GLNG

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN FOR LNG FACILITY
(Appendix 2, GLNG Environmental Management Plan)

REV	DATE	REASON FOR REVISION	BY	CK'D	Site Mgr	APE	PM
3	05-Dec-13	Issued for Update	ER	PN	BF	HH	BT
2	12-Apr-13	Issued for Annual Review and Update	RJF	SMP	BF	RR	BT
1	1-Nov-11	Updated for Publication	RW	RR	BF	BT	AP
0	19-May-11	Issued for Use	RW	RRR	BF	CJK	BT / AP
F	09-Feb-11	Client comments incorporated; Reissued for Permit	RW	CJK	JJM	CJK	BT / AP
E	11-Jan-11	Updated to include EPBC Approval; reissued for Permit	RW	CJK	JJM	CJK	BT / AP
D	19-Oct-10	Title revised from App B to App 2; Reissued for Permit	CJK	RW	JJM	CJK	BT / AP
C	10-Sep-10	Appendix A revised; Issued for Permit	CJK	RW	JJM	CJK	BT / AP
B	9-Aug-10	Client comments incorporated; Issue for Permit	RW	CJK	JJM	CJK	BT / AP
A	21-Jun-10	Issue for Review	RW	MD	JM	CK	BT AP

BECHTEL OG&C INC.		JOB NO. 25576	
BECHTEL	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN FOR LNG FACILITY	DOCUMENT NO.	REVISION
		100-G01-GHX-00017	3
		GLNG Doc No. 3310-BTH-3-3.3-6817	

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1 INTRODUCTION

This Construction Environmental Management Plan (CEMP), a standard element of all Bechtel construction projects, will address environmental requirements of the Project's Environmental Impact Statement (EIS), its attending Environmental Management Plan(s), conditions of the Queensland Coordinator General's Evaluation Report, Federal EPBC Approval, and regulatory permit requirements for construction and commissioning of the Gladstone LNG facility on Curtis Island, Queensland, including mainland facilities. A separate CEMP will cover construction activities at the module construction yard in Batangas, Philippines.

This CEMP describes the environmental program for Bechtel on-site field personnel and their contracted entities during the construction, and commissioning phases of the GLNG Liquefied Natural Gas (LNG) Project (the Project). It addresses field implementation and controls for environmental management in accordance with the Contract during construction and commissioning phases, as well as the processes for monitoring construction activities that could potentially impact the environment.

The objectives of the CEMP are to:

- Summarize specific requirements for compliance with government regulatory requirements, permit conditions and the Prime Contract, hereafter referred to as the Contract available at the date of issuance of this document;
- Provide for communication and documentation of environmental compliance activities during the construction and commissioning phase of the Project.

1.1 Scope

The scope of this CEMP applies to construction and commissioning activities, which are anticipated to commence early 2011 and continue through until the construction and commissioning of the LNG Facility (two Trains) is complete and has reached practical completion.. For most of this time, the dominant activities will be construction of the LNG plant and related infrastructure. Commissioning activities are expected to commence late 2013 and represent a gradual transition from construction, to which this CEMP applies, into long term operations, to which the EMP applies. Prior to commissioning, Bechtel will review the CEMP and update as necessary. This CEMP does not apply to design engineering and licensing support activities.

This CEMP, including all referenced sub-plans and procedures, does not override or modify Bechtel's proposals, the Contract or any scope of work documents for this Project ("Project Documents"). Commitments and undertakings within this CEMP, including all referenced sub-plans and procedures, are made by the Project based on the EIS (including Supplement), the Coordinator-General's Evaluation Report, the

Federal EPBC Act approval, relevant contractual requirements between GLNG and Bechtel, Bechtel's standard environmental management procedures, and the Project Documents. Nothing in this CEMP shall be construed by any party as relating to the ultimate responsibility for cost or schedule impacts of following the commitments and undertakings made, in which impacts shall be addressed in and governed by the Project Documents.

1.2 Environmental Guidance Documents

The GLNG Environmental Impact Statement (EIS) and its associated LNG Facility Environmental Management Plan and Marine Facilities Environmental Management Plan, and the Queensland Coordinator-General's Evaluation Report contain environmental conditions for the Project. These Plans / Reports contain a distillation of the EIS environmental performance criteria, implementation strategies, monitoring and auditing issues, and reporting and corrective measures. This CEMP conforms to the environmental conditions contained in these documents per the Contract, specifically the CEMP requirements of the Coordinator-General's Report, Appendix 4, Part 3, Condition 2, part (c).

