the estuarine mud flats and in the northern portion. These locations are likely to be impacted by the proposed LNG facility.

In addition to the impacts to identified objects, including isolated stone artefacts, there is the potential for previously undetected objects to be revealed during the construction phase and during further site investigations to be undertaken prior to construction.

It is unlikely that any potential impacts will occur during the operation of the LNG facility as there will be no requirement to disturb land under normal operating conditions. In the event that land disturbance is required the implementation strategy contained in Table 24.29 will occur.

24.17.3 Indigenous cultural heritage management

Table 24.29 Indigenous cultural heritage – construction and operation

Element/issue	Indigenous cultural heritage – construction and operation
Operational policy	Protect the Indigenous cultural heritage values of the LNG facility site during the construction of the LNG facility
Performance criteria	Compliance with the requirements of the *Aboriginal Cultural Heritage Act 2003* and the relevant CHMP
Implementation strategy	Develop a CHMP in conjunction with identified Aboriginal parties. The CHMP will: • outline how and when any further Indigenous cultural heritage investigations are to be conducted • Describe the timing and format of information provided by the endorsed Aboriginal parties to the Project in relation to further investigations to facilitate redesign of facilities where necessary and practical • Describe management measures during and following construction • Outline post construction management following completion of the construction of the LNG facility Conduct training and awareness sessions for construction contractor on CHMP
Monitoring and auditing	Monitoring and auditing of compliance with the CHMP will be specified in the CHMP
Reporting	Reporting requirements (including responsibility and frequency) will be specified in the CHMP
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

24.18 Shared cultural heritage

24.18.1 Environmental values

Only one non-indigenous heritage site is known for the LNG facility. This is an extensive network of fences with an associated dam and stock watering trough, dating from the early-mid 20th Century.

There is a possibility that undetected, non-indigenous heritage sites remain in the Project area. These will most likely include sites associated with the pastoral history of Curtis Island. These may include further fences, cattle yards, stock watering points, machinery or loading facilities. It is possible that sites associated with the early contact period and conflict with Indigenous people might be found on the island.

The initial marine survey did not detect any sites, however sites associated with the maritime use of The Narrows may exist along the shore of Curtis Island. These may include items lost when vessels were stranded. Due to the history of The Narrows, if items did exist, it is probable that past dredging has removed any historical traces.

24.18.2 Potential impacts

Approximately 2.58km of fence lines occur in the proposed LNG facility site, and this would be destroyed by construction.

It is unlikely that any potential impacts will occur during the operation of the LNG facility as there will be no requirement to disturb land under normal operating conditions. In the event that land disturbance is required the implementation strategy contained in Table 24.30 will occur.

24.18.3 Shared cultural heritage management

Table 24.30 Shared cultural heritage – construction and operation

Element/issue	Shared cultural heritage – construction and operation
Operational policy	Protect the shared cultural heritage values of the LNG facility site
Performance criteria	Retention of shared cultural heritage values
Implementation strategy	For previously undetected site all work in the vicinity of any suspected heritage sites must cease and a temporary buffer is to be established to ensure that impacts are avoided The Australia Pacific LNG Site Manager will be notified as per notification protocols established for the Project The Australia Pacific LNG Project's cultural heritage personnel will be advised of the finding, and will inspect the suspected heritage items to assess them and ensure that the provisions of the *Queensland Heritage Act 1992* in relation to non-indigenous archaeological sites are met The Australia Pacific LNG Stakeholder & Indigenous Relations Officer will liaise with officers of DERM, as required, to ensure heritage items are properly recorded, their significance assessed and appropriate management measures implemented. These measures may include protecting and avoiding the site; investigating and recording heritage items; or excavation of the heritage items and removing these

Element/issue	Shared cultural heritage – construction and operation
	for safekeeping.
Monitoring and auditing	Personnel to remain vigilant during construction and operation activities
Reporting	**Construction** Environmental Manager and Construction Manager to be notified immediately if a suspected heritage site is located Construction Manager to notify APLNG and relevant regulatory authority if suspected heritage **Operation** Environmental Manager to provide annual reports to the Operation Manager on routine monitoring and auditing activities and results Operation Manager to provide annual reports to Australia Pacific LNG on routine monitoring and auditing activities and results
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

24.19 Safety

24.19.1 Environmental values

The environmental values to be protected and enhanced are:

- Life, health and wellbeing of people
- Diversity of ecological processes and associated ecosystems.

24.19.2 Potential impacts

Potential impacts on safety associated with the construction and operation of the LNG facility are:

- Contamination of ground and surface water or land
- Destruction/impairment of the LNG facility
- Exposure of Project personnel or the community to harmful substances
- Injury or death to members of the community from unauthorised access to the site

24.19.3 Safety management

Table 24.31 Hazard and risk management – construction and operation

Element/issue	Hazard and risk management – construction and operation
Operational policy	To ensure construction and operation of the LNG facility does not present a risk to the community and construction or operations personnel
Performance criteria	No injuries or fatalities in the community that is attributable to the LNG facility

Element/issue	Hazard and risk management – construction and operation
	construction or operation No injuries or fatalities of Project personnel as a result of the construction or operation of the LNG facility
Implementation strategy	Construct and operate the LNG facility in accordance with both Australian and international industry standards and guidelines Utilise a plant-wide gas detection system for the early detection of any leaks Utilise an emergency depressuring system, designed to rapidly dump inventory from a compromised section of the plant and dispose of it safely via the ground flare system Install passive (e.g. fire retardant materials) and active (e.g. sprinkler systems) fire protection systems Store, handle and dispose of hazardous substances and materials including fuels, oils and chemicals in accordance with standard procedures to minimise potential leakage to adjacent vegetated areas Undertake risk assessments on identified hazards and reduce them to as low as reasonably practical Develop and implement a safety management plan Consult with CASA and Gladstone Regional Council Airport Services to determine an appropriate course of action to manage any potential impact to aviation safety Develop security measures that consist of the following as a minimum: • 24 hour per day manned site during operation • Fenced site • Controlled single access point with individual electronic identity card access for personnel • Restricted vehicular access • Closed circuit televisions at strategic locations within the LNG facility
Monitoring and auditing	Review risk registers in accordance with the following: • Annual basis • Incident or emergency • Identification of non compliance with environmental authority conditions • Legislative changes (including standards and guidelines) • New or changed in processes (including addition or removal of mitigation measures) • When further risk studies are undertaken (HAZID, HAZOP, job hazard analysis etc.) Conduct periodic audits of Project personnel work practices

Element/issue	Hazard and risk management – construction and operation
	Conduct on-line and real time monitoring of plant processes Conduct annual security drills and exercises
Reporting	Environmental Manager to provide annual reports to the Construction/Operation Manager on routine monitoring and auditing activities and results Construction/Operation Manager to provide annual reports to Australia Pacific LNG on routine monitoring and auditing activities and results Non-routine monitoring and auditing results will be communicated to the Construction/Operation Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

Table 24.32 Emergency response – construction and operation

Element/issue	Emergency response – construction and operation
Operational policy	To ensure that Project personnel can respond effectively and efficiently in the event of an emergency associated with the construction or operation of the LNG facility
Performance criteria	All Project personnel are familiar with emergency response plans and their roles within their area of responsibility
Implementation strategy	Detailed emergency response plans will be developed during the detailed design phase and will consider: • Advice from local emergency service providers • Response procedures for hydrocarbon spill, equipment failure, bomb threat, terrorist attack, cyclone, tropical storm, bushfire, medical emergency, marine transportation or other likely emergency, • Engagement of local emergency service providers in emergency response exercises • Roles, responsibilities and contact details • Emergency controls and alarms • Emergency response equipment • Evacuation plans • Training requirements • Site access and security Site induction for all Project personnel to include emergency response plan details
Monitoring and auditing	Conduct annual tests of emergency response plans Review records of site inductions to ensure all Project personnel on-site have been

