



14.1 Introduction

The purpose of this preliminary Environmental Management Plan (EMP) prepared for the GLNG Project is to propose environmental protection commitments to protect the environmental values that may be affected by the development of the project and to assist the administering authorities to decide the appropriate approval conditions for the project (under section 310D of the *Environmental Protection Act 1994* (Queensland) (EP Act)).

EMPs are designed to be dynamic documents, which will be reviewed and revised as the project progresses through the following stages:

- Feedback from regulatory agencies including the Queensland Department of Environment and Resource Management (DERM) and the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA);
- Detailed design;
- Construction;
- Operation; and
- Decommissioning.

It is envisaged that the final EMPs for the necessary environmental authorities will provide more detailed guidance for construction and operational personnel, regulators and stakeholders. The EMPs contain commitments framed in a way that enables assessment of the extent to which the commitment has been met.

The following five preliminary EMPs were prepared as part of the EIS process for the GLNG Project;

- Coal Seam Gas Fields EMP;
- Gas Transmission Pipeline EMP;
- LNG Facility EMP;
- Marine Facilities EMP; and
- Access Road and Bridge EMP.

Each EMP has been prepared as a 'stand alone' document, to be used as the basis for actively managing activities as the project progresses.

This preliminary EMP has been prepared based on the findings outlined in Sections 3 and 8 of the EIS (March, 2009) and additional work undertaken during the preparation of the EIS Supplement. It relates to construction and operation of the marine facilities. The EMP has been developed to cover the activities associated with the construction and operation of the marine facilities. A description of the marine facilities is provided in section 14.11 of this EMP.

This preliminary EMP has been structured to be in accordance with the Terms of Reference (TOR) for the GLNG Project and to satisfy the requirements of the DERM guidelines and related operational policies as outlined in Table 14.1.1 below. The EMP proposes environmental management strategies to prevent or minimise environmental harm while allowing for environmentally sustainable development. Monitoring, corrective actions and reporting requirements form part of this EMP, which will ensure that the proposed management strategies are being properly implemented.

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Table 14.1.1 EMP Structure

Structure	Description
Element/issue	How elements of the activity (construction or operation) are 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 programs (to nominated operational design standards) that will 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).

This preliminary EMP will be refined and finalised after negotiation as agreed with DERM, then used to support the necessary applications for environmental authorities (petroleum activities) for respective petroleum authorities issued under the *Petroleum and Gas (Production & Safety) Act 2004*.

14.2 Objectives

The objectives of this EMP are to provide:

- Evidence of practical and achievable plans to ensure that the project’s environmental requirements are complied with;
- A document capable of integration into any EPC Contract (which will include obligations to support compliance with the EMP);
- An integrated plan for monitoring, assessing and controlling potential impacts;
- Local, State and Commonwealth authorities with a common focus for approval conditions and compliance with policies and conditions; and
- The community with evidence that the construction and operation of the marine facilities will be managed in an environmentally acceptable manner.

This EMP will be reviewed and updated, to reflect knowledge gained during the course of the assessment of the GLNG Project. Changes to the EMP will be made in consultation with the relevant authorities where necessary.

14.3 Links to the EIS

Potential environmental issues requiring management and monitoring were identified during the impact assessment process and are detailed throughout the GLNG EIS.

This EMP has been structured to provide a link between the proposed authorised activities, the receiving environment and the selection of appropriate management strategies to prevent or minimise any potential environmental harm arising from the development of the GLNG project. The EMP also incorporates monitoring and corrective actions to ensure compliance with the commitments made in the EIS and the conditions of any statutory approvals. The management strategies outlined within this EMP were selected after detailed investigations of potential environmental impacts.

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A number of other key aspects of construction, operation and commissioning phases for the marine facilities have been included such as dredging, emergency response procedures and incident management.

14.4 Legislation

Section 1 of the EIS specifies the legislation and policies controlling the approval process for the GLNG Project. Appendix C of the EIS provides a list of the development approvals required for the GLNG Project including the marine facilities.

Environmental requirements of all relevant legislation are addressed within the EMP. The requirement of local government, the community and other stakeholders have also been addressed.

14.5 Santos Environmental Health Safety Management System (EHSMS)

Santos has a company-wide EHSMS which provides a structured framework for effective environmental and safety practice across all of its activities and operations (see Section 1.2.3.3). The framework has been developed to ensure compliance with AS/NZS ISO 14001:1996 *Environmental Management Systems – Specification with guidance for use* and Australian Standard 4801:2000 *Occupational Health and Safety Management Systems – Specification with guidance for use*.

The EHSMS framework consists of multiple layers, the key components being management and hazard standards that have been developed as part of the EHSMS. These standards guide the implementation of the EMPs. The management standards define the requirements necessary to ensure that environmental (health, safety and process safety) risk is systematically managed.

14.6 Responsibilities

Santos will be responsible for ensuring that this EMP is implemented. The assignment of roles, responsibilities and accountability will be in accordance with the EHSMS. All Santos and contractor staff will be responsible for the environmental performance of their activities and for complying with the general environmental duty as outlined in the *Environmental Protection Act 1994* (EP Act). Section 319(1) of the EP Act states that “a person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practical measures to prevent or minimise the harm.”

Santos staff and contractors will be responsible for implementing the final EMP and for undertaking all work in a manner which complies with all relevant environmental standards, adheres to all legislative requirements, and ensures that all environmental objectives associated with the work are achieved. Contract documents will include the necessary environmental specifications and commitments and require compliance with the EMP, construction specifications, technical drawings and the general environmental duty.

14.6.1 Construction Phase

The Construction Manager will be responsible for the environmental management of the project's construction and for ensuring compliance with the EMP for the marine facilities.

The construction contractor will be responsible for implementing the construction phase of the EMP and for undertaking work in a manner which complies with all relevant environmental procedures, adheres to all legislative requirements, and ensures that all environmental objectives associated with the contract are achieved. Contract documents will include the necessary environmental specifications and commitments and will require compliance with the EMP, construction specifications, technical drawings and the general environmental duty.

Compliance audits will be conducted by Santos against the requirements of the EMP, the construction procedures, relevant legislation, license and permit conditions and industry standards.

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14.6.2 Operational Phase

Santos will be responsible for ensuring that all environmental commitments are complied with for the operation of the marine facilities. An Environmental Manager will be appointed to be responsible for the day-to-day implementation of the operations phase of the EMP.

14.7 Monitoring Programs

Monitoring programs will be undertaken in accordance with this EMP.

Routine environmental monitoring of marine facilities will be conducted to ensure performance standards put in place are met. Monitoring, undertaken by GLNG operational and corporate personnel and specialist service providers, will be periodically conducted in accordance with site-specific monitoring plans.

Specialist studies to investigate particular aspects of the environment (e.g. flora and fauna, weeds, hydrological risk) will be periodically commissioned when a need is determined during environmental review and risk assessment.

14.8 Reporting and Auditing

Compliance audits will be conducted by Santos in accordance with the requirements of this EMP as well as construction procedures, relevant legislation, license and permit conditions and industry standards.

All inspection and audit reports of environmental performance will be stored in the Audit and Inspection Manager (AIM). AIM is an electronic database that is used to enable corrective actions identified during the inspection / auditing process to be recorded, tracked and closed out. The information will be made available to the relevant regulatory authorities as required.

In addition to the monitoring and reporting requirements documented in the relevant sections of the EMP, the following auditing regime will be implemented:

- During construction, internal audits will be undertaken at regular intervals to verify that all work is proceeding in accordance with the EMP;
- A post-construction audit of the marine facilities will be conducted; and
- During operations, internal audits of environmental compliance will be undertaken on a regular basis.