This CEMP includes the following attachments and sub-plans:

Att.	Title	GLNG Doc No	Bechtel Doc No
A	Drawings	Included in the CEMP main document	
B	List of Forms	Included in the CEMP main document	
C	Acid Sulfate Soils Management	3310-BTH-3.3.3.6503	-100-GPP-GCE-00003
D	Air Quality and Dust Management Plan	3310-BTH-3.3.3.6818	-100-G01-GHX-00018
E	Bushfire Management Plan	3310-BTH-3.3.3.6819	-100-G01-GHX-00019
F	Contaminated Soil Plan	3310-BTH-3.3.3.6821	-100-G01-GHX-00021
G	Emergency Response and Preparedness Plan	3310-BTH-3.3.3.6804	-100-G01-GHX-00004
H	Environmental Monitoring Plan	3310-BTH-3.3.3.6828	-100-G01-GHX-00028
J	Environmental Training Outline	3310-BTH-3.3.3.6836	-100-G01-GHX-00036
K	Landscaping & Site Rehabilitation Plan	3310-BTH-3.3.3.6826	-100-G01-GHX-00026
L	Mosquito Management Plan	3310-BTH-3.3.3.6840	-100-G01-GHX-00040
M	Noise/Vibration, Visual/Aesthetics & Lighting Control Plan	3310-BTH-3.3.3.6829	-100-G01-GHX-00029
N	Spill Prevention, Control, and Countermeasures Plan	3310-BTH-3.3.3.6832	-100-G01-GHX-00032
O	Stormwater Management & Erosion & Sediment Control Plan	3310-BTH-3.3.3.6833	-100-G01-GHX-00033
P	Surface Water and Groundwater Management Plan	3310-BTH-3.3.3.6834	-100-G01-GHX-00034
Q	Unanticipated Discoveries Procedure	3310-BTH-3.3.3.6841	-100-G01-GHX-00041
R	Waste Management Plan	3310-BTH-3.3.3.6837	-100-G01-GHX-00037
S	Weed & Plant Pathogen Management Plan	3310-BTH-3.3.3.6838	-100-G01-GHX-00038
T	Wildlife and Habitat Management Plan	3310-BTH-3.3.3.6839	-100-G01-GHX-00039

1.3 Project Description

The LNG facility is located within the Gladstone State Development Area, Queensland, Australia, at the southwest end of Curtis Island, which is situated approximately 5 km north of the city of Gladstone. The LNG facility is being developed in two stages (called trains), the first of which will have a capacity of approximately 3 - 4 Mtpa. Figure 1.1 shows the location of the LNG facility in the context of the Gladstone region. Attachment A contains the following conceptual drawings of the facility, which are subject to refinement during detailed design without compromising the environmental outcomes:

- Drawing A3 shows the conceptual layout of the facility on the site;
- Drawing A4 shows the conceptual stormwater system and outfalls;
- Drawing A8 shows the works in the intertidal zone for the Materials Off-load Facility

Marshalling areas, parking lots, and port facilities are used on the mainland in the commercial area of Gladstone Harbour, though no significant construction has or will occur at these brownfield sites. Attachment A also contains the following conceptual drawings of these facilities:

- Drawing A1 shows the works for Port Central;
- Drawing A2 shows the works for RG Tanna.

Development of the Project gas field and gas transmission pipeline is beyond the scope of this CEMP.

The LNG facility site permit comprises a total area of approximately 188 ha. The LNG facility includes a Product Loading Facility (PLF), including a jetty, for loading LNG onto tanker ships and a Material Offloading Facility (MOF) for handling shipments of construction material. There is a heavy haul road for transferring plant, equipment and personnel from the MOF to the construction site. A construction accommodation facility (camp) is provided on the site for much of the construction workforce.

Access channels and a swing basin have been dredged by others to enable vessels to access the PLF and the MOF. The dredged material from this process has been placed both in offshore and onshore dredge material placement sites, which is beyond the scope of this CEMP.

Access to the LNG facility from the mainland will be by barge or ferry for the life of the GLNG Plant Project.

Detailed site engineering drawings and Project construction plans/procedures are available in other project submittals and not included in this Plan.

1.4 Construction

1.4.1 Contracting Strategy

Construction is being undertaken by Bechtel direct hire workforce with select activities undertaken by subcontractors. Bechtel is overall Project Manager and Principal Contractor for all construction and commissioning activities, and for operation of the mainland facilities during construction. The following major activities may be subcontracted:

- Mainland facilities – marine and land-based development for Port Central, RG Tanna and Fisherman's Landing sites, which are required for transport of personnel and materials to Curtis Island;
- Material Offloading Facility (MOF) – this will be the arrival point for personnel ferries and materials/equipment barges;
- Site Civil – including site clearing grading and establishing major stormwater control systems;
- Temporary Workers Accommodation Facility (TWAF) and recreational activities;
- Construction Facilities on Curtis Island – including construction offices, construction warehouse, and other key buildings for construction support;
- Permanent Buildings – including Control Room, Warehouse/Maintenance Building, and other key buildings for permanent plant operation.

A range of other activities and services may also be subcontracted, such as waste management, non-destructive examination, concrete batching, and various specialist services. All subcontractors will be required to comply with this CEMP. Subject to review and approval by Bechtel, major subcontractors may follow their own detailed procedures that meet or exceed the requirements of this CEMP.

1.4.2 Construction Methodology & Sequence

For the main plant areas, the execution strategy is to use modular construction. Modules are built off-shore and shipped directly to the MOF on Curtis Island.