Element/issue	Emergency response – construction and operation
	inducted
Reporting	Environmental Manager to provide annual reports to the Construction/Operation Manager on routine monitoring and auditing activities and results Construction/Operation Manager to provide annual reports to Australia Pacific LNG on routine monitoring and auditing activities and results Non-routine monitoring and auditing results will be communicated to the Construction/Operation Manager and Australia Pacific LNG as they become available
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

24.20 Decommissioning

24.20.1 LNG facility

Table 24.33 Decommissioning– LNG facility

Element/issue	Decommissioning – LNG facility
Operational policy	Decommission the LNG facility in an environmentally sensitive manner
Performance criteria	LNG facility is not added to contaminated land register Rehabilitation in line with benchmark reference sites
Implementation strategy	At least 5 years prior to the scheduled end of project life for the LNG facility a process for the decommissioning will be established. During this process Australia Pacific LNG will negotiate with the relevant stakeholders with respect to infrastructure items that can remain in place and any rehabilitation requirements. Factors that will contribute to the methodology of the plan will include: • Available technology • Legal and regulatory requirements • Economic conditions including reuse and recycling availability • Proposed subsequent land use Subject to the subsequent land use for the facility Australia Pacific LNG will undertake site investigation and rehabilitation in accordance with the applicable regulations and guidelines at the time of decommissioning If rehabilitation is determined to be a part of the decommissioning requirements, then a rehabilitation plan will be developed that may include the following: • Removal methods for infrastructure that is not to remain at the site

Element/issue	Decommissioning – LNG facility
	• Identification of suitable land uses for the area to be rehabilitated (eg. bushfire buffer, laydown area etc) • Identification of soil types required for the above land uses • Selection of appropriate soil conditioners to allow for revegetation • Selection of suitable flora species and densities consistent with the proposed land use and regional ecosystem types • Where revegetation to its former community is required, species will be sourced locally to promote endemic and local provenance • Methods to reshape significantly disturbed land to a stable landform similar to that of surrounding undisturbed areas • Relevant planting/seeding methods • Undertake weed management practices until vegetation becomes established to minimise intrusion of weeds and pests • Implementation of suitable natural or artificial fauna devices to assist recovery of native fauna to the area • Identification of suitable benchmark reference site/s to guide rehabilitation monitoring • Methods to re-establish surface drainage lines • Identification of suitable benchmark reference site/s to guide rehabilitation monitoring • Rehabilitation will be considered successful when the site can be managed for its designated land use without any greater management input than for the benchmark reference site/s for at least 18 months
Monitoring and auditing	A monitoring program that will assess the effectiveness of decontamination efforts will be developed as part of the decommissioning plan Monitoring of the rehabilitated area and benchmark reference site/s will be undertaken on a periodic basis while still under the responsibility of Australia Pacific LNG Ongoing environmental monitoring will be undertaken for a period of time (to be specified in the decommissioning plan) after plant and equipment has been removed from the facility to detect if land contamination occurs
Reporting	Reporting of monitoring and auditing outcomes will be specified in the decommissioning plan
Corrective action	Corrective actions will be implemented in accordance with Section 24.3.10 and ConocoPhillips' HSEMS element No.10 – Non conformance, investigation and corrective actions

24.21 Social impact management plan

The Queensland State Government is working through a process for developing social impact management plans (SIMP) which is to be applied to all resource projects in Queensland. A draft SIMP has been developed for the Project to establish and define Australia Pacific LNG's management of social performance throughout the life of the Project. This is a work in progress and will continue to be developed in consultation with the government, community and other stakeholders over the life of the Project. The Project's draft SIMP framework identifies and develops the strategies required to implement the proposed mitigation measures and opportunities for enhancement. The framework has four sections: project summary, community engagement strategy, implementation and monitoring and the plan. Impact identification and assessment, mitigation strategies, responsibility, timing and performance measures are included in the Plan.

24.21.1 Project summary

Table 24.34 outlines the project summary in relation to development of the draft SIMP.

Table 24.34 Project summary

Reference	Project summary	
1.1	Location of the Project	Refer to Volume 1 Chapter 3
1.2	Brief summary of the Project	Refer to Volume 1 Chapter 3
1.3	Description of the Project's social and cultural area of influence	Refer to Volume 4 Chapter 20 and Volume 5 Attachment 42
1.4	Key social baseline study issues and statistics	Refer to Volume 4 Chapter 20 and Volume 5 Attachment 42
1.5	Potential contribution to regional development	Refer to Volume 4 Chapter 21
1.6	Overview of social impact assessment (SIA) community engagement strategy including: • key stakeholders* • issues and concerns • community views, attitudes and aspirations	Refer Volume 4 Chapter 20 – Sections 3 and 5
1.7	Overview of proposed workforce profile (construction and operations) including workforce accommodation proposals	Refer to Volume 4 Chapter 20 - Section 4

* Refer to Volume 4 Chapter 2

24.21.2 Community engagement strategy

Table 24.35 outlines the community engagement strategy in relation to development of the draft SIMP

Table 24.35 Community engagement strategy

Reference		Community engagement (CE) strategy
2.1	List of key stakeholders key interests including Indigenous stakeholders and interests	Refer to Volume 4 Chapter 20 – Section 3 Refer to Volume 4 Chapter 2
2.2	Description of proposed CE strategy that promotes active and ongoing role for community and stakeholders throughout the Project life cycle	Australia Pacific LNG's community engagement strategy is guided by its project sustainability framework, having particular regard to the following sustainability principles: • Engaging regularly, openly and transparently with people affected by our activities, considering their views in our decision-making and striving for positive social outcomes • Working cooperatively with communities, governments and other stakeholders to achieve positive social and environmental outcomes, seeking partnership approaches where appropriate Australia Pacific LNG's CE strategy is to address these principles include: • Consulting early, openly and regularly with community stakeholders, including affected communities, non-government organisations, businesses and Indigenous groups • Keeping community stakeholders informed of Project developments or activities pre-emptively through regular community briefings, including one-on-one discussions, open forum consultations, newsletters and media activities • Ensuring that consultation processes enable the participation of social equity target group representatives • Establishing participative processes that consider community ideas in key decision making outputs relating to construction, operations and decommissioning • Continuation of an 1800 dedicated telephone hotline to receive public enquiries and complaints • Investing in activities in partnership with local communities and government • Planning and implementing social infrastructure investments through partnerships and collaborative arrangements between government, industry, educational and community organisations

Reference		Community engagement (CE) strategy
		• Developing community programs in conjunction with members of the local community
2.3	Management strategies to integrate CE strategy into the Project implementation at site level, and at local regional and state levels.	**Site level** Australia Pacific LNG is committed to integrating community engagement objectives into site level construction, operations and closure activities. The following strategies and activities are proposed to ensure site level integration: • Ensuring key site level staff and contractors have a working knowledge of relevant Australia Pacific LNG community engagement policies and protocols • Ensuring employees and contractors have awareness and understanding of the Australia Pacific LNG stakeholder and Indigenous engagement strategies and receive community cultural awareness training and briefings • Regular liaison between site management and corporate office to understand the results of community baseline and impact assessments and monitoring and identified communities of interest • Ensuring that identified communities are as fully informed as practically possible about site level activities and their possible effects • Developing and maintaining a register of key stakeholders and of complaints at site level • Tracking complaints from community members and the follow-up and sign-off by relevant managers. Ensuring early referral of difficult or unresolved complaints to Corporate Communications • Participation of relevant site level managers in key community engagement activities; including community forums and any reference groups or community consultative committee meetings that may be implemented • Ensuring that internal decision making processes at site level consider the potential effects and opportunities of its activities on affected communities **Local, regional and state level** As part of its community engagement strategy, Australia Pacific LNG is committed to ensuring that Project implementation is integrated with broader local, regional and state level activities. The following strategies and activities are proposed to ensure that broader integration occurs:

Reference		Community engagement (CE) strategy
		• Meeting with and regularly updating Mayors, CEOs and relevant officers of regional Councils regarding operational issues and progress towards Project milestones • Maintaining regular dialogue with government agencies on key issues concerning relevant portfolios; including health, education, environment, infrastructure planning and transport • Participating in regional assessments and planning processes
2.4	Mechanisms to support a regular review of the CE strategy's effectiveness	Australia Pacific LNG will develop a monitoring and reporting framework that will incorporate mechanisms to regularly review community engagement strategies (refer Section 24.21.3)

24.21.3 Implementation and monitoring

Assessment of impacts

Potential impacts were assessed through a four stage process in accordance with the draft guidelines for SIMPs received from the Queensland Department of Infrastructure and Planning in November 2009. It should be noted that this methodology was adopted to ensure consistency with the draft guidelines, is consistent across the gas fields, LNG facility and main gas transmission pipeline SIA and that it differs to that adopted elsewhere in the EIS. The key stages in assessing potential impacts are summarised below.