Any environmental incident, hazard, near miss, non-conformance or third party complaint will be managed in accordance this EMP and recorded in the Incident Management System (IMS), an electronic notification and recording system. All non-conformances lodged are tracked and actioned by nominated personnel, which includes the investigation and implementation of corrective action where required.

Relevant records supporting inspections and audits (in addition to monitoring and other critical aspects of the management system) will be generated and maintained. In accordance with the various statutory approvals required for the project, Santos will report to the administering authorities on the petroleum activities undertaken during the previous period.

14.9 Training and Communications

All Santos personnel, contractors and visitors are required to undertake appropriate environmental training and induction programs.

All managers and supervisors will be responsible for ensuring that personnel under their control have the requisite competencies, skills and training to carry out their assigned tasks in accordance with the requirements of the EMP. They will also be responsible for identifying additional training and competency requirements.

All staff will complete a comprehensive project induction. The induction will include a comprehensive review of environmental requirements and standards, safety, and access protocols. All project

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supervisors and managers will have additional detailed training on the use and implementation of the EMP.

All managers and supervisors will hold regular toolbox meetings with personnel to discuss issues associated with their scheduled work. This will include highlighting and discussing relevant environmental issues.

14.10 Review

This EMP will be a dynamic document. The EMP will be reviewed regularly and revised to reflect project changes and new developments. Revisions will include, but not be limited to:

- feedback from regulatory agencies including the Queensland Department of Environment and Resource Management (DERM) and the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA);
- Inclusion of relevant approval conditions arising from the project's approval and subsequent permits, authorities and/or licences; and
- Inclusion of any site-specific elements relevant to new developments as they occur during the life of the project.

Additional revisions will occur on an as-needed basis, including revisions to address items identified during incident investigations, inspections or audits.

Santos will be responsible for the regular review of the EMP to achieve continuous improvement in environmental performance.

14.11 Description of the Proposed Marine Facilities

Sections 3 and 8 of the GLNG EIS provide a detailed description of the marine facilities that will be part of the GLNG Project. The marine facilities will consist of the following:

- Product Loading Facility (PLF);
- A Materials Offloading Facility (MOF);
- Dredging Program;
- Dredge Material Placement Facility (DMPF); and
- Mainland Marine Facilities.

14.11.1 Product Loading Facility

The PLF will include:

- Access trestle – approximately 700 m piled structure to connect the onshore plant to the offshore loading platforms, of which 400 m will be over open water with the balance being onshore;
- Loading platform (with four loading arms) for loading of LNG;
- Marine operations platform - for housing the marine terminal, which may be moved to onshore at a later stage in design;
- Building, electrical room, firewater pumps and stand-by generators, which may be moved to onshore at a later stage in design and the firewater supplied from an onshore tank; and
- Six mooring and four breasting dolphins.

The access trestle, loading platform and berthing dolphins will load LNG to specially designed LNG tankers for shipment to markets.

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14.11.2 Materials Offloading Facility

The MOF will be constructed at Hamilton Point West to enable the transportation of construction material, equipment and personnel to the site. The MOF is expected to consist of:

- Three separate berths to accommodate wide range of construction vessels and personnel ferries;
- Wharf structures, mooring and breasting dolphins; and
- Material, equipment and module lay down areas including vehicle manoeuvring areas.

The MOF will comprise berths suitable for the following type of vessels:

- Heavy lift semi-submersible vessels;
- Vessels offloaded by lift-on lift-off operations;
- Ro-Ro barges, landing craft and personnel; and
- Ferries.

A haul road will connect the MOF to the LNG facility site for the delivery of off-loaded materials.

14.11.3 Dredging Program

The proposed capital dredging program will include the dredging of an approach channel off the existing Targinie Channel, berthing pockets and a swing basin, to a design depth of 14.0 -mLAT. This will allow the safe passage, docking and loading of LNG bulk carriers, with a margin of safety between vessel keel and the seabed. The estimated *in-situ* volume of material to be dredged to lower the seabed to 14 -mLAT is approximately 8,000,000 m³. Dredging is likely to be undertaken using a conventional cutter suction dredge, with all material pumped as a water/sediment slurry from the dredge, through a floating discharge line to the dredge material placement facility. An additional 100,000 m³ of material will be dredged at the MOF to a design depth of 8 -mLAT.

14.11.4 Dredge Material Placement Facility

In the absence of a port-wide dredge materials placement facility (DMPF) being available, the GLNG Project will include a purpose-built facility on Curtis Island. The facility will be an engineered placement facility to contain both capital and maintenance dredge materials and manage water associated with the dredge material.

A Dredge Management Plan (required under the *Coastal Protection and Management Act*) will be prepared (refer Attachment G9) as part of the application process for approvals to undertake dredging activities.

14.11.5 Mainland Marine Facilities

The EIS proposed that material, equipment and personnel would be barged/ferried to Curtis Island from Auckland Point. Since the release of the EIS a revised transport and logistic strategy has been developed. The revised strategy proposes that for an initial six month period material and equipment will depart from Fisherman's Landing and personnel will depart from Auckland Point. During this initial six month period, permanent facilities will be constructed so that material and equipment departs from either a site located on the south bank of the Calliope River or alternatively the RG Tanna facility and personnel will travel from "Port Central".

A description of the environmental values and potential impacts of the mainland facilities are outlined in Attachment L - GLNG Mainland Marine Facilities report. The report outlines management and mitigation measures to address these potential impacts. Once the location of the mainland facilities are finalised, GLNG will work with GPC to develop a comprehensive Environmental Management Plan for the facilities that will address construction and operational issues including noise, dust emissions and potential impacts from additional lighting requirements.

14.12 Description of Environmental Values, Potential Impacts and Proposed Management Strategies

Section 8 of the EIS provides a detailed description of the environmental values of the environment where the facilities will be located, the potential impacts from the proposed activities, environmental protection objectives and management strategies to mitigate those impacts.

The assessment of the beneficial or adverse effects has included an assessment of the following aspects:

- Magnitude or relative size of impact in relation to the environmental value being affected;
- Severity of any adverse effect or scale of beneficial outcome;
- Duration of the effect, for example the impact may range from a seasonal change, or it may end with the petroleum activity or extend beyond cessation of the petroleum activity; and
- An indication of the level of uncertainty and any assumptions used to address the uncertainty in any of the data or proposed commitments to protect the environmental values.

In relation to Sections 14.11 and 14.12 of this EMP, the EIS provides appropriate maps, plans and/or aerial photographs to identify the location of the marine facilities, related infrastructure and environmentally sensitive areas.

14.13 Rehabilitation Program and Financial Assurance

This EMP incorporates a rehabilitation program and decommissioning plan for the marine facilities. Sections 3 and 8 of the EIS outline the rehabilitation objectives, performance criteria and strategies that will be employed for rehabilitating the areas disturbed during the construction phase for the marine facilities.

If required, financial assurance for the marine facilities will be determined in consultation with the relevant State government agencies and in accordance with the applicable DERM guidelines.

14.14 Marine Facilities Environmental Management Plan Overview

This preliminary marine facilities EMP contains both construction and operational elements. The following elements have been incorporated into this EMP:

- Dredging Management;
- Water Quality Management;
- Acid Sulfate Soils;
- Terrestrial Flora and Fauna Management;
- Marine Flora and Fauna Management;
- Marine Pests;
- Shipping;
- Marine Noise;
- Unexpected Discovery Management Strategy;
- Waste Management;
- Mosquito and Biting Midge Management;
- Emergency Response;
- Cultural Heritage;
- Incidents and Complaints; and
- Decommissioning.