The general methodology for construction and commissioning of the LNG plant is as follows:

- Site clearing;
- Establishment of Temporary Workers Accommodation Facility and construction infrastructure;
- Installation of temporary and permanent drainage for the site, access roads and Project infrastructure (progressive);
- Installation of temporary and permanent environmental controls as detailed on the Project drawings (progressive);
- Bulk earthworks (cut and fill);
- Infrastructure construction;
- Marine work including MOF dredging and construction, pile driving, and construction of jetty;
- Construction of permanent plant and facilities;
- Transport of materials, including via ferry/barge to Curtis Island;
- Operation of temporary sewage treatment plant and desalination plant;
- Commissioning of the LNG Plant
- Demolition and removal of temporary camps and construction structures;
- Site stabilisation and rehabilitation following construction.

1.4.3 Schedule

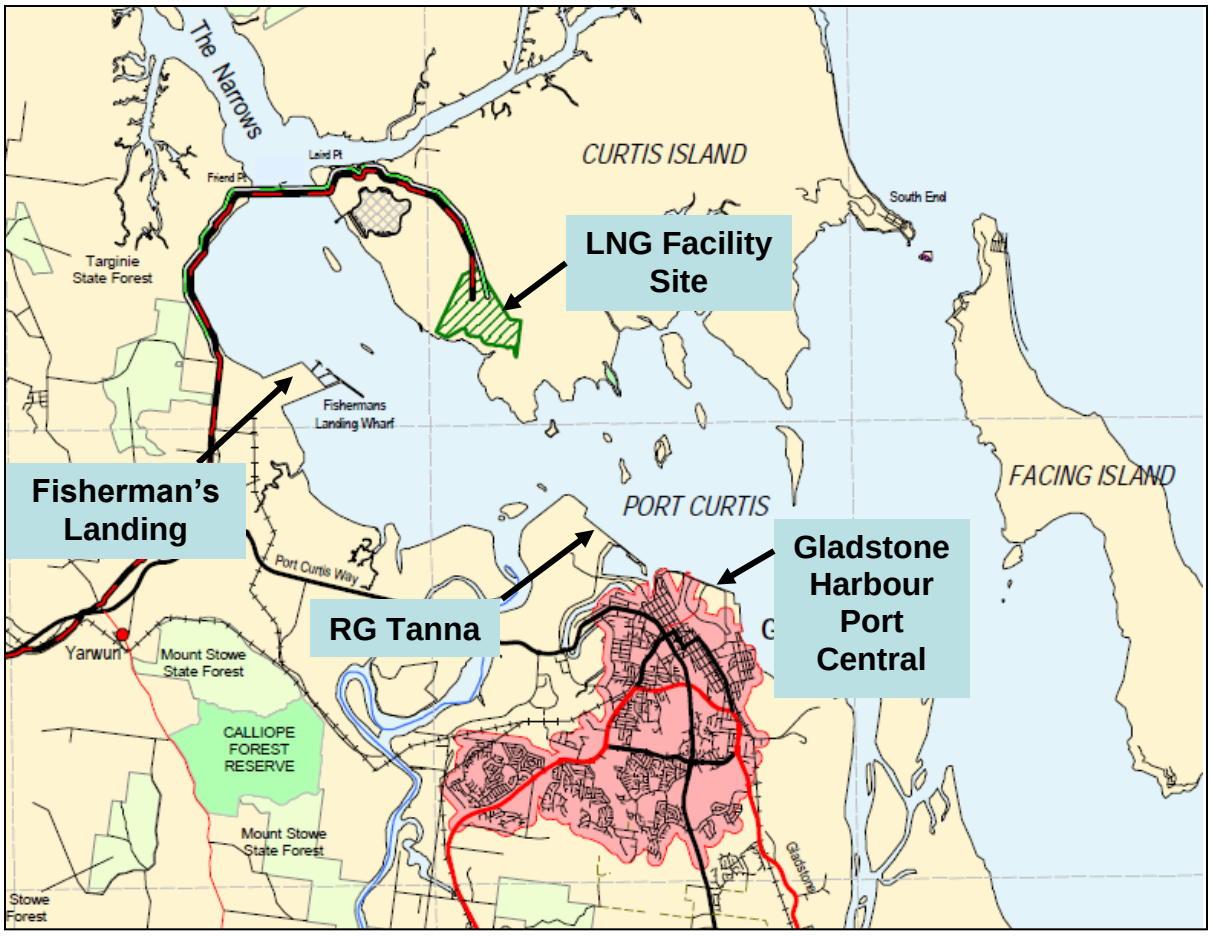
The Project is expected to begin construction in 2011 with Train 1 expected to be completed in 2015 and Train 2 in 2016. The following table summarises key schedule activities and dates.