Stage one explains each of the potential impacts, describing why these are regarded as an impact and demonstrating clearly whether the impact is positive or negative, direct or indirect, long-term or short-term, local or widespread and if it is reversible or irreversible.

Stages two and three qualify each impact based upon two assessment characteristics. These characteristics include an assessment of the probability of the impact occurring and an assessment of the actual result and scale of effect of an impact if it were to happen (that is, potential consequences).

Occurrence

The probability of occurrence for each impact is rated between low and high as follows:

- High (81-100%)
- Medium (31-80%)
- Low (0-30%).

Consequence

The potential consequences may vary between low, medium and high, as follows:

- Low

  - Isolated issues or complaint that can be resolved via routine site procedures
  - Insignificant to minor social harm
  - No threat to social licence to operate
- Medium
  - Repeated incidents or community complaints that require significant adjustment to overall site level and business level procedures
  - Moderate social harm
  - Medium threat to social license to operate
- High
  - Significant, widespread and enduring community issue or dissent
  - Major to severe or irreversible social harm
  - Direct threat to social license to operate
- Positive (+)

Implementation responsibilities

Australia Pacific LNG recognises that it has a significant role to play in the management and mitigation of impacts. However, effective impact mitigation requires the participation and collaboration of a range of stakeholders due to the complexity of many of the issues involved.

In particular, government has a significant role in the planning and delivery of core services such as health, education, emergency services, transport and infrastructure, and employment and training initiatives. Where relevant, this draft SIMP nominates the appropriate state or federal government department which has a shared responsibility for the implementation and / or monitoring of a particular mitigation strategy.

The factors which contribute to the need for a shared approach to management and mitigation include:

- The scope of CSG to LNG activities
- The staging of activities (planning, construction, operations and decommissioning)
- The breadth of current and future LNG industry and broader resource sector participants (and therefore extent of risk for cumulative impacts)
- The diverse local, regional and broader governance contexts in which the Project components exist (gas fields, pipeline and LNG facility).

Accordingly, the draft SIMP sets out the areas of responsibility for implementation of identified mitigation strategies under the following broad stakeholder categories:

- Australian Pacific LNG (this includes joint venture partners and contractors)
- Government (local, state and federal) – primary departments
- Industry (oil and gas)
- Shared responsibility could include other parties in addition to those listed above such as:

  - Other government agencies where relevant
  - Private sector
  - Community.

The relevant Government Departments include but are not limited to:

- Federal Government:
  - Department of Education, Employment and Workplace Relations
  - Department of Infrastructure, Transport, Regional Development and Local Government
- Queensland Government:
  - Department of Premier and Cabinet
  - Department of Communities
  - Department of Infrastructure and Planning
  - Department of Education and Training
  - Department of Employment, Economic Development and Innovation
  - Department of Environment & Resource Management
  - Queensland Police
  - Department of Community Safety
  - Department of Transport and Main Roads
  - Queensland Health.

Timing

The draft SIMP designates the anticipated commencement timing for the implementation of mitigation strategies under the following categories:

- Pre-construction (PC)
- Construction (C)
- Operations (O)

Mitigation strategies that continue throughout the Project lifecycle (including construction, operation and decommissioning) are further designated as life of project (LP).

Measures and targets

Australia Pacific LNG has established a range of metrics, standards and qualitative criteria as measures or indicators of the relative performance of individual mitigation strategies. In selecting indicators, consideration has been given to the following criteria:

- Relevance of the indicator to the impact being measured
- Measurability
- Reliability of data sources and ease of data collection

- Current availability of data or the resources and capacity to collect new data.

The list of indicators included in the SIMP is not intended as a prescription for evaluating Australia Pacific LNG's ongoing performance. Rather, it is an aspirational starting point in an iterative process of implementation, review, modification and improvement. Australia Pacific LNG anticipates that, over time, different phases of the project may require different or modified performance measures and that some indicators may prove too difficult to measure or not as informative as originally anticipated. Not all indicators are intended for the public domain and the classification of performance measures in this regard will be guided by Australia Pacific LNG's monitoring and reporting framework (see below).

To assist in implementation of the SIMP, Australia Pacific LNG will develop appropriate targets against which to measure and report the performance of the SIMP over time. In setting targets, Australia Pacific LNG will take a broad and balanced approach, including consideration of:

- Baseline data
- Intended outcomes of individual mitigation strategies
- Australia Pacific LNG Project sustainability framework
- Industry standards
- Community expectations and aspirations
- Government requirements

Targets will be periodically reviewed and updated to ensure ongoing relevance to impacts being measured.

Critically, the success of the Australia Pacific LNG's performance against many of the measures outlined in the SIMP depends on government, particularly State Government, delivery on measures of its' own departmental policies and plans. These include Toward Q2: Tomorrow's Queensland, which describes five ambitions for the State, covering the economy, environment and lifestyle, education and skills, health and community, Blueprint for the Bush and the Blueprint for Queensland's LNG Industry which provides an outline of how the State Government will facilitate the development of the LNG industry in Queensland and work with local communities to ensure that any development of LNG resources is beneficial. The targets and performance measures for these initiatives are described in the social baseline assessment in Volume 5 Attachment 42.

Monitoring and reporting

Australia Pacific LNG believes that effective monitoring of its activities is essential so that impacts can be accurately measured, mitigation measures assessed and meaningful reports provided to stakeholders. To this end Australia Pacific LNG will be developing a monitoring and reporting framework post EIS. The development of the framework will have regard to the following objectives:

- Build a sound understanding of the environmental, social and economic systems in which Australia Pacific LNG operates
- Share this knowledge with our communities of interest to assist in developing community capacity
- Assist in decision making with respect to project design, delivery and investments throughout the project lifecycle
- Track progress towards performance targets

- Assist Australia Pacific LNG to contribute to local and regional planning activities
- Promote an emphasis on learning, improvement and accountability
- Ensure that adaptive management occurs as part of continuous improvement
- Establish roles and responsibilities for monitoring and reporting
- Identify relevant indicators for internal versus external reporting requirements
- Report with an emphasis on outcomes and impacts, including at an intermediate outcome stage
- Assist Australia Pacific LNG to report on its overall performance against the company's sustainability framework.

Links between sustainability framework and social impact management plan

Australia Pacific LNG aspires to be at the forefront of sustainable practices, contributing to a positive future for its customers, communities, investors and people, delivering a positive benefit to people, communities and the environment. The SIMP is guided by Australia Pacific LNG's project sustainability framework, having particular regard to the following sustainability principles:

- Fostering the health and wellbeing of its workforce
- Respecting the rights, interests and diverse cultures of the communities in which Australia Pacific LNG operate
- Engaging regularly, openly and transparently with people and communities affected by Australia Pacific LNG's activities, considering their views in decision making and striving for positive social outcomes
- Working cooperatively with communities, governments and other stakeholders to achieve positive social and environmental outcomes, seeking partnership approaches where appropriate
- Upholding exemplary ethical behaviour in all aspects of business
- Identifying, assessing, managing, monitoring and reviewing risks to our workforce, our property, the environment and the communities affected by our activities
- Ensuring that all employees and contractors work consistently within the sustainability principles, commitments, values and systems

24.21.4 Draft SIMP

Table 24.36 outlines the draft SIMP for the Project.