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14.15 Environmental Management Plans

14.15.1 Dredging Management

Element/Issue	Dredging Management
Operational Policy or Management Objective	To protect the marine values of Port Curtis from the effects of the project's dredging and dredge material placement.
Performance Criteria	<ul style="list-style-type: none"> • Minimal disturbance of the marine ecology of Port Curtis. • Compliance with the project's environmental authority approval conditions. • Continued protection of the area's World Heritage values.
Implementation Strategy	<p>In accordance with the requirements of the <i>Coastal Protection and Management Act</i>, the dredge contractor will prepare a dredge management plan (DMP) in accordance with the DERM document <i>Approval of a Dredge Management Plan Guideline</i> and relevant environmental authority approval conditions. The DMP will describe the activities and the management measures to be implemented.</p> <ul style="list-style-type: none"> • Dredge contractor to provide a justification for the design of the dredge area and side slopes. • Dredge contractor to include a buffer zone on the dredging management system with a series of alerts that inform the dredge operator that dredging is taking place close to the boundary, or that dredging is taking place in an unauthorised area.
Monitoring and Auditing	<ul style="list-style-type: none"> • Bathymetric surveys show no dredging outside of authorised areas (areas to be shown on a detailed dredge plan to be provided by the dredge contractor). • Dredging within the designated buffer zone. • Dredge material discharge flow rate will be measured continually. • Dredge plume (suspended solids) within Port Curtis measured daily. • Dredge material placement facility discharge: <ul style="list-style-type: none"> – Flow rate measured. – Suspended solids, pH oil and grease measured. – Metals and biological parameters measured. • Regional monitoring coordinated with the Port Curtis Integrated Monitoring Program.
Reporting and Corrective Action	<p>Monitoring and auditing will be conducted in accordance with Section 14.8 of this EMP.</p> <p>Reporting, investigation and management of corrective actions associated with environmental events (including incidents, hazards, near misses, non-compliance events and third party complaints) will be managed through the IMS and reported to the appropriate authority as required.</p> <p>Records and results of the monitoring program to be retained and made available to the relevant regulatory agencies as required.</p> <p>The following will constitute a non-compliance or incident:</p> <ul style="list-style-type: none"> • Dredge management plan conditions not met. • Discharge water quality standards not met. • Regional water quality monitoring shows unacceptable impact from GLNG Project. <p>Should an incident or failure to comply occur, one or more of the following will be taken:</p> <ul style="list-style-type: none"> • Dredge contractor will stop dredging, raise draghead and move to an authorised dredge area. • Contingency measures employed to improve the quality of the facility discharge. • Dredging operations modified.

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14.15.2 Water Quality Management

Element/Issue	Water Quality Management
Operational Policy or Management Objective	To protect the water quality of Port Curtis from the effects of the project's dredging and dredge material disposal.
Performance Criteria	<ul style="list-style-type: none"> • Minimal disturbance of the water quality of Port Curtis. • Compliance with the project's environmental authority approval conditions. • Continued protection of the area's World Heritage values. • No increase in suspended sediment above the stop threshold.
Implementation Strategy	<p>In accordance with the requirements of the <i>Coastal Protection and Management Act</i>, the dredge contractor will prepare a dredge management plan (DMP) in accordance with the DERM document <i>Approval of a Dredge Management Plan Guideline</i> and relevant environmental authority approval conditions.</p> <p>The DMP will describe the activities and the management measures to be implemented. The DMP will have two threshold levels:</p> <ol style="list-style-type: none"> 1) Caution level; and 2) Stop threshold. <p>Separate thresholds will be proposed with one set aimed at controlling impacts from the DMPF discharge, another set aimed at controlling the impacts from the dredger and a further set confirming the impact of no significant impacts at the sensitive receiver locations.</p> <p>The stop threshold will act as the mechanism that prevents impacts on sensitive receptors while the caution level will act as a trigger to warn the contractor that action must be taken to prevent an impact from occurring.</p>
Monitoring and Auditing	<ul style="list-style-type: none"> • Monitoring and auditing will be conducted in accordance with Section 14.7 of this EMP. • A real time water quality monitoring programme will be developed including: <ul style="list-style-type: none"> – Dredge material discharge flow rate will be measured continually. – Dredge plume (suspended solids) within Port Curtis measured daily. – Dredge material placement facility discharge: <ul style="list-style-type: none"> o Flow rate measured. o Suspended solids, pH oil and grease measured. o Metals and biological parameters measured. • Regional monitoring coordinated with the Port Curtis Integrated Monitoring Program.
Reporting and Corrective Action	<p>Monitoring and auditing will be conducted in accordance with Section 14.8 of this EMP. Reporting, investigation and management of corrective actions associated with environmental events (including incidents, hazards, near misses, non-compliance events and third party complaints) will be managed through the IMS and reported to the appropriate authority as required.</p> <p>Records and results of the monitoring program to be retained and made available to the relevant regulatory agencies as required.</p> <p>The following will constitute a non-compliance or incident:</p> <ul style="list-style-type: none"> • Dredge management plan conditions not met. • Caution threshold is triggered. • Regional water quality monitoring shows unacceptable impact from GLNG Project. <p>Should an incident or failure to comply occur, one or more of the following will be taken:</p> <ul style="list-style-type: none"> • Dredging operations modified or ceased until levels have fallen to below the caution threshold for a period to be agreed with the regulators. • Contingency measures employed to improve the quality of the facility discharge for example: <ul style="list-style-type: none"> – Dredging without overflow;

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Element/Issue	Water Quality Management
	<ul style="list-style-type: none"> - Dredging a different material; - Reducing the duration of dredging; - Dredging at a certain state of the tide; and - Managing the weir boxes and internal cell structure at the DMPF to cease discharge or to reduce the suspended sediment content of the discharge.

14.15.3 Acid Sulfate Soils

Element/Issue	Acid Sulfate Soils
Operational Policy or Management Objective	To control acid generation from the in-situ soils and to minimise the potential for on-site and off-site environmental impacts.
Performance Criteria	<ul style="list-style-type: none"> • No net increase in existing soil acidity due to oxidation of in-situ or excavated materials. • No direct or indirect release of runoff waters or leachate that do not meet the established water quality parameters.
Implementation Strategy,	<p>If potential ASS become exposed during construction, actions will be undertaken in accordance with the requirements of:</p> <ul style="list-style-type: none"> • <i>Environmental Protection Act 1994.</i> • Environmental Protection (Water) Policy 1997. • State Planning Policy (SPP2/02) – Planning and Managing Development involving ASS. <p>An ASS management plan will be prepared to the satisfaction of DERM prior to construction of the Marine Facilities, which will include the following:</p> <p>ASS Management and Treatment</p> <p>If ASS material is excavated, the material will be trucked to a designated area and spread out in loose layers approximately 300 mm thick for moisture conditioning and subsequent lime treatment if required. Non-ASS material (residual or alluvial) will be stockpiled separately to estuarine ASS material.</p> <p>Prior to placing the material, a low bund will be constructed around the perimeter of the stockpile to prevent overland flows entering the area and/or to contain runoff or leachate from exiting the treatment area. Bunds will comprise non-ASS materials and will be approximately 0.5 m to 1 m high.</p> <p>The surface of the treatment pad will comprise a layer of imported (non-PASS) fill 0.3-0.5 m thick, compacted to effectively restrict infiltration into the substrate soils.</p> <p>A surface layer of Aglime applied at a rate of 5 kg/m² will be worked into the soil surface to act as a guard layer to neutralise any leachate from the materials being treated on the treatment area.</p> <p>Lime Treatment of Excavated Material</p> <p>Lime will be blended into the material to neutralise any potential acid production. Proposed liming rates will be developed following testing of the material to be treated.</p> <p>Following placement and spreading of material, samples will be obtained for laboratory verification testing. Sample handling and transport will be in accordance with the ASS sampling and analysis guidelines – Ahern <i>et al.</i> (1998).</p> <p>Once the material is sufficiently dry, lime will be added at a rate of 1.5 times the theoretical amount necessary to neutralise the existing and potential acidity.</p> <p>The lime will be blended thoroughly using a rotary hoe, disk plough or other approved alternative method.</p> <p>Validation Testing</p> <p>Validation testing of the treated material will be carried out by obtaining a representative composite samples for laboratory testing using either the suspended peroxide oxidation-combined acidity and sulfate (SPOCAS) method or combined S_{CR} plus acid neutralisation capacity (ANC) test method or other approved testing methods. A total potential acidity (TPA) test result of 0 mols H⁺/t together with an average ANC value of 1.5 times the</p>