Step	Activity/Description	Timing
Early Works		
1	Start of Site Prep (MOF & Heavy Haul Road)	2Q 2011
	• Vegetation Clearance	2Q 2011
	• Dredging	2Q 2011
2	Start of Site Prep (RG Tanna & Auckland Point)	1Q 2011
3	Start of Civil works, Foundation & Structures Permanent Plant	4Q 2011
Construction		
4	LNG Tank Construction	2Q 2012
5	PLF Construction	3Q 2012
6	Start Mechanical/Electrical Installation (main plant)	1Q 2013
7	Start Module Installation (main plant ISBL)	3Q 2013
8	System Strength and Integrity Testing (Hyrdrotesting)	4Q 2013
9	Energization of Power Generation	4Q 2014
10	Train 1 - Start System Commissioning	3Q 2014
11	Train 1 - Introduction of Gas to Front End	1Q 2015
12	Train 1 - Start-up of Refridge	1Q 2015
13	Train 1 – First Production of LNG	2Q 2015
14	Train 1 – First Cargo	3Q 2015
15	Train 1 – Performance Test	3Q 2015
16	Train 1 – Practical Completion	3Q 2015
17	Handover of Train 1 to GLNG Operations Team	3Q 2015
18	Train 2 - Introduction of Gas to Front End	4Q 2015
19	Train 2 - Start-up of Refridge	4Q 2015
20	Train 2 – First Production of LNG	4Q 2015
21	Train 2 – First Cargo	4Q 2015
22	Train 2 – Performance Test	2Q 2016
23	Train 2 – Practical Completion	2Q 2016
24	Handover of Train 2 to GLNG Operations Team	2Q 2016
Operations		
25	Normal Operations of LNG Facility (Train 1 and Train 2)	2Q 2016

1.5 Social Impact Management

Management of social impact is a GLNG responsibility. As part of the overall Project Environmental Management Plan, GLNG has prepared a Social Impact Management Plan (SIMP), in collaboration with local stakeholders and in accordance with the *Sustainable Resource Communities Policy 2008* and Department of Infrastructure and Planning draft SIMP guidelines. TheSocial Impact Management Plan establishes the roles and responsibilities of proponents, government, stakeholders, and communities throughout the life of a project in mitigating and managing social impacts and opportunities during construction, operation and decommissioning of major resource development projects (draft DIP SIMP guideline 2010).

FIGURE 1.1
LOCATION OF THE FACILITIES ADDRESSED BY THIS CEMP



2 ENVIRONMENTAL RESPONSIBILITIES

Each member of the Project team is responsible for conforming to applicable Australian laws and regulations and for conducting work in accordance with permit requirements and this CEMP. Specific responsibilities of Project entities and personnel are addressed in the following sections. A Project Contact List (updated as new information is available) is included in Appendix B, Forms.

2.1 Permits

Local, state, and federal permits are required for construction and commissioning of the Project. Most of these permits have been obtained at the time. If new permits are obtained or terms and conditions of existing permits are altered this CEMP will be amended if required.

2.2 GLNG

GLNG is the operator of the Project. GLNG is thus responsible for the following items:

- Removal and disposal of all hazardous substances and unanticipated discoveries (including archaeological finds, human remains and chemical contamination) at the site;
- Providing a site free of hazardous substances;
- Obtaining all environmental permits and negotiating with relevant agencies in the local, state, and federal Australian governments for permit approvals that are required for site access, development, commissioning and operation.

Division of responsibilities between GLNG and Bechtel are further described in the Contract.

2.3 Bechtel

Bechtel is the Prime Contractor for the construction scope which includes commissioning activities. Bechtel is responsible for complying with its obligations set forth in the Contract. Bechtel and its subcontractors are responsible for the implementation of this CEMP. All environmental issues will be directed to the Bechtel site Environmental Manager.

Bechtel responsibilities may be modified based on changes to the Contract and additional approvals and/or licenses obtained.

2.3.1 Senior Project Manager

Bechtel's Senior Project Manager is responsible for ensuring that Bechtel and its subcontractors comply with its environmental obligations. The Senior Project Manager will be assisted as required by a Site Manager (SM) and Project Management Team (PMT).

2.3.2 Site Manager

The Site Manager (SM) reports to the Senior Project Manager and is the Bechtel representative responsible for overall construction management of the site and to assure that the site is in compliance with the applicable environmental requirements set forth in the Contract. The SM oversees implementation of the requirements set forth in the Contract and this CEMP during construction, such as:

- Communicate to all Project personnel regarding the environmental performance requirements and other items of environmental importance;
- Coordinate with the Environmental, Safety and Health Manager (ESHM) to verify that the overall environmental control program described in the CEMP is being implemented;
- Communicate the general site environmental issues and the status of site environmental compliance activities with GLNG.

2.3.3 Commissioning and Start-Up Manager

The Commissioning and Start-Up Manager (CSU Manager) reports to the Senior Project Manager and is the Bechtel representative responsible for commissioning activities associated with the GLNG Plant Project and to ensure that these activities are undertaken in compliance with the applicable environmental requirements set forth in the Contract. The CSU Manager oversees implementation of the requirements set forth in the Contract and this CEMP, such as:

- Communicate to all Project personnel regarding the environmental performance requirements and other items of environmental importance during the commissioning phase;
- Coordinate with the Environmental, Safety and Health Manager (ESHM) to verify that the overall environmental control program described in the CEMP continues to be implemented;
- Communicate the general site environmental issues and the status of site environmental compliance activities with GLNG during the commissioning phase.