Table 24.36 Draft social impact management plan

Identification		Assessment		Management		Responsibility	Timing (PC, C, O, LP)***	Performance measures
Impact	Project phase (Cons, Ops)*	Probability (H, M, L, +)**	Consequence (H, M, L, +)**	Management/mitigation strategies	Residual risk rating (H, M, L, +)**			
Population								
Increase in population of Gladstone	Cons Ops	H H	M L	Australia Pacific LNG will provide housing for non-local construction staff and contractors in temporary accommodation facilities and will consult with stakeholders including the local council as part of the site selection process Australia Pacific LNG will work with government, the community and other industries to plan for potential cumulative impacts and share information relating to potential impacts and mitigation measures Australia Pacific LNG will continue to participate in Local Government and regional planning processes and provide information about the Project to inform discussion and decision making in a timely manner Australia Pacific LNG will continue to use and or develop methods to attract people local to the region to the workforce Australia Pacific LNG will continue to use and/or develop methods to attract under-represented groups to the workforce	L L	Australia Pacific LNG Shared responsibility Government: • Department of Communities (Housing and Homelessness Services) • Department of Infrastructure and Planning	PC C	Percentage of construction workforce sourced from the Gladstone area Number and percentage of persons employed by Australia Pacific LNG by social equity target group, occupation and position / seniority Functional working relationships are established with government, the community and other industries Evidence of joint stakeholder outputs (planning forums, communications, action plans etc.) to identify and mitigate potential cumulative impacts Relevant cumulative impact and regional planning strategies are acknowledged and reflected in Australia Pacific LNG planning documents and related communications Track and analyse community attitudes towards consultation processes and management of construction workforce issues
Demographic profile								
Change in community demographics due to construction workforce profile	Cons Ops	H L	M L	Australia Pacific LNG will continue to use and develop methods to attract people local to the region to the workforce Australia Pacific LNG will continue to use and develop methods to attract under-represented groups to the workforce Australia Pacific LNG will uphold a high standard of behaviour and will communicate and strictly enforce its code of conduct for all staff and contractors Refer to community health and safety mitigation measures	L L	Australia Pacific LNG Shared responsibility Government: • Department of Infrastructure and Planning	PC C	Percentage of construction workforce sourced from the Gladstone Area community Percentage of construction workers accommodated at the temporary accommodation facilities Number and percentage of persons employed by Australia Pacific LNG by social equity target group, occupation and position / seniority Track and analyse breaches of the code of conduct by incident type Track and analyse community attitudes towards Australia Pacific LNG's position and processes in relation to recruitment and workforce management

Identification	Assessment			Management		Responsibility	Timing (PC, C, O, LP)***	Performance measures
Impact	**Project phase (Cons, Ops)***	**Probability (H, M, L, +)****	**Consequence (H, M, L, +)****	**Management/mitigation strategies**	**Residual risk rating (H, M, L, +)****			
								Also refer to community health and safety performance measures
Income and affordability								
Increase in cost of living due to inflationary pressure from higher average weekly incomes	Cons Ops	M L	M M	Australia Pacific LNG will provide housing for non-local construction staff and contractors in temporary accommodation facilities and will consult with stakeholders including the local council as part of the site selection process for these facilities Australia Pacific LNG will work through committees established under the Sustainable Resource Communities Policy to identify housing market issues, forecasts and possible responses To mitigate potential impacts on housing affordability and availability, Australia Pacific LNG community programs will include working with Government and agencies that provide housing to people in financial distress	L L	Australia Pacific LNG Shared responsibility Government: • Department of Communities (Housing and Homelessness Services) • Department of Infrastructure and Planning	PC O LP	Percentage of construction workers accommodated at the temporary accommodation facilities Functional working relationships established with local councils, state government, relevant agencies and committees
Social divide resulting from increased wage gap (for example, the haves and have nots)	Cons Ops	M L	M M	Australia Pacific LNG will continue to use and develop methods to attract people local to the region to the workforce Australia Pacific LNG will implement a local content strategy whereby we participate in or establish programs which assist qualified local and regional businesses with the opportunity to tender for provision of goods and services for the Project Australia Pacific LNG will continue to use and develop methods to attract under-represented groups to the workforce Australia Pacific LNG will aim to build collaborative partnerships with government and community organisations to enhance the capacity of employers to provide jobs and the capacity of locals to develop skills and secure jobs Australia Pacific LNG's community investment programs will support sustainable community development To mitigate potential impacts on housing affordability and availability, Australia Pacific LNG community programs will include working with Government and agencies that provide housing to people in housing distress	L L	Australia Pacific LNG Shared responsibility Government: • Department of Education and Training • Department of Employment, Economic Development and Innovation • Department of Communities (Housing and Homelessness Services)	PC O LP	Percentage of workforce sourced from the Gladstone region Number and percentage of persons employed by Australia Pacific LNG by social equity target group, occupation and position / seniority Functional working relationships established with government and community organisations and evidence of partnership projects Evaluate Australia Pacific LNG community investment programs to assess the achievement of program goals and objectives See also local content strategy and employment and training indicators under employment, training and business impacts
Employment training and business								
Opportunity to	Cons	M	+	Australia Pacific LNG workforce strategy will address:	+	Australia Pacific LNG	PC	**Employment**

Identification		Assessment		Management		Responsibility	Timing (PC, C, O, LP)***	Performance measures
Impact	Project phase (Cons, Ops)*	Probability (H, M, L, +)**	Consequence (H, M, L, +)**	Management/mitigation strategies	Residual risk rating (H, M, L, +)**			
increase labour-force participation and increase local skills capacity	Ops	M	+	In-house training programs including potential opportunities for on site training on an existing LNG facility Analysis of ongoing labour requirements Training strategies targeted to local labour Targeted employment and training programs Methods to attract people local to the region to the workforce Methods to attract under-represented groups to the workforce Australia Pacific LNG will work with government, the community and other industries to plan for potential cumulative impacts and share information relating to potential impacts and mitigation measures Australia Pacific LNG will work together with the CSG/LNG industry through the CSG/LNG Skills Taskforce of Energy Skills Queensland to help address skill shortages by: Raising awareness of the CSG/LNG industry in the local community Supporting vocational training Facilitating career advice and work readiness programs for new entrants and mature entrants from related industries Australia Pacific LNG will participate in CSG/LNG gateway programs with high schools in the Project region to implement programs that promote career opportunities and facilitate employment in the CSG/LNG industry. Australia Pacific LNG will continue to collaborate on programs with government, training and education groups that build the local skills base both to meet the specific needs of the industry and other impacted sectors. This will include further development of apprenticeship, traineeship, scholarship and higher education programs Establish a construction employment facility within Gladstone to raise awareness on job prospects and for prospective employees to source information and lodge job applications	+	Shared responsibility Government: • Department of Education and Training Industry	O LP	Number of persons employed via the government sponsored employment programs by length of time unemployed. Number and percentage of persons employed by Australia Pacific LNG by social equity target group, occupation and position / seniority Functional working relationships are established with other industries Evidence of joint industry outputs (planning forums, communications, action plans, etc.) to identify and mitigate potential cumulative impacts **Training** Number of Gladstone area residents participating in skills development programs offered by Australia Pacific LNG Number of Gladstone Area residents participating in skills development programs offered by Australia Pacific LNG by social equity target group and occupation Number and percentage of apprentices and trainees starting, graduating and finding continuous employment with Australia Pacific LNG by occupation / operational area Evaluate Australia Pacific LNG community investment programs to assess the achievement of program goals and objectives Number of students given work experience and/or receiving scholarship or financial support