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Element/Issue	Acid Sulfate Soils
	<p>theoretical amount (of lime) necessary to neutralise the total of any existing and potential acidity, is the target for validation testing.</p> <p>If the testing indicates inadequate treatment, additional lime will be mixed with the soil material and further validation testing will be carried out until satisfactory results are achieved.</p> <p>Self-Neutralising Soils</p> <p>Some sediments contain naturally occurring calcium or magnesium carbonates in the form of crushed shell (shell-grit) coral and foraminifera, and when present in appreciable quantities, the oxidisable sulphur (%S) levels determined from the SPOCAS or the chromium reducible sulphur (CRS) suite of tests, may be reduced to reflect the self neutralising capability of the sediments. Where appropriate, the SPOCAS or combined CRS plus ANC test methods will be carried out to determine the inherent soil self-neutralising capacity of the sample being tested.</p>
Monitoring and Auditing	<p>Monitoring and auditing will be conducted in accordance with Section 14.7 of this EMP.</p> <p>Monitoring to be undertaken includes:</p> <ul style="list-style-type: none"> • Inspection of the bunds around the lime treatment area (should ASS treatment be necessary). • Inspection of site for evidence indicating the occurrence of untreated ASS. • Water pH in retention ponds.
Reporting and Corrective Action	<p>Reporting of environmental performance data will be conducted in accordance with Section 14.8 of this EMP.</p> <p>The appropriate Environmental Manager will report any occurrences of exposed ASS to the Construction Manager and provide regular updates on any ASS treatment.</p> <p>Reports will include:</p> <ul style="list-style-type: none"> • The effectiveness of the operating strategies. • Problems in implementing the ASS management strategies. • Results and compliance with testing requirements, runoff control and materials handling. • Effectiveness of any corrective action adopted. • Deviations from the ASS management strategies. <p>If lime treatment of PASS is unsuccessful or performance targets are not being met as indicated by the validation and water quality testing procedures, the earthworks schedule will be reassessed and action taken to determine the problems causing the breach of standards.</p> <p>Should results of verification testing indicate residual acidity outside allowable limits, the affected material will remain in place and additional lime added and the verification process repeated until performance criteria are met.</p> <p>If the problems are related to ineffective implementation of the ASS management plan then the plan will be audited to ensure improved implementation. Monitoring and testing will be increased to ensure compliance with the established standards.</p> <p>Any major changes to the management plan will be subject to discussions with and the approval of the relevant regulatory authorities.</p>

14.15.4 Terrestrial Flora and Fauna Management

Element/Issue	Terrestrial Flora and Fauna Management
Operational Policy or Management Objective	To minimise and manage impacts to the ecological values of the marine facilities sites.
Performance Criteria	<ul style="list-style-type: none"> • Minimal disturbance of flora and fauna during construction of the infrastructure. • No unplanned or unapproved damage to flora and fauna. • Relevant permit is in place before removing any protected species.

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Element/Issue	Terrestrial Flora and Fauna Management
Implementation Strategy	<ul style="list-style-type: none"> • Monitor the use of mangrove areas by significant terrestrial fauna species recorded in these areas prior to disturbance by the Marine Facilities including the beaches, tidal zones and mud flats at China Bay. • All works will be conducted in accordance with the Queensland Government's operational policy for the removal or disturbance of marine plants in accordance with the <i>Fisheries Act 1994</i> including obtaining the necessary permits to remove, destroy or damage marine plants. • Disturbance will be restricted to designated work areas. • Physical barriers will be installed around significant (landward) vegetation areas in order to restrict unauthorised access and avoid disturbance. • Clearing and disturbance in intertidal areas and wetland/water body areas will be minimised to that necessary to safely construct the site and meet other environmental requirements (e.g. dredge material placement facility, separation of stockpiles, erosion control). • Controls to prevent permanent barriers to fish and other fauna movement will be implemented. • Bushland and habitat surrounding construction areas will be managed to prohibit any unauthorised disturbance so as to maintain the area's habitat values as much as possible. • Dead trees, stumps and hollow branches will be salvaged from the terrestrial areas to be cleared and relocated to the surrounding undisturbed areas to create compensatory shelter. • Hollow bearing trees will be felled in a manner which reduces potential for fauna mortality. Felled trees will be inspected after felling and fauna (if identified and readily accessible) will be removed and relocated or rendered assistance if injured. After felling, hollow bearing trees will remain unmoved over-night to allow animals to move of their own volition. • The dredge areas will be inspected for the presence of marine megafauna and, if seen, appropriate mitigation measures (such as 'soft-start') will be implemented.
Monitoring and Auditing	<p>Monitoring and auditing will be conducted in accordance with Section 14.7 of this EMP. Ongoing monitoring will be undertaken to assess the success and integrity of construction and ensure appropriate follow-up rehabilitation measures are implemented.</p> <p>Routine inspections of undisturbed areas by the contractor's environmental representative to identify any evidence of habitat disturbance or feral pest presence.</p> <p>The contractor's environmental representative will monitor site clearing to ensure that:</p> <ul style="list-style-type: none"> • Areas to be cleared are clearly defined. • There is no unauthorised disturbance of the surrounding habitat area. • Compensatory shelter is established where necessary. • Where necessary, an animal retrieval program is implemented.
Reporting and Corrective Action	<ul style="list-style-type: none"> • Reporting of environmental performance data will be conducted in accordance with Section 14.8 of this EMP. • Reporting, investigation and management of corrective actions associated with environmental events (including incidents, hazards, near misses, non-compliance events and third party complaints) will be managed through the IMS and reported to the appropriate authority as required. • Non-compliance and incident reports will be closed out by senior management. • Any third party complaints will be recorded in the Santos complaints register and appropriate corrective actions will be implemented and closed out by the appropriate Environmental Manager.