2.3.4 Environmental, Safety and Health Manager

The Environmental, Safety and Health Manager (ESHM) has the primary responsibility for coordinating the implementation of the CEMP on-site. The ESHM is assigned with the approval of the Senior Project Manager. The ESHM may be assisted and supported by the Environmental Manager (EM) and other staff, as required.

The ESHM and delegated environmental staff will perform the following duties:

- Implement and execute the requirements described in this CEMP;
- Assign and train staff to perform environmental tasks;
- Participate in the subcontractor selection process and evaluate candidates for environmental and regulatory compliance capability;
- Coordinate with subcontractors prior to mobilization to verify that subcontractors comply with the CEMP as applicable;
- Develop the Project's regulatory compliance, government interface procedures, and environmental awareness training program;
- Verify suppliers and subcontractor contractual arrangements include applicable regulatory compliance and environmental management requirements;
- Provide the Project with technical and regulatory compliance support;
- Verify that the documentation developed during engineering, procurement, and construction (EPC), illustrating compliance with ESH and permit requirements, is properly distributed utilizing the appropriate process/tool (i.e., the document management system);
- Coordinate with Project subcontractors to verify that the subcontractors are implementing their approved environmental plan;
- Coordinate with the Project Permits Manager and tracks acquisition of environmental permits and verifies permit conditions are communicated to Project Managers and incorporated into plans and procedures;
- Prepare and update the environmental awareness portion of New-Hire Orientation training, and train the HSE trainer(s) who will teach the orientation class to all on-site Bechtel construction personnel and subcontractors;
- Develop and deliver advanced environmental training to Project managers/superintendents/engineers and environmental staff, and maintain all training records;
- Conduct regular field inspections of construction activities (including subcontractors) for compliance with the requirements described in this CEMP, Project applicable environmental permits, and Project plans;
- Communicate the need for corrective actions to be performed to the SM, Area Superintendents, Engineers, subcontractors, and Subcontracts Manager, as appropriate;

- Develop and implement the site environmental monitoring and reporting program;
- Use “stop-work” authority for construction activities that could have, or are causing, adverse impacts to the environment or are in violation of the requirements described in this CEMP;
- Review and evaluate subcontractor environmental compliance plans and provide guidance for improvements as needed;
- Maintain environmental tracking registers (e.g., waste records, spill log) and prepare and submit required associated reports;
- Coordinate with GLNG sustainable development and community relations staff;
- Perform Environmental Self Assessments;
- Verify and validate construction effluent discharges meet Project effluent discharge quality limits as defined in applicable permits.

2.3.5 Project Permits Manager

The Project Permits Manager (PPM) will assist GLNG in obtaining environmental and other permits required for development of the Project. The PPM will inform the Site Manager and Environmental, Safety and Health Manager of relevant requirements and conditions contained in permits.

2.3.6 Environmental Manager

A site Environmental Manager will be appointed for the Project and will report to the Environment, Safety and Health Manager. The Environmental Manager is assigned to the Project site and works for the Environment, Safety and Health Manager in implementing the CEMP. The Environmental Manager is responsible for:

- Performing assessments and monitoring of construction activities that may affect the environment;
- Reporting as required by Project permits/approvals.

2.3.7 Environmental Staff

The Environment, Safety and Health Manager may assign staff to assist the Environmental Manager in performing environmental tasks such as training, inspection, or monitoring to ensure compliance with Project Plans, legislative and other requirements.

2.3.8 Subcontracts Manager

The on-site Subcontracts Manager and delegated administrators will be responsible for verifying that the subcontractors implement the CEMP (as applicable) and maintain compliance with all applicable environmental requirements. The Bechtel Environment, Safety and Health Manager and Environmental Manager will provide technical assistance and support to the Subcontracts Manager as required. The Subcontracts Manager has responsibilities that include, but are not limited to:

- Confirming that the subcontractors perform their scope of work in accordance with their contract and the applicable portions of the CEMP;
- Documenting construction environmental compliance, corrective actions, and notifying the Site Manager, as necessary;
- Interacting with the subcontractors and the Environment, Safety and Health Manager for environmental compliance issues;
- Coordinating subcontractor environmental non-compliance issues and problem resolution with the Environment, Safety and Health Manager and the Site Manager, as required.

2.4 Subcontractors

A number of firms will be subcontracted to Bechtel to perform various portions of the on-site work. Each of these subcontractors and their lower-tier subcontractors will be required to comply with Project environmental requirements relevant to their scope of work. It is each subcontractor's responsibility to read and understand this CEMP and associated Plans, adhere to the Project's environmental requirements, and perform all of their work in accordance with these requirements.