Identification		Assessment		Management		Responsibility	Timing (PC, C, O, LP)***	Performance measures
Impact	Project phase (Cons, Ops)*	Probability (H, M, L, +)**	Consequence (H, M, L, +)**	Management/mitigation strategies	Residual risk rating (H, M, L, +)**			
Opportunities for local and regional businesses to supply goods and services to the Project	Cons Ops	H M	+ +	Australia Pacific LNG will implement a local content strategy whereby it participates in or establishes programs which assist qualified local and regional businesses with the opportunity to tender for provision of goods and services for the Project The local content strategy will include provision such as regular Project updates, overview of goods and services packages, supply chain education Australia Pacific LNG will ensure contracts with suppliers and sub-contractors are aligned with Australia Pacific LNG's 12 sustainability principles	+ +	Australia Pacific LNG Shared responsibility Government: • Department of Employment, Economic Development and Innovation	PC O LP	Percentage and dollar value of supplier contracts (Australia Pacific LNG and its contractors) awarded to businesses based in the Gladstone area Track and analyse local business community attitudes towards the availability of supplier information and engagement with procurement of the local content strategy, including existing suppliers and non-suppliers
Inflationary pressure on commercial real estate costs impacts on local businesses	Cons	L	L	Australia Pacific LNG will continue to participate in local government and regional planning processes by providing information regarding demand for commercial real estate	L	Shared responsibility Government: • Department of Infrastructure and Planning	PC O LP	Functional working relationships are established with government planning bodies and development industry stakeholders
Impact to local and regional businesses losing employees to the Project	Cons Ops	M L	M L	Australia Pacific LNG will aim to build collaborative partnerships with government and community organisations to enhance the capacity of employers to provide jobs and the capacity of locals to develop skills and secure jobs. For example through the Community Skills Scholarship program Australia Pacific LNG will continue to collaborate on programs with government and training and education groups that build the local skills base both to meet the specific needs of the industry and other impacted sectors. This will include further development of apprenticeship, traineeship, scholarship and higher education programs Australia Pacific LNG will continue to provide input into Gladstone Engineering Alliance/ State Government Skills Formation Strategy as well as other planning processes	L L	Australia Pacific LNG Shared responsibility Government: • Department of Education and Training	PC O LP	See employment and training and local content indicators above Functional working relationships established with government and community organisations and evidence of partnership projects Evaluate Australia Pacific LNG community investment programs to assess the achievement of program goals and objectives
Opportunities for industrial tourism	Ops	L	+	Continue to support opportunities for industrial tourism through entities such as Gladstone Economic and Industry Development Board, Gladstone Engineering Alliance and Gladstone Area Promotion and Development Limited	+	Australia Pacific LNG	LT	Potential industrial tourism opportunities identified and either developed in-house or tendered out
Opportunities for apprenticeships, scholarships and vocational training	Ops Cons	H M	+ +	Australia Pacific LNG will continue to collaborate on programs with government and training and education groups that build the local skills base both to meet the specific needs of the industry and other impacted sectors. This will include further development of apprenticeship, traineeship, scholarship, higher education programs and potentially including those that	+ +	Australia Pacific LNG Shared Responsibility Government: • Department of Education	PC O LP	See employment and training indicators above Evaluate Australia Pacific LNG community investment programs to assess the achievement of program goals and objectives

Identification	Assessment			Management		Responsibility	Timing (PC, C, O, LP)***	Performance measures
Impact	Project phase (Cons, Ops)*	Probability (H, M, L, +)**	Consequence (H, M, L, +)**	Management/mitigation strategies	Residual risk rating (H, M, L, +)**			
				recognise prior learning Australia Pacific LNG will work with government, the community and other industries to plan for potential cumulative impacts and share information relating to potential impacts and mitigation measures Australia Pacific LNG will continue to participate in local government and regional planning processes and provide information about its Project to inform discussion and decision making in a timely manner		• and Training • Department of Infrastructure and Planning		Expenditure on training programs Number of apprenticeships and scholarships offered by the Australia Pacific LNG Project
Opportunity to support work readiness programs and pre-trade training concepts	Ops Cons	H M	+ +	Australia Pacific LNG will continue to utilise existing or develop local partnerships to assist students to transition from school to work or higher education Australia Pacific LNG will partner with local training providers to develop industry and employment skills Australia Pacific LNG will work together with the CSG/LNG industry through the CSG/LNG Skills Taskforce of Energy Skills Queensland to help address skill shortages by • Raising awareness of the CSG/LNG industry in the local community • Supporting vocational training • Facilitating career advice and work readiness programs for new entrants and mature entrants from related industries Australia Pacific LNG will participate in CSG/LNG gateway programs with secondary schools in the Project region in partnership with providers such as the Queensland Minerals and Energy Academy to implement programs that promote career opportunities and facilitate employment in the CSG/LNG industry Australia Pacific LNG will expand competency based training and skills development programs for Production and Process Plant Operators	+ +	Australia Pacific LNG Industry Shared responsibility Government: • Department of Education and Training	PC O LP	Functional working relationships established with training providers and industry groups Relevant cumulative impact and regional planning strategies are acknowledged and reflected in Australia Pacific LNG planning documents and related communications Track and analyse awareness levels of the CSG/LNG industry in Project areas Level of growth in competency based training and skills development programs for Production and Process Plant Operators
Primary and secondary education								

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Impact	Project phase (Cons, Ops)*	Probability (H, M, L, +)**	Consequence (H, M, L, +)**	Management/mitigation strategies	Residual risk rating (H, M, L, +)**			
Inability of primary and secondary education facilities to meet demand	Cons Ops	L L	M M	Australia Pacific LNG will assist primary and secondary education institutions in forecasting future demand by providing accurate workforce data to relevant state government departments Australia Pacific LNG will work with government, the community and other industries to plan for potential cumulative impacts and share information relating to potential impacts and mitigation measures	L L	Australia Pacific LNG Shared Responsibility Government: • Department of Education and Training • Department of Infrastructure and Planning	PC O LP	Communication of workforce demand estimates to the state government, tertiary institutions and training providers Functional working relationships are established with government, the community and other industries Evidence of joint stakeholder outputs (planning forums, communications, action plans etc.) to identify and mitigate potential cumulative impacts Relevant cumulative impact strategies are acknowledged and reflected in Australia Pacific LNG planning documents and related communications
Housing and accommodation								
Increase in housing and/or rental prices caused by increased demand and limited supply resulting in poor levels of housing affordability and an over-inflated market	Cons Ops	H M	M M	Australia Pacific LNG will work with government, the community and other industries to plan for potential cumulative impacts and share information relating to potential impacts and mitigation measures Australia Pacific LNG will continue to participate in local government and regional planning processes and provide information about its Project to inform discussion and decision making in a timely manner Australia Pacific LNG's community investment programs will support sustainable community development Australia Pacific LNG will provide housing for non-local construction staff and contractors in temporary accommodation facilities and will consult with stakeholders including the local council as part of the site selection process for these facilities The Australia Pacific LNG operations workforce will live within the local community in the general housing pool during the operational phase of the Project Australia Pacific LNG will work through committees established under the Sustainable Resource Communities Policy to identify housing market issues, forecasts and possible responses To mitigate potential impacts on housing affordability and availability, Australia Pacific LNG community programs will include working with government and agencies that provide housing to people in housing distress	L	Australia Pacific LNG Shared Responsibility Government: • Department of Infrastructure and Planning • Department of Communities (Housing and Homelessness Services)	PC O LP	Percentage of non-local workers accommodated at temporary accommodation facilities Worker accommodation completed ahead of Project demand Functional working relationships are established with government, the community and other industries Evidence of joint stakeholder outputs (planning forums, communications, action plans, etc.) to identify and mitigate potential cumulative impacts Relevant cumulative impact and regional planning strategies are acknowledged and reflected in Australia Pacific LNG planning documents and related communications