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14.15.5 Marine Flora and Fauna Management

Element/Issue	Marine Flora and Fauna Management
Operational Policy or Management Objective	To limit impacts to the marine flora and fauna as a result of the GLNG project activities to those areas directly affected.
Performance criteria	<ul style="list-style-type: none"> • No unplanned or unapproved damage to marine flora and fauna. • Restoration of disturbed areas to equivalent of surrounding area after construction.
Implementation Strategy	<p>Strategies outlined below will be implemented to meet the proposed performance criteria for marine flora and fauna:</p> <ul style="list-style-type: none"> • Training for personnel of LNG related vessels to identify large aquatic fauna. • Maintain a lookout for Dugongs, turtles, marine mammals and other large fish whilst sailing in Port Curtis. • Lighting for GLNG Project related activities will comply with the Occupational Health and Safety (OSH) guidelines to minimise where practicable light spill on marine fauna. • GLNG Project related vessels will abide by the Port of Gladstone speed restrictions and exclusion zones. • Personnel operating GLNG Project related vessels will be aware of marine mammals in Port Curtis. • A risk assessment of potential marine pest introductions will be carried out for each proposed GLNG Project related vessel. <ul style="list-style-type: none"> – For GLNG Project vessels that are considered high risk, inspections of the hulls and/or hoppers may be carried out, and, for overseas vessels, preferably before they depart for Australian waters. • Santos will promote that all chartered vessels adhere to the International Maritime Organisation's voluntary ballast water management guidelines. • Undertake targeted surveys to confirm absence/presence of water mouse within in any mangrove / or intertidal habitat to be directly disturbed by proposed construction in accordance with relevant guidelines. • Provide training for staff regarding the sensitivity of wetland ecosystems. <ul style="list-style-type: none"> – Signage will be used to notify construction staff of the reasons why trespassing on these ecosystems is prohibited and the impacts this might have. – Fences will be erected around ecologically sensitive areas to visually and physically enforce the need for avoidance of disturbance to these areas. • A total ban on fishing and crabbing activities being undertaken by any person employed or contracted by GLNG while on the LNG facility site or associated project areas. • Appointment of a Fisheries Liaison Officer.
Monitoring and Auditing	<p>The following records will be maintained.</p> <ul style="list-style-type: none"> • Records of quarantine clearances and ballast water management will be maintained for ships servicing the GLNG Project. • Records of hull inspections of all high risk ships will be maintained. • The marine facilities' marine monitoring program will include surveys for potential introduced marine pests.
Reporting and Corrective Action	<p>Reporting of environmental performance data will be conducted in accordance with Section 14.8 of this EMP.</p> <p>Reporting, investigation and management of corrective actions associated with environmental events (including incidents, hazards, near misses, non-compliance events and third party complaints) will be managed through the use of the IMS and reported to the appropriate authority as required.</p> <p>Non-compliance and incident reports will be closed out by senior management.</p>

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Element/Issue	Marine Flora and Fauna Management
	<p>Any third party complaints will be recorded in the Santos complaints register and appropriate corrective actions will be implemented and closed out by the appropriate Environmental Manager.</p> <p>The appropriate Environmental Manager will report any incidents of marine flora disturbance to the Construction Manager or the Marine Facilities Manager as necessary</p> <p>The following constitute an incident or failure to comply in regard to marine flora management:</p> <ul style="list-style-type: none"> • Unauthorised disturbance of marine vegetation outside the defined construction areas. • Unauthorised disturbance of marine habitat. <p>In the event of a failure to comply, investigations will be undertaken into the cause of the incident or failure to comply and the appropriate corrective actions taken to overcome the problem and prevent recurrence</p>

14.15.6 Marine Pests

Element/Issue	Marine Pests
Operational Policy or Management Objective	To prevent the introduction and spread of introduced marine pests.
Performance Criteria	No sightings / evidence of introduced marine pests.
Implementation Strategy	<ul style="list-style-type: none"> • All vessels from overseas must obtain a quarantine ship clearance from Australian Quarantine and Inspection Service (AQIS). • All vessels from overseas must comply with AQIS controls on ballast water discharge. • A risk assessment of potential marine pest introductions will be carried out for each vessel proposed to be used on the GLNG Project. • For vessels that are considered high risk, inspections of the hulls and/or hoppers may be carried out, and, for overseas vessels, preferably before they depart for Australian waters. • Santos will promote that all chartered vessels adhere to the International Maritime Organisation's voluntary ballast water management guidelines.
Monitoring and Auditing	<ul style="list-style-type: none"> • Records of quarantine clearances and ballast water management will be maintained for ships servicing the GLNG Project. • Records of hull inspections of all high risk ships will be maintained. • The marine facilities' marine monitoring program will include surveys for potential introduced marine pests.
Reporting and Corrective Action	<p>Reporting of environmental performance data will be conducted in accordance with Section 14.8 of this EMP.</p> <p>Reporting, investigation and management of corrective actions associated with environmental events (including incidents, hazards, near misses, non-compliance events and third party complaints) will be managed through the IMS and reported to the appropriate authority as required.</p> <p>Non-compliance and incident reports will be closed out by senior management.</p> <p>Any third party complaints will be recorded in the Santos complaints register and appropriate corrective actions will be implemented and closed out by the appropriate Environmental Manager.</p> <p>Should an incident or failure to comply occur, a selection of the following actions will be taken:</p> <ul style="list-style-type: none"> • Ship operators will be instructed regarding the correct quarantine and/or ballast management procedures. • Additional reporting and surveillance measures will be introduced.

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14.15.7 Shipping

Element/Issue	Shipping
Operational Policy or Management Objective	<p>To prevent the occurrence of environmental incidents related to the project's shipping activities.</p> <p>To reduce potential interference from the dredging with commercial and recreational fishing industry vessels.</p>
Performance Criteria	<p>No environmental incidents related to project shipping.</p> <p>Compliance with local and international regulations based on the International Convention for Prevention of Pollution from ships, known as MARPOL.</p>
Implementation Strategy	<ul style="list-style-type: none"> • All vessels exporting LNG from the facility will comply with the following design requirements: <ul style="list-style-type: none"> – Ships will be double hulled to provide additional protection. – The LNG tanks will be double insulated to minimise the amount of gas boil off. – The on-board storage tanks will contain inner structures to absorb stress fluctuations resulting from wind, wave, cargo load and temperature changes. – Gas that vapourises during shipment will typically be collected, compressed and used as fuel in the ship's propulsion system. • Ships entering and leaving Port Curtis will navigate in accordance with the port rules as established by the Gladstone Ports Corporation. • All vessels chartered for LNG export will be required to comply with the International Convention for the Protection of Pollution from Ships 1973/78 (MARPOL 73/78) under the provisions of the Commonwealth Government's <i>Protection of the Sea (Prevention of Pollution from Ships) Act 1983</i> and the <i>Navigation (Protection of the Sea) Amendment Act 1983</i>. • While operating in Queensland coastal waters ships will comply with Queensland's <i>Transport Operations (Marine Safety) Act 1994</i> and <i>Transport Operations (Marine Pollution) Act 1995</i>. • Santos will promote that all chartered vessels adhere to the International Maritime Organisation's voluntary ballast water management guidelines. • The LNG vessels will manoeuvre in Port Curtis under the following preliminary operational limits: <ul style="list-style-type: none"> – Wind in any direction up to 25 knots. – Waves up to 2.5 m. – Visibility limit set to see at least two navigational beacons ahead of the LNG ship in motion. – Minimum under-keel clearance is 10% of the vessel's draught. • The LNG vessels will be under active tug escort as they transit through Port Curtis. • No deep draught vessels will be permitted to pass an LNG vessel (either overtake or move in the opposite direction) whilst it is in transit through the Gladstone Port. • Whilst a vessel is on berth a safety and security zone will be declared around the vessel through which other craft should not transit. Whilst a vessel is on berth a standby tug shall also be deployed to patrol the edge of the zone and to warn other craft of the existence of the zone and to discourage vessels from entering this zone. The tug shall also be outfitted with full fire fighting and rescue capability such that it can render assistance in the unlikely event that an incident occurs. • The safety and security zone will be a circle of 200 m radius around the PLF. • Prior to construction works commencing the contractor will create a detailed construction and operation fuel/oil spill avoidance and response plan (or similar) to satisfy the Gladstone Port Corporation (GPC) requirements. • A management plan will be developed for the operation of small commercial vessels used to transport GLNG project staff and equipment to and from Curtis Island. • Appointment of a Fisheries Liaison Officer.