Certain large-scope subcontractors who have the potential to significantly impact the environment may be required by Bechtel to develop Environmental Plans or Environmental Procedures (EP) specific to their task(s). The EP's will describe the required practices and procedures to manage environmental risk and ensure environmental compliance with legislative and other requirements of their specific segment of construction. Each of these subcontractors will submit their EP to the Subcontracts Manager for review and approval by the Bechtel Environment, Safety and Health Manager. Subcontractors' EPs should use the standards identified in this CEMP, as applicable.

The subcontractors will address the following as it applies to their scope of work:

- Division of Responsibilities ("DOR") within the subcontractor's organization;
- Regulatory compliance and environmental training of staff;
- Daily field inspections and documentation;
- Subcontractor's waste management (non-restricted and restricted) plan;
- Erosion and sedimentation control;
- Sensitive resources;
- Air quality (vehicle emissions and dust control),;
- Effluent quality compliance;
- Unanticipated (archaeological, human remains, environmental and UXO) discoveries;
- Spill prevention and response program;
- Hazardous materials management;
- Noise;
- Odours;
- Lighting;
- Government interface procedures; and
- Any other areas covered in the CEMP that need to be addressed due to the subcontractor's Scope of Work.

Each subcontractor has the responsibility of formally communicating the requirements applicable to their scope of work to their personnel and lower-tier subcontractors (note, subcontractors are responsible for the environmental performance and monitoring of all of their lower-tier subcontractors). Each subcontractor will designate an individual who is responsible for implementing appropriate environmental procedures. Each subcontractor will perform bi-weekly inspections of their work areas to document compliance with the applicable Project environmental requirements. These documented field inspections must be kept at the subcontractor's field office during their stay at the Project. The subcontractor will make these files available to the Environment, Safety and Health Manager when requested.

All wastes (e.g., trash, construction debris, restricted, non-restricted) will be the responsibility of the subcontractor that generates the waste until the waste is transferred to the Project designated area for each type of waste.

2.5 Environmental Policy

Bechtel is committed to the protection and enhancement of the environment and to the communities in which they operate. In order to achieve this, Bechtel's activities will be executed according to the following:

- Compliance with current environmental and other national legal requirements;
- Where possible, limit disturbance to fauna, flora and soil;
- Prevention and reduction of waste, soil, air, and water pollution, and disturbance of the surroundings;
- Correct handling of environmental-threatening products and limitation of their use, where reasonably practicable;
- Rational use of water, energy, fuels and materials;
- Implementation of measures to prevent environmental incidents and emergency situations; and
- Encouragement of environmental awareness of all employees and relevant subcontractors by education, training and written work instructions or procedures.

The Project will conform to Bechtel Policy 111 and the GLNG Environmental Policy found on the following pages.

111: ENVIRONMENTAL, SAFETY & HEALTH

STATEMENT OF POLICY:

One of Bechtel's most important values is conducting business with the greatest care for the health and safety of our employees, our partners', contractors' and customers' personnel and the people in the communities where we work. Bechtel is also dedicated to sustainable environmental protection. We are committed to achieving and sustaining "Zero Accidents" performance, and to working with all appropriate stakeholders to improve ES&H effectiveness in our industry. We will not compromise on these values.

RESPONSIBILITIES:

ES&H is a line responsibility, requiring leadership and active participation by all managers, supervisors and employees. Through this leadership and involvement, Bechtel will:

- Educate and coach managers, and employees on ES&H requirements and hold them accountable for compliance.
- Implement an integrated ES&H management system to identify, assess and manage ES&H risks associated with our businesses and projects.
- Perform our work with dedication to eliminating and/or mitigating potential environmental, safety and human health impacts.
- Conduct all of our activities in a manner that accounts for impact to the environment and the safety and health of our workforce and local communities.
- Comply with all applicable laws, regulations and contract requirements relating to ES&H protection including all Bechtel ES&H standards.
- Develop, maintain and apply standards where ES&H protections do not exist.
- Promote timely open communications and consultation with employees, customers, partners, governments, government agencies, communities, and contractors on ES&H matters.
- Develop and maintain appropriate ES&H metrics to measure and continuously improve ES&H performance.
- Provide resources and training to support environmental, safety, and health protection and achievement of ES&H objectives.
- Require Bechtel (sub)contractor compliance with our ES&H policy and standards.
- Promote utilization of Bechtel ES&H standards on our Joint Venture projects.

IMPLEMENTATION:

Management Instructions will be issued to reinforce and describe the implementation of this ES&H Policy.

RELATED POLICIES:

115 : Sustainable Development
Manual of Personnel Policies

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Environmental Policy

Our Environmental Vision:

"We will lighten the footprint of our activities"

GLNG adopts the principles of sustainable development. We recognise our responsibility to meet community expectations and we are committed to the continuous improvement of our environmental performance. We believe that environmental stewardship is both a management obligation and the responsibility of every employee.