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Impact	Project phase (Cons, Ops)*	Probability (H, M, L, +)**	Consequence (H, M, L, +)**	Management/mitigation strategies	Residual risk rating (H, M, L, +)**			
Concerns that the temporary accommodation facilities will foster anti-social behaviour and impact the host community	Cons	M	H	Australia Pacific LNG will locate the temporary accommodation facility on Curtis Island to reduce the potential impact from an influx of construction workers to Gladstone Australia Pacific LNG will continue consultation and engagement programs with communities and stakeholders to ensure their views are understood and considered throughout the life of the Project Australia Pacific LNG will communicate and strictly enforce its project rules and accommodation code of behaviour upon all employees and contractors Australia Pacific LNG will design and construct a high quality temporary accommodation facility with sufficient social and recreational facilities Australia Pacific LNG will continue to implement a community complaints procedure for stakeholders to raise concerns, and in turn have them addressed in a timely manner	L	Australia Pacific LNG	PC C	Track and analyse breaches of the code of conduct and accommodation facility rules by incident type Number and type of community complaints made to Australia Pacific LNG, its contractors, local council and others Track and analyse complaints response time and resolution. Track and analyse workforce attitudes towards the physical and operational standards of the temporary accommodation facility and the conduct of workers
Increased demand for hotel/motel accommodation presents challenges for competing local industry and businesses	Cons	M	H	Australia Pacific LNG will work with government, the community and other industries to plan for potential cumulative impacts and share information relating to potential impacts and mitigation measures Australia Pacific LNG will continue to participate in local government and regional planning processes and provide information about its Project to inform discussion and decision making in a timely manner Australia Pacific LNG will provide housing for non-local construction staff and contractors in temporary accommodation facilities	L	Australia Pacific LNG Shared responsibility Government: • Department of Infrastructure and Planning	PC C	Timely communication of Project and workforce demands Functional working relationships are established with government, the community and other industries Evidence of joint stakeholder outputs (planning forums, communications, action plans etc.) to identify and mitigate potential cumulative impacts Relevant cumulative impact and regional planning strategies are acknowledged and reflected in Australia Pacific LNG planning documents and related communications
Community health and safety								
Community concern about health and safety impacts resulting from the Project	Cons Ops	M M	H H	Project health and safety practices and results of relevant monitoring will be communicated through a range of channels such as Australia Pacific LNG's community centre, consultation sessions, media and meetings Emergency response planning to include consultation with neighbours and collaboration with relevant stakeholders, as practical Australia Pacific LNG will implement community complaints procedure for stakeholders to raise concerns, and in turn have them addressed in a timely manner Australia Pacific LNG will work with government, the community and other	L M	Australia Pacific LNG Shared responsibility Government: • Department of Infrastructure and Planning	PC O LP	Number and type of health, safety and environment (HSE) related complaints pertaining to Australia Pacific LNG and its contractors made to Australia Pacific LNG, its contractors, local council and others Track and analyse community attitudes towards Australia Pacific LNG and its contractors environmental, health and safety performance Number and percentage of HSE incidents by incident type Level of compliance with environmental legislative reporting

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Impact	Project phase (Cons, Ops)*	Probability (H, M, L, +)**	Consequence (H, M, L, +)**	Management/mitigation strategies	Residual risk rating (H, M, L, +)**			
				industries to plan for potential cumulative impacts and share information relating to potential impacts and mitigation measures Australia Pacific LNG will continue consultation and engagement programs with communities and stakeholders to ensure their views are understood and considered throughout the life of the Project Australia Pacific LNG will engage with community groups, such as the Clean and Healthy Air group, in two-way dialogue on health and safety matters				requirements Functional working relationships are established with government, the community, other industries and environment related community groups Evidence of joint stakeholder outputs (planning forums, communications, action plans etc.) to identify and mitigate potential cumulative impacts Relevant cumulative impact and regional planning strategies are acknowledged and reflected in Australia Pacific LNG planning documents and related communications
Potential for socially unacceptable behaviour due to the increase in population and changed demographics	Cons Ops	M L	M M	Australia Pacific LNG will continue consultation and engagement programs with communities and stakeholders to ensure their views are understood and considered throughout the life of the Project Australia Pacific LNG will uphold a high standard of behaviour and will communicate and strictly enforce its project rules and accommodation code of behaviour for all employees and contractor. Australia Pacific LNG will design and construct a high quality temporary accommodation facility with sufficient social and recreational facilities Australia Pacific LNG will implement a community complaints procedure for community members and stakeholders to raise concerns, and in turn have them addressed in a timely manner Health promotion programs relating to the 'Fit for Work' and 'Drug and Alcohol' policies will be implemented by Australia Pacific LNG	L L	Australia Pacific LNG	PC O LP	Track and analyse participation of Australia Pacific LNG employees and contractors participating in health promotion programs and safety training initiatives Track and analyse results of employees and contractors testing positive for alcohol and drug tests at Australia Pacific LNG Track and analyse breaches of the code of conduct and accommodation facility rules by incident type Number and type of behavioural related complaints relating to Australia Pacific LNG workers and contractors made to Australia Pacific LNG, its contractors, local council and others Track and analyse community attitudes towards the conduct of Australia Pacific LNG workers
Increased road, air and shipping movements impacting on road and maritime safety congestion	Cons Ops	H H	H H	Australia Pacific LNG will work with the federal, state and local government and industry in regard to potential upgrades required to meet the increase demands on regional infrastructure. Australia Pacific LNG will develop a logistics management plan to efficiently move people and materials and to reduce the impact of traffic and transport on communities by: • Consolidation of material prior to transport to reduce truck movements • Siting logistic hubs (warehouses and lay down facilities) that divert traffic flows around local towns	M L	Australia Pacific LNG Shared responsibility Government: • Department of Infrastructure, Transport, Regional Development and Local Government • Department of Main Roads • Department of Infrastructure and Planning	PC	Number of employee, contractor and community participants completing road safety programs and dollar value of program Number and type of traffic related incidents relating to Australia Pacific LNG workers and contractors Track and analyse community attitudes towards the Project

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				• The use of buses for personnel site access during construction and operations • Appropriate travel restrictions • Development and implementation of safe transportation management practices to reduce the impact to the local environment. • Avoid travel along school routes during set down pick up times • Night time travel managed where routes pass sensitive sites, e.g. Residential and schools • Speed restrictions especially next to sensitive sites – residential, schools or along unsealed roads to reduce dust creation • Vehicles lights and warning lights illuminated as appropriate • Implementation of driver training program Australia Pacific LNG will expand the Community Safety Awareness program in conjunction with industry partners, government and community groups to develop responses to community safety concerns in the region. Refer to mitigation measures in Volume 4 Chapter 17				
Facilities and services								
Increased demand on medical and health services	Cons Ops	M M	H L	Provision of first response medical capabilities on site at Curtis Island In collaboration with other LNG proponents, consider extending emergency medical evacuation services to Curtis Island residents Australia Pacific LNG will collaborate with government, industry and other providers to mitigate cumulative impacts on health services in local communities including providing the appropriate level of medical facilities for its temporary accommodation facilities and operating facilities Australia Pacific LNG will continue to participate in local government and regional planning processes and provide information about its Project to inform discussion and decision making in a timely manner Health promotion programs relating to the 'Fit for Work' and 'Drug and Alcohol' policies will be implemented by Australia Pacific LNG	L L	Australia Pacific LNG Shared responsibility Government: • Department of Infrastructure and Planning • Qld Health	PC	Communication of workforce demand estimates to Queensland Health and local councils within the region Number and type of lost workday cases related to illness Workforce participation rates for employee wellbeing program activities Number of workforce related visits to medical facilities outside of Australia Pacific LNG facilities
Increased demand on emergency	Cons	L	M	Australia Pacific LNG will continue to participate in local government and regional planning processes and provide information about its Project to inform	L	Australia Pacific LNG	PC	Australia Pacific LNG participation in and active contribution to regional planning activities as evidenced through relevant