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Element/Issue	Shipping
	<ul style="list-style-type: none"> Pre-dredging communication via the Fisheries Liaison Officer to identify locations and periods of particular fishing sensitivity. Santos will work with a number of organisations, including the Regional Harbour Master, Gladstone Ports Corporation, Maritime Safety Queensland and the LNG industry to develop risk minimisation measures for LNG carriers.
Monitoring and Auditing	<ul style="list-style-type: none"> Records of quarantine clearances and ballast water management will be maintained for ships servicing the GLNG Project. Records of hull inspections of all high risk ships will be maintained. The marine monitoring program will include surveys for potential introduced marine pests. Routine inspections will check for leaks as well as unsecured containers in all fuel/oil storage areas on vessels.
Reporting and Corrective Action	<ul style="list-style-type: none"> Reporting of environmental performance data will be conducted in accordance with Section 14.8 of this EMP. Reporting, investigation and management of corrective actions associated with environmental events (including incidents, hazards, near misses, non-compliance events and third party complaints) will be managed through the IMS and reported to the appropriate authority as required. <p>The following constitute an incident or failure to comply in regard to marine flora management:</p> <ul style="list-style-type: none"> Warranted complaints from the fishing industry. Warranted complaints of GLNG vessels not following instructions or port operating procedures. <p>Should an incident or failure to comply occur, a selection of the following actions will be taken:</p> <ul style="list-style-type: none"> An investigation of the complaint and response provided to the fishing industry through the Fishing Liaison Officer. Ship operators will be instructed regarding correct port operating procedures. Ship operators will be instructed regarding the correct quarantine and/or ballast management procedures. Additional reporting and surveillance measures will be introduced. <ul style="list-style-type: none"> In the event of a fuel/oil spill, the Regional Harbour Master will be notified immediately. The Regional Harbour Master will direct any response as required.

14.15.8

Marine Noise

Element/Issue	Marine Noise
Operational Policy or Management Objective	To ensure that no significant impacts occur to marine ecology due to underwater noise impacts.
Performance Criteria	No environmental harm due to underwater noise impacts.
Implementation Strategy	<ul style="list-style-type: none"> To prevent a startle response from dugong or dolphin at the start of dredging or impact piling in deeper water (>3m) observations will be made of the work area before commencement on any day or after an extended time when work has stopped. If dugong or dolphin is observed within the area then commencement of impact piling will be delayed until they clear the area. Alternatively, a soft start to piling will be considered. Sonar devices on dredges will have operating frequencies above 200 kHz to minimise the impact upon dolphin and dugong.

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Element/Issue	Marine Noise
Monitoring and Reporting	Marine mammal observations will be undertaken prior to the commencement of impact pile driving activities.
Corrective Action	The following will constitute a non-compliance or incident: <ul style="list-style-type: none"> • Mammal observations are not undertaken. • A soft start is not made in the event of positive mammal observations. Should an incident or failure to comply occur, a selection of the following actions will be under taken: <ul style="list-style-type: none"> • Mammal observations will be undertaken. • Initial piling operations will be modified.

14.15.9 Unexpected Discovery Management Strategy

Element/Issue	Unexpected Discovery Management
Operational Policy or Management Objective	To ensure that any wreck found during dredging is assessed for its historic importance and any impacts appropriately managed.
Performance Criteria	<ul style="list-style-type: none"> • Records maintained in accordance with the unexpected discoveries protocol, for any wreck material or wreck site encountered during dredging.
Implementation Strategy	<ul style="list-style-type: none"> • Consult navigation charts for known wreck sites within the dredge footprint. • Review of available pre-dredge bathymetric and geophysical survey data to confirm that there are no known wreck sites in the dredge footprint. • Training of the dredger crew to recognise when ship wreck material has been encountered and appropriate actions to be taken. • Develop and implement an agreed protocol for assigning and managing any unexpected discoveries.
Monitoring and Auditing	<ul style="list-style-type: none"> • Reporting of environmental performance data will be conducted in accordance with Section 14.7 of this EMP. • Complete records of any discovered wreck material or wreck sites. • Periodic reporting of wreck encounters or confirmation of no encounters.
Reporting and Corrective Action	The following will constitute a non-compliance or incident: <ul style="list-style-type: none"> • Wreck material observed in the dredging areas but not recorded. Should an incident or failure to comply occur, a selection of the following actions will be under taken: <ul style="list-style-type: none"> • Within two hours of the encounter contact the appropriate Environmental Manager to report the wreck. • The dredger will stop dredging, if safe to do so, and offload any wreck material at an agreed location onshore.

14.15.10 Waste Management

Element/Issue	Waste Management
Operational Policy or Management Objective	To manage wastes from the construction and operation of the marine facilities in such a way that any potential impacts on the environment are minimised or avoided by incorporating the waste management hierarchy.
Performance Criteria	<ul style="list-style-type: none"> • Minimal waste generated by construction and operation activities. • No inappropriate disposal or management of waste. • No contamination of soil, air or water as a result of waste disposal activities. • Compliance with the waste management requirements of the Santos environment, health and safety management system.

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Element/Issue	Waste Management
Implementation Strategy	<p>Construction</p> <p>A waste management plan will be developed for the construction stage that includes elements such as:</p> <ul style="list-style-type: none"> • Opportunities and actions to be taken to implement the waste management hierarchy. • Waste management procedures. • Training and management. • A monitoring and reporting program. <p>The following tasks will be undertaken during the construction phase to achieve the performance requirement:</p> <ul style="list-style-type: none"> • Careful planning will be employed when ordering materials. Where practical, any excess materials and used chemical containers and packaging will be returned to the supplier or to a local consumer. • Preference will be given to materials that will result in no, or low, levels of waste (from both the materials and the packaging). • Waste streams will be separated into various components where these are produced. Waste separation at source will be achieved by providing bins for re-useable and recyclable materials. For large quantities of waste, an area on site will be allocated for the collection of materials. • Recyclable building wastes will be collected separately and re-used or recycled, e.g.: <ul style="list-style-type: none"> – Timber from concrete formwork can be recovered and reused. – Scrap steel and off-cuts can be recycled. – Plastics can be recycled. – Oils can be collected and sent for refining. • Wastes that cannot be re-used or recycled will be disposed of at an approved landfill. • All wastes leaving the site will be tracked in accordance with the requirements of the Environmental Protection (Waste Management) Regulation 2000 Schedule 2. • All regulated waste will be removed from site by a person who holds a current authority to transport such waste under the provisions of the <i>Environmental Protection Act 1994</i> and sent to a facility licensed to accept such waste. • If a hazardous contaminant is released to waters or land the following steps will be taken: <ul style="list-style-type: none"> – Take immediate action to stop any further release; – Take immediate action to contain the hazardous contaminant to the affected area, taking particular care to protect environmentally sensitive areas; – Restore or rehabilitate the environment to its condition before the release occurred; and – Take necessary action to prevent a recurrence of the release. <p>Operation</p> <ul style="list-style-type: none"> • All vessels chartered for LNG export will be required to comply with the International Convention for the Protection of Pollution from Ships 1973/78 (MARPOL 73/78) under the provisions of the Commonwealth Government's Protection of the Sea (Prevention of Pollution from Ships) Act 1983 and the Navigation (Protection of the Sea) Amendment Act 1983. • While operating in Queensland coastal waters ships will comply with Queensland's Transport Operations (Marine Safety) Act 1994 and Transport Operations (Marine Pollution) Act 1995. • Santos will promote that all chartered vessels adhere to the International Maritime Organisation's voluntary ballast water management guidelines. • Requirements for ship's garbage reception will be reviewed by Santos in association with the Gladstone Ports Corporation, with the aim of ensuring that project vessels will be permitted to off-load solid wastes. • No vessel will be allowed to discharge treated or untreated sewage into port waters.