To achieve this we will:

- Adopt and contribute to continuously improving the Santos Environment, Health and Safety Management System (EHSMS).
- Ensure that all employees and contractors receive appropriate training to fulfil their individual environmental responsibilities.
- Proactively pursue the identification of all hazards and eliminate or, if not possible, manage the risk to as low as reasonably practicable.
- Establish annual environmental objectives and targets and implement programs to achieve them.
- As a minimum comply with relevant legal and other requirements.
- Ensure that we have the resources and skills necessary to achieve our environmental commitments.
- Incorporate environmental performance in the annual appraisal of employees and contractors and recognise accordingly.
- Implement strategies to minimise pollution, manage waste effectively, use water and energy efficiently and address relevant cultural heritage and biodiversity issues.
- Formally monitor, audit, review and report annually on our environmental performance requirements against defined objectives.
- Require that companies providing contract services to GLNG manage their environmental performance in line with this Policy.

As Chief Executive Officer, I am committed to working with GLNG personnel to ensure that this policy is communicated, understood, accepted and successfully implemented by all GLNG employees and contractors.

Mark Macfarlane
CEO GLNG Operations (OPL)
1 September 2010

GLNG Operations Pty Ltd POLICY P056

3 ENVIRONMENTAL MANAGEMENT

3.1 Introduction

This section describes the environmental management measures for construction and commissioning including: inspection; quality assurance; emergencies, incidents and complaints; document control, records and reporting; training; compliance reviews, coordination, and communication.

3.2 Environmental Compliance

Regular site environmental compliance reviews shall be conducted between the Bechtel Environmental Manager, the Bechtel Site Manager, the lead subcontractor representatives, and the designated environmental representative(s) of GLNG. The purpose of these reviews is to discuss current and future construction work activities as they relate to maintaining environmental compliance.

3.3 Environmental Awareness Training

Environmental awareness training is mandatory and is provided to all site personnel as part of their regular site specific orientation. The training is provided before site personnel, including subcontractor employees, are allowed to work on-site. Refer section 6 for more information on training.

As an ongoing training and education tool, an Environmental Communication bulletin shall be issued on a regular basis to highlight a specific environmental topic or issue such as spill prevention and response, waste management, storm water management, dewatering, and several others.

3.4 Inspection

The Bechtel Environmental Manager shall develop a Project specific environmental inspection program, with a primary purpose to verify and validate Project compliance with the environmental and regulatory requirements. The Bechtel Environmental Manager or their designee shall perform and document regular field inspections to confirm that site activities (including subcontractor activities) remain in compliance with all applicable environmental requirements for the Project.

Specific areas/activities to be inspected include:

- Installation and maintenance of appropriate erosion and sediment controls throughout all work locations;
- Management of stormwater runoff in accordance with the CEMP;
- Adherence with approved grading limits, buffers, and exclusion zones;
- Verify weather station data on a daily basis;

- Proper hazardous chemical management and storage in accordance with the CEMP (e.g., stored to minimize spills, reduce exposure, prevent fires/explosions);
- Proper solid waste management activities (e.g., sufficient number of trash containers, waste segregation, use of designated storage areas, proper labelling);
- Implementation of fugitive dust mitigation measures (e.g., watering roads, covering truck loads);
- Work confined within site boundaries and approved impact areas;
- Weed and pest management in accordance with the CEMP.

The type of construction and commissioning activities occurring and environmental requirements relevant to those activities shall dictate actual inspection schedules. Subcontractors shall be expected to inspect their work areas and storage/laydown areas at least once every work day. The Bechtel Environmental Manager shall periodically verify this is being done by reviewing the subcontractor's environmental files.

The inspection checklists shall include details about the observations, the responsible party, and when the situation shall be mitigated. This inspection shall be documented on an Environmental Field Report (e.g. CEMP, Att. B, Form 2). In event of non-compliance, a Corrective Action Report (CEMP, Att. B, Form 3) shall be completed detailing the issue, responsible party, recommended corrective action, and schedule for completion.

Records of all Bechtel inspections shall be maintained by the Bechtel Environmental Manager. Subcontractors shall be required to maintain copies of their inspection reports for the life of the Project. The Bechtel Environmental Manager shall periodically check subcontractors' records to verify that records are being maintained as required by the CEMP. Records of environmental documentation (e.g., inspections, site assessments, compliance reviews, incident reports and checklists) shall be maintained by the Bechtel Environmental Manager and be made available to GLNG upon request.

3.5 Quality Assurance

Quality assurance of the Project's environmental management system shall be achieved by self-checks and Corporate audits.

3.5.1 Environmental Self-Assessment

Each quarter, the Environment, Safety and Health Manager with the assistance of the Bechtel Environmental Manager shall perform an Environmental Self-Assessment (ESA) to determine the overall level of implementation of the environmental program described in the CEMP. The self-assessment protocol shall be developed and revised according to the active scope at the time of the self-assessment. Copies of the completed ESA shall be provided to the Bechtel Site Manager and GLNG.

3.5.2 Environmental Audits

Bechtel's Corporate Environment, Safety and Health (ESH) unit shall conduct an annual environmental audit. At the conclusion of the audit, findings (if any) shall be presented to the Bechtel Environmental Manager and Site Manager. The Bechtel Environmental Manager shall be expected to close-out any outstanding environmental items identified by the auditors and report back to Corporate ESH manager on the outcome.