Identification		Assessment		Management		Responsibility	Timing (PC, C, O, LP)***	Performance measures
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services	Ops	L	L	discussion and decision making in a timely manner Australia Pacific LNG will collaborate with government, industry and other providers to mitigate the impact to health services in local communities including providing the appropriate level of medical facilities for its temporary accommodation facilities and facilities In collaboration with other LNG proponents, extend emergency medical evacuation services to Curtis Island residents See Volume 4 Chapter 22 for mitigation measures for hazard and risk as they relate to emergency services	L	Shared responsibility Government: • Department of Infrastructure and Planning • Qld Health	C	planning outputs (reports, minutes, media communications) and subsequent commitments Relevant cumulative impact and regional planning strategies are acknowledged and reflected in Australia Pacific LNG planning, documents and related communications Track and analyse emergency response requirements
Increased demand for community support services and facilities (for example, public transport, family services)	Cons Ops	M M	M M	Australia Pacific LNG will collaborate with government, industry and community partners on research programs to understand the social impacts and opportunities created by development in the communities in which it operates Australia Pacific LNG's community investment programs will support sustainable community development Australia Pacific LNG will work with government, the community and other industries to plan for potential cumulative impacts and share information relating to potential impacts and mitigation measures Provide orientation to employees moving to the region through the workforce induction program to assist in alleviating pressure on existing support services Australia Pacific LNG will continue to participate in local government and regional planning processes and provide information about its Project to inform discussion and decision making in a timely manner Develop a social program to encourage employees to become active members of the community during the operational phase of the Project See Volume 4 Chapter 17 for mitigation measures for impacts on traffic and transport services and infrastructure	L L	Australia Pacific LNG Shared responsibility Government: • Department of Infrastructure and Planning • Department of Communities	PC O LP	Communication of estimated workforce demands to local government, state government and community service providers. Australia Pacific LNG participation in and active contribution to social impact research programs as evidenced through relevant planning outputs (reports, minutes, media communications) Functional working relationships are established with government, the community and other industries to plan for cumulative impacts Evidence of joint stakeholder outputs (planning forums, communications, action plans, etc.) to identify and mitigate potential cumulative impacts Relevant cumulative impact and regional planning strategies are acknowledged and reflected in Australia Pacific LNG planning documents and related communications Evaluation of Australia Pacific LNG community investment programs to assess the achievement of program goals and objectives Number of Australia Pacific LNG staff and contractors participating in community organisations, activities and events
Increased pressure on utility services	Cons Ops	L L	L L	Australia Pacific LNG will work with government, the community and other industries to plan for potential cumulative impacts and share information relating to potential impacts and mitigation measures	L L	Shared responsibility Government:	PC	Communication of workforce demand estimates to the state government

Identification		Assessment		Management		Responsibility	Timing (PC, C, O, LP)***	Performance measures
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				Australia Pacific LNG will continue to participate in local government and regional planning processes and provide information about its Project to inform discussion and decision making in a timely manner		• Department of Infrastructure and Planning		
Reduced access to waterways, water bodies and other recreational areas	Cons Ops	M M	M M	Australia Pacific LNG will continue consultation and engagement programs with stakeholders to ensure their views are understood and considered throughout the life of the Project and will communicate the extent and timing of any impacts to affected stakeholders and schedule works around minimal disturbance Australia Pacific LNG will implement a community complaints procedure for community members and stakeholders to raise concerns, and in turn have them addressed in a timely manner Australia Pacific LNG will work with government and stakeholders to address loss of fishing access Refer to Volume 4 Chapter 10 for mitigation measures relating to offsets for loss of fishing access	M L	Australia Pacific LNG Shared responsibility Government: • Primary Industries and Fisheries	PC O LP	Communication of Project works activities to affected stakeholders Track and analyse community attitudes towards the Project Number and type of community complaints made to Australia Pacific LNG, its contractors, local council and others Number and type of community complaints made to Australia Pacific LNG, its contractors, local Council and others Track and analyse complaints response time and resolution Evaluation of Australia Pacific LNG community investment programs to assess the achievement of program goals and objectives, particularly those that offset the loss of projected marine habitat
Community values and lifestyle								
The region's growth will impact local community values and residents' lifestyle patterns	Cons Ops	M M	M M	Australia Pacific LNG will collaborate with government, industry and community partners on research programs to understand the social impacts and opportunities created by development in communities in which it operates Australia Pacific LNG's community investment programs will support sustainable community development Australia Pacific LNG will ensure contracts with suppliers and sub-contractors are aligned with Australia Pacific LNG's 12 sustainability principles Australia Pacific LNG will continue consultation and engagement programs with stakeholders to ensure their views are understood and considered throughout the life of the Project Australia Pacific LNG will communicate and strictly enforce its project rules and accommodation code of behaviour for all employees and contractors Australia Pacific LNG will uphold a high standard of behaviour Partner with volunteer and community organisations to adapt the corporate	L L	Australia Pacific LNG Shared responsibility Government: • Department of Infrastructure and Planning • Department of Communities	PC O LP	Australia Pacific LNG participation in and active contribution to social impact research programs as evidenced through relevant planning outputs (reports, minutes, media communications) Evaluate Australia Pacific LNG community investment programs to assess the achievement of program goals and objectives Track and analyse community attitudes towards consultation processes and management of Project impacts during construction and operational phases Track and analyse breaches of the code of conduct and accommodation facility rules by incident type Number and type of community complaints made to Australia Pacific LNG, its contractors, local council and others

Identification	Assessment			Management		Responsibility	Timing (PC, C, O, LP)***	Performance measures
Impact	Project phase (Cons, Ops)*	Probability (H, M, L, +)**	Consequence (H, M, L, +)**	Management/mitigation strategies	Residual risk rating (H, M, L, +)**			
				volunteering framework for the Gladstone region Consider an incentive program for the workforce to enhance participation in community activities				Track and analyse community attitudes towards the conduct of staff and contractors Number of Australia Pacific LNG staff and contractors participating in community organisations, activities and events Track and analyse community attitudes over time, for example, social attitudes and experiences of community life, cultural diversity and social interactions
Shift work employment decreases the time workers spend with their families and participating in community activities (including volunteering)	Cons Ops	M M	M M	Australia Pacific LNG will collaborate with government industry and community partners on research programs to understand the social impacts and opportunities created by development in communities in which it operates Australia Pacific LNG will allow flexible work policies, where appropriate Australia Pacific LNG will consider structured opportunities for the non-local construction workforce to participate in community activities (including volunteering) during rostered days off Australia Pacific LNG will employ a lifestyle coordinator to implement and monitor strategy for employee participation in the community during the construction phase of the Project	L L	Australia Pacific LNG Shared responsibility Government: • Department of Infrastructure and Planning • Department of Communities	PC O LP	Australia Pacific LNG participation in and active contribution to social impact research programs as evidenced through relevant planning outputs (reports, minutes, media communications). Number of Australia Pacific LNG staff and contractors participating in community organisations, activities and events
Relationship between increased disposable income and how people spend it (e.g. increased spend on gambling, alcohol or drugs) impacting on community values	Cons Ops	L L	H H	Australia Pacific LNG will uphold a high standard of behaviour and will communicate and strictly enforce its project rules and accommodation code of behaviour upon all employees and contractors Australia Pacific LNG will continue consultation and engagement programs with communities and stakeholders to ensure their views are understood and considered throughout the life of the Project Australia Pacific LNG's community investment programs will support sustainable community development Australia Pacific LNG will work with government, the community and other industries to plan for potential cumulative impacts and share information relating to potential impacts and mitigation measures Australia Pacific LNG will collaborate with government, industry and community partners on research programs to understand the social impacts and opportunities created by development in communities in which it operates As part of the employee well-being program conduct regular education	L L	Australia Pacific LNG Shared responsibility Government: • Department of Infrastructure and Planning • Department of Communities Industry	PC C	Track and analyse breaches of the code of conduct and accommodation facility rules by incident type Number and type of community complaints made to Australia Pacific LNG, its contractors, local Council and others Track and analyse community attitudes towards the conduct of staff and contractors Track and analyse community attitudes towards consultation processes and management of Project impacts during construction and operational phases Evaluate Australia Pacific LNG community investment programs to assess the achievement of program goals and objectives Evidence of joint stakeholder outputs (planning forums, communications, action plans, etc.) to identify and mitigate