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Element/Issue	Waste Management
	<ul style="list-style-type: none"> All regulated waste will be removed from site by a person who holds a current authority to transport such waste under the provisions of the <i>Environmental Protection Act 1994</i> and sent to a facility licensed to accept such waste.
Monitoring and Auditing	<ul style="list-style-type: none"> Construction waste streams to be monitored. Housekeeping checks to ensure waste is being stored correctly and that no littering is occurring. Records of quarantine clearances and ballast water management will be maintained for ships servicing the GLNG Project.
Reporting and Corrective Action	<ul style="list-style-type: none"> Reporting of environmental performance data will be conducted in accordance with Section 14.8 of this EMP. Reporting, investigation and management of corrective actions associated with environmental events (including incidents, hazards, near misses, non-compliance events and third party complaints) will be managed through the IMS and reported to the appropriate authority as required. Non-compliance and incident reports will be closed out by senior management. <p>The following will constitute a non-compliance or incident:</p> <ul style="list-style-type: none"> Construction waste management plan not prepared or implemented. Ships' wastes (ballast, garbage or sewage) not being discharged according to relevant protocols and requirements. <p>Should an incident or failure to comply occur, a selection of the following actions will be under taken:</p> <ul style="list-style-type: none"> Construction waste management plan to be prepared and/or implemented. Ship operators will be instructed regarding correct waste management procedures.

14.15.11

Mosquito and Biting Midge Management

Element/Issue	Mosquito and Biting Midge Management
Operational Policy or Management Objective	To prevent the occurrence of potential mosquito and biting midge breeding sites and the presence of adult mosquitoes and biting midges.
Performance criteria	<ul style="list-style-type: none"> Minimal number of potential mosquito and biting midge breeding sites created.
Implementation Strategy	<ul style="list-style-type: none"> Depressions in the ground surface (such as wheel ruts) will be filled as soon as practicable to prevent the ponding of water. Pools of stagnant water will be drained and/or the depressions filled. Storage containers capable of ponding water will be either discarded after use or stored in an inverted position (care will be taken to ensure that ponding does not occur in waste storage areas). Erosion and washdown practices will be controlled to prevent the formation of standing water pools in natural water courses adjacent to the sites. Staff will be trained to recognise mosquito and biting midge breeding activity and the treatment of breeding sites. An assessment of work areas will be undertaken prior to works and on an ongoing informal basis to identify potential breeding sites. Workforce accommodation facilities to be fitted with protective barriers, such as fly screens and air conditioning. Insect repellent will be made available to Santos and Contractor personnel as required. Any required specific area control plans based on assessment of potential breeding sites will conform to the DERM's Mosquito Management Code of Practice for Queensland. Queensland Health and the Gladstone Regional Council will be contacted for

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Element/Issue	Mosquito and Biting Midge Management
	assistance in choosing a suitable method of laticiding / eradication should this be necessary.
Monitoring and Auditing	A record of periodic monitoring of ponding waters and rainwater tanks inspections for mosquitoes and biting midges will be maintained. Areas of ponding and pooled water that cannot be easily removed or backfilled will be inspected regularly for presence of larvae by the appropriate Environmental Manager.
Reporting and Corrective Action	The following represent an incident or failure to comply in regard to mosquito management: <ul style="list-style-type: none"> An increase in the numbers of potential mosquito and biting midge breeding sites on-site. An increase in the numbers of larvae and/or mature mosquitoes and biting midge on-site. Significant incidences of mosquito and midge bites are reported. Mosquito and biting midge management strategies are not implemented. Should an incident or failure to comply occur, a selection of the following actions will be taken: <ul style="list-style-type: none"> An investigation will be undertaken into why directives are not being carried out. Personnel will be re-educated on desired practices. Work policies and procedures will be reviewed and modified to improve the situation.

14.15.12 Emergency Response

Element/Issue	Emergency Response
Operational Policy or Management Objective	To ensure that project personnel can respond effectively and efficiently in the event of an emergency associated with construction or operation of the marine facilities.
Performance Criteria	Emergency plans are developed and in place for both construction and operational activities. Compliance with the relevant requirements of: <ul style="list-style-type: none"> <i>Dangerous Goods and Safety Management Act 2001.</i> <i>Fire and rescue Authority Act 1990.</i> All personnel familiar with emergency procedures and their role in the event of emergency, and drills undertaken. All personnel familiar with the District Disaster Management Group and their role in the event of a disaster.
Implementation Strategy	Santos will prepare a detailed emergency response plan during the detailed design phase. The plan will include consideration of the following: <ul style="list-style-type: none"> Information outlining the connection to relevant legislation as well as specific GLNG project Environmental Management Plans. Inclusion of Gladstone's emergency agencies when developing the Emergency Response Plan (ERP). Communication and coordination between Santos and the District Disaster Management Group regarding the project's activities. Development of a response, investigation, command, control and recovery for both natural disasters and other disasters/emergencies and incidents. Response procedures in the event of a fire, chemical release, spill, LNG leak, accident, explosion, equipment failure, bomb threat, natural disaster (including severe storm, bushfire or flood events) or any other likely emergency. Communication arrangements and contact details. Roles and responsibilities of responsible personnel. Emergency controls and alarms. Evacuation procedures.

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Element/Issue	Emergency Response
	<ul style="list-style-type: none"> Emergency response equipment. Leak detection and control points. Training requirements. Site access and security.
Monitoring and Auditing	The effectiveness of the emergency response plan will be regularly tested and audited.
Reporting and Corrective Action	<p>Reporting, investigation and management of corrective actions associated with emergency response events (including incidents, hazards, near misses, non-compliance events and third party complaints) will be managed through the IMS and reported to the appropriate authority as required.</p> <p>Non-compliance and incident reports will be closed out by senior management.</p> <p>The following constitute incidents or failure to comply:</p> <ul style="list-style-type: none"> Emergency response plan is not prepared or implemented. Emergency response equipment is not provided. Emergency response training is not undertaken. Emergency response procedures not followed in the event of an incident. <p>In the event of an incident or failure to comply, one or more of the following actions will be undertaken as appropriate:</p> <ul style="list-style-type: none"> Prepare or implement the emergency response plan. Provide the necessary equipment or training. Investigate why the emergency response procedures were not followed and implement mitigating measures.

14.15.13 Cultural Heritage

Element/Issue	Cultural Heritage
Operational Policy or Management Objective	To protect the cultural heritage values of the marine facilities sites.
Performance Criteria	<p>Compliance with the requirements of the <i>Aboriginal Cultural Heritage Act 2003</i> and the relevant Cultural Heritage Management Plan(s) (CHMP).</p> <p>No disturbance of any place on the Queensland Heritage Register in accordance with the requirements of the <i>Queensland Heritage Act 1992</i>.</p>
Implementation Strategy	<ul style="list-style-type: none"> Santos will develop and implement an approved CHMP(s) in consultation with the relevant Aboriginal Party(ies). Protection, management and mitigation measures will be agreed after cultural heritage surveys are complete, and will be incorporated in the Santos cultural heritage management system. Where potential non-indigenous heritage material is identified and likely to be disturbed, Santos will determine the significance of the site in consultation with the DERM and undertake relocation / preservation of the material. A project specific conservation management plan will be prepared to establish mitigation, management and approval procedures. Include cultural heritage issues in the project induction program for staff and contractors, and involve representatives from the Aboriginal Party(ies) in the development and implementation of such programs.
Monitoring and Auditing	Reporting of environmental performance will be conducted in accordance with Section 14.7 of this EMP.
Reporting and Corrective Action	<p>Any signs of disturbance of artifacts will be reported to the Construction Manager and the relevant indigenous stakeholders.</p> <p>Any of the following will constitute an incident or failure to comply:</p> <ul style="list-style-type: none"> Failure to comply with CHMP(s).

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Element/Issue	Cultural Heritage
	<ul style="list-style-type: none"> • Unauthorised disturbance of any artifacts. <p>In the event of an incident or failure to comply, the commitment that has not been undertaken will be reviewed and modifications implemented as appropriate.</p>

14.15.14 Incidents and Complaints

Element/Issue	Incidents and Complaints
Operational Policy or Management Objective	To manage and respond to any environmental or social incidents and complaints from the community regarding the marine facilities.
Performance Criteria	<p>Incidents and complaints regarding environmental and social issues will be minimised and mitigation measures implemented to reduce the incidence of complaints.</p> <p>Incident and complaints register established and maintained.</p>
Implementation Strategy	<p>All incidents and complaints will be documented in the IMS.</p> <p>The complaints form will document at least the following information:</p> <ul style="list-style-type: none"> • Time, date and nature of complaint. • Type of communication (telephone, letter, email, visit). • Name, contact address and contact number (if provided). • Response and investigation undertaken as a result of the complaint. • Action taken and signature of person investigating complaint. <p>Each complaint will be investigated as soon as practicable and, where appropriate, corrective action taken to remedy the cause of the complaint.</p>
Monitoring and Auditing	The LNG Facility Environment Manager will maintain the IMS complaints register and ensure all complaints are resolved. The complaint form will be checked within two weeks of complaint receipt to ensure follow-up action has been taken to resolve the issue.
Reporting and Corrective Action	<p>All complaints and incidents are to be reported to senior management.</p> <p>The complainant will be advised of what action, if any, has been taken as a result of the complaint.</p> <p>Should further incidents occur or complaints be received in relation to previous occurrences, an appropriate selection of the following corrective actions will be undertaken:</p> <ul style="list-style-type: none"> • Additional environmental awareness training of the workforce with respect to the procedures to be followed for environmental incidents or complaints. • Investigation into why the incident/complaint was not addressed within the specified time frame. • Incident/complaint follow-up according to the results of the investigation. • Where required, work place practices will be reviewed.

14.15.15 Decommissioning

Element/Issue	Decommissioning
Operational Policy or Management Objective	To ensure that the marine facilities are effectively rehabilitated and/or decommissioned in an environmentally sustainable manner.
Performance Criteria	<ul style="list-style-type: none"> • The marine sites contain no long term environmental hazards. • Risks to the public are to be mitigated to acceptable levels. • The sites are returned to a state suitable for other uses in the future.
Implementation Strategy	<p>Rehabilitation</p> <p>The dredge material placement facility will be rehabilitated once it is no longer required for the disposal of capital or maintenance dredge material. Rehabilitation procedures will</p>

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Element/Issue	Decommissioning
	<p>include the following:</p> <ul style="list-style-type: none"> • In consultation with the relevant authorities, assessment will be made of potential future uses of the site based on consideration of the nature of surrounding land uses, the availability of existing infrastructure, and the proximity to Port Curtis. • The dredge material stored within the facility will be left to dry and compact so that it can support rehabilitation equipment. • The bund walls will be designed and constructed to be stable against long-term failure and to provide adequate safety factors. • Drainage will be provided to manage surface water flows and control erosion across the landform. Drainage and landform design will be appropriate to promote structural integrity. • The facility will be designed to ensure that no permanent water pondage occurs on the surface and stormwater is removed from the landform as quickly as possible to minimise seepage. The drainage design will include a system of contour drains and rock-lined drainage channels and drop structures. The runoff collected from the surface will be discharged in a controlled manner. • Once the surface has been re-contoured, a low-permeability cover layer will be constructed. The cover will comprise a multi-layered system to maximise its long-term stability and to reduce the seepage of water through the dredged material. • A topsoil layer will then be placed on top of the low permeability layer to enable the site to be revegetated. • The surface of the facility will be revegetated using native grass and shallow-rooted shrub species to stabilise the cover surface, to assist in the removal of water stored within the cover following extended wet periods, and to provide habitat. Sterile exotic grasses that are quicker growing than native grasses may be used initially to assist in surface stabilisation. <p>Decommissioning</p> <ul style="list-style-type: none"> • In consultation with the Gladstone Ports Corporation and other relevant authorities, an assessment will be made of the potential future uses for the project's marine facilities. This will be based on consideration of the engineering integrity of the facilities, the nature of surrounding land uses, the availability of existing infrastructure, and the proximity to Port Curtis. • If alternative uses are to be made of the facilities, Santos will enter into a formal agreement with the parties who are to take over the facilities regarding ongoing ownership and responsibilities. • A decommissioning plan will be prepared detailing the decommissioning procedures and success criteria. • Any items not proposed for ongoing use will be dismantled and removed from the site for re-sale, re-cycling or disposal. • Unwanted wharves will be demolished and piles cut off at seabed level to minimise any long term risk to navigation. • Equipment will be removed for re-sale, re-cycling or disposal. • Phase 1 and 2 contaminated land assessments will be conducted on potentially contaminated land based areas of the facilities to standards prescribed by the EP Act or other appropriate legislation applicable at the time. Where necessary, decontamination or site remediation work will be undertaken. • The land based areas will then be re-contoured and rehabilitated to achieve a stable self-sustaining landform.
Monitoring and Auditing	<p>A monitoring program that will assess the effectiveness of rehabilitation and decontamination efforts will be developed as part of the preparation of the final decommissioning plan.</p> <p>On-going environmental monitoring may be required for a period of time to ensure decontamination and rehabilitation procedures have been successful and there is no likelihood of any further contamination resulting from the site's previous activities.</p>

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Element/Issue	Decommissioning
Reporting and Corrective Action	<p>Records will be kept of any areas where decontamination is required and the steps taken to accomplish this.</p> <p>The results of rehabilitation, decontamination and any monitoring programs will be kept and presented in a decommissioning report which will be submitted to the DERM.</p> <p>The following constitute an incident or failure to comply:</p> <ul style="list-style-type: none"> • A decommissioning plan is not prepared or implemented. • Aspects of the decommissioning, remediation or rehabilitation do not satisfy the relevant regulatory authorities or other stakeholders in the project. • There is evidence of ongoing environmental harm following the completion of decommissioning activities. <p>In the case of the occurrence of the above incidents, the decommissioning plan will be reviewed and revised in consultation with all relevant parties and the situation remedied.</p>