Identification	Assessment			Management		Responsibility	Timing (PC, C, O, LP)***	Performance measures
Impact	Project phase (Cons, Ops)*	Probability (H, M, L, +)**	Consequence (H, M, L, +)**	Management/mitigation strategies	Residual risk rating (H, M, L, +)**			
				campaigns such as 'Fit for Work', 'Drug and Alcohol' and 'Financial Management'				potential cumulative impacts Relevant cumulative impact and regional planning strategies are acknowledged and reflected in Australia Pacific LNG planning documents and related communications Australia Pacific LNG participation in and active contribution to social impact research programs as evidenced through relevant planning outputs (reports, minutes, media communications) Participation rates for employee well-being program activities
Impact of lighting, dust, noise and traffic to community amenity and lifestyle	Cons Ops	M L	H M	Australia Pacific LNG will work with government, the community and other industries to plan for potential cumulative impacts and share information relating to potential impacts and mitigation measures Australia Pacific LNG will continue consultation and engagement programs with communities and stakeholders to ensure their views are understood and considered throughout the life of the Project Implement community complaints procedure for stakeholders to raise concerns, and in turn have them addressed in a timely manner Australia Pacific LNG will continue to participate in local government and regional planning processes and provide information about its Project to inform discussion and decision making in a timely manner See Volume 4 Chapter 7 for mitigation measures for potential visual amenity related impacts See Volume 4 Chapter 7 for mitigation measures for potential lighting related impacts See Volume 4 Chapter 11 for mitigation measures for potential dust related impacts See Volume4, Chapter 15 for mitigation measures for potential noise related impacts	L L	Australia Pacific LNG Shared responsibility Government: • Department of Infrastructure and Planning	PC O LP	Functional working relationships are established with government, the community and other industries to plan for cumulative impacts Evidence of joint stakeholder outputs (planning forums, communications, action plans, etc.) to identify and mitigate potential cumulative impacts Relevant cumulative impact and regional planning strategies are acknowledged and reflected in Australia Pacific LNG planning documents and related communications Number of community information sessions relating to environmental impacts Number of community information sessions and participants Track and analyse community attitudes towards consultation processes and management of Project impacts during construction and operational phases Also refer to performance measures for the Australia Pacific LNG environmental management plan
Community concerns about the management of environmental,	Cons Ops	H M	M M	Australia Pacific LNG will continue consultation and engagement programs with communities and stakeholders to ensure their views are understood and considered throughout the life of the Project Australia Pacific LNG will collaborate with government, industry and	L L	Australia Pacific LNG Shared responsibility Government:	PC O LP	Percentage of community survey respondents satisfied with Australia Pacific LNG and its contractors' performances with respect to management and communication of environmental, social and economic impacts

Identification				Assessment		Management		Responsibility	Timing (PC, C, O, LP)***	Performance measures
Impact	Project phase (Cons, Ops)*	Probability (H, M, L, +)**	Consequence (H, M, L, +)**	Management/mitigation strategies	Residual risk rating (H, M, L, +)**					
social or economic issues				community partners on research programs to understand the social impacts and opportunities created by development in communities in which it operates Australia Pacific LNG's community investment programs will support sustainable community development		• Department of Infrastructure and Planning • Department of Communities			Australia Pacific LNG participation in and active contribution to social impact research programs as evidenced through relevant planning outputs (reports, minutes, media communications) Evaluate Australia Pacific LNG community investment programs to assess the achievement of program goals and objectives Functional working relationships are established with environmental community groups
Indigenous peoples										
Reduced ability to access affordable housing	Cons Ops	H M	H M	Australia Pacific LNG will work with government, the community and other industries to plan for potential cumulative impacts and share information relating to potential impacts and mitigation measures To mitigate potential impacts to housing affordability and availability, Australia Pacific LNG community programs will include working with Government and agencies that provide housing to people experiencing housing distress	L L	Australia Pacific LNG Shared responsibility Government: • Department of Infrastructure and Planning • Department of Communities • Department of Communities (Housing and Homelessness Services)	PC O LP	NB Information regarding Indigenous heritage will be provided on a voluntary basis Number of Indigenous persons employed in construction and operational workforces by occupation and position / seniority Number of Indigenous businesses or joint ventures engaged through the Project. Indigenous employee retention rates for construction and operational workforces Number of Gladstone area Indigenous residents participating in skills development programs supported by Australia Pacific LNG Number and percentage of Indigenous apprentices and trainees starting, graduating and finding continuous employment with Australia Pacific LNG by occupation / operational area Number of Indigenous apprenticeships, traineeships and scholarships, work experience programs supported by Australia Pacific LNG in non-LNG industries
Difficulty in securing and retaining employment on the Project for Indigenous Australians	Cons Ops	H H	M M	Australia Pacific LNG will continue to use and develop methods to attract people local to the region to the workforce Australia Pacific LNG will continue to use and develop methods to attract under-represented groups to the workforce Australia Pacific LNG will aim to build collaborative partnerships with government and community organisations to enhance the capacity of employers to provide jobs and the capacity of locals to develop skills and secure jobs. For example through the Community Skills Scholarship program Indigenous engagement strategy to address recruitment and retention strategies specific to Indigenous Australians	M M	Australia Pacific LNG Shared responsibility Government: • Department of Education and Training	PC O LP	
Lack of business development opportunities realised for	Cons Ops	H H	M M	Australia Pacific LNG will implement a local content strategy whereby we participate in or establish programs which assist qualified local and regional businesses with the opportunity to tender for provision of goods and services for the Project.	M M	Australia Pacific LNG Government: • Department of Employment, Economic Development and	PC O LP	Functional working relationships established with local and regional Indigenous organisations Communication of estimated workforce demands to state government and Indigenous housing and other service

Identification		Assessment		Management		Responsibility	Timing (PC, C, O, LP)***	Performance measures
Impact	Project phase (Cons, Ops)*	Probability (H, M, L, +)**	Consequence (H, M, L, +)**	Management/mitigation strategies	Residual risk rating (H, M, L, +)**			
Indigenous Australians				Australia Pacific LNG will ensure contracts with suppliers and sub-contractors are aligned with Australia Pacific LNG's 12 sustainability principles Indigenous engagement strategy to identify business opportunities and programs for development Australia Pacific LNG will provide input into Gladstone Engineering Alliance/ State Government Skills Formation Strategy as well as other planning processes		• Innovation • Department of Communities – Aboriginal and Torres Strait Islander Partnerships		providers Number and value of joint initiatives undertaken by Australia Pacific LNG and Indigenous organisations Number and percentage of Australia Pacific LNG employees and contractors completing cultural awareness training Number of Indigenous people participating in cultural heritage management and natural resource management initiatives directly related to the Project (see also cultural heritage management plan). Track and analyse Indigenous community attitudes towards Australia Pacific LNG's position, processes and performance in relation to Indigenous development and Indigenous engagement
Lack of respect for Indigenous Australians	Cons Ops	L L	H H	Australia Pacific LNG will implement a cultural awareness program Australia Pacific LNG will support Indigenous stakeholders to participate in Caring for Country initiatives Support programs that contribute to the health and well-being of Indigenous employees Engage with Indigenous Australians in a respectful and culturally appropriate way	L L	Australia Pacific LNG	PC O LP	

* Con = construction, Ops = operations

** H = high, M = medium, L = low, + = positive

*** PC = pre construction, C = construction, O = operation, LP = life of project