GLNG may also perform an environmental audit of the Project site. Bechtel shall cooperate with all GLNG audits by providing access to necessary environmental records. Findings of GLNG audits shall be discussed with GLNG site representatives and incorporated into the environmental program as warranted.

3.5.3 Construction Superintendents and the Environmental Team

Bechtel Construction Superintendents (including the relevant subcontract superintendent) and the Environmental Team have key roles in providing quality assurance for the environmental program. The responsibilities of each are described below.

Construction Superintendent	Environmental Team
Direct contact with Bechtel and subcontractors' management and crews	Weekly inspect all work areas and daily spot check on-going work
Daily inspect work activities accompanied by individual crew leads/supervisors	Prepare daily reports with photographs as appropriate
Manage environmental compliance by stopping or modifying work if necessary	Stop or modify work in conjunction with Construction Superintendent if necessary for compliance
Document inspections in Daily Reports with photographs as appropriate	Review work areas with crew leads/foremen, Subcontractor leads, and Construction Superintendent to avoid environmental issues
Notify the Environmental Manager of non-compliance or potential non-compliance and request support if necessary	Maintain an environmental punch list of items crews must perform to achieve compliance – provide this punch list to Construction Superintendents
Prepare written notice to subcontractor for serious non-compliance – provide notification to the Environmental Manager	Prepare Corrective Action Reports (CAR) for serious issues of non-compliance or potential non-compliance– distribute to Construction Superintendent and/or Contracts Manager for transmittal to subcontractors as appropriate
Meet with subcontractor and the Environmental Manager if necessary to resolve compliance issues	Provide a weekly summary of the environmental punch list and any CARs to Site Manager
Cooperate with Bechtel Corporate and GLNG environmental audits	Accompany GLNG, regulatory agency, and other stakeholders during site inspections and meetings. Record findings in daily reports, include action items in environmental punch list, and report results to Site Manager

See Attachment B, Forms, for a checklist for site environmental inspections.

3.6 Emergencies, Incidents & Complaints

An important component of the environmental management system is treatment of emergencies that may arise because of:

- Human behaviour, equipment failures, and natural events (such as a cyclone);
- Incidents that result in potential environmental impact, such as a minor oil spill;
- Complaints from the public, government agencies, or other stakeholders.

3.6.1 Emergency Response

Specific information regarding emergency response procedures, including notifications of off-site emergency response agencies, is contained in the Project's Emergency Response Plan (see also the Spill Prevention, Control, and Countermeasures Plan for immediate spill response). The Project's Environmental Incident Report Form (Att. B Form N2) shall be used to document an emergency event or incident, with appropriate narrative and supporting documents attached and filed.

3.6.2 Non-conformance, Corrective and Preventative Action

Non-conformance with the CEMP and its associated plans and procedures shall be managed in accordance with Project procedures. Environmental non-conformances are defined as:

- Any breach of approvals, permits or licenses;
- Any non-compliance with the environmental management measures outlined in the CEMP and Management Plans; or
- Any other error, misadventure or incident resulting in environmental damage which is significant, costly or harmful to the Project's, Bechtel's, or GLNG's reputations.

If audits or site inspections by the Bechtel Environmental Manager or designees identify a non-conformance, the Bechtel Environmental Manager or designee may issue subcontractors or Bechtel with a Corrective Action Request (CEMP, Att. B, Form 3). In this case, the responsible person must review, analyse and record the cause of non-conformance and develop corrective action to eliminate the cause. This must include the determination of immediate action to prevent recurrence as well as long term corrective action.

The Bechtel Environmental Manager shall maintain an Action Item Register of outstanding environmental Corrective Action Reports and the status of the necessary actions. The Action Item Register shall summarize completed and uncompleted environmental issues and/or incidents and their status so the same can be timely corrected. Trends in environmental performance may be assessed using the Trend Analysis for Environmental Corrective Actions (CEMP Att. B, Form 5) if the number of significant incidents warrants.

3.6.3 Incidents

When an activity or condition is observed or reported that may violate the Project environmental requirements, permits or procedures, the Bechtel Environmental Manager or designee shall investigate the status of the incident or noncompliance event. The Bechtel Environmental Manager shall collect the necessary information

to report to and/or brief the Bechtel Site Manager and/or the Bechtel Commissioning and Start-Up Manager dependent upon the activity being undertaken. The Bechtel Environmental Manager and/or the Bechtel Commissioning and Start-Up Manager, with assistance of the Bechtel Environmental Manager, shall communicate the event to GLNG and/or the appropriate regulatory agency, as required.

The Bechtel Environmental Manager shall work with the responsible parties to identify actions to reduce the environmental impact resulting from the incident or non-compliance event and to prevent any further or future occurrence of noncompliance. The Bechtel Environmental Manager shall prepare incident reports that shall be reviewed by the Bechtel Site Manager and/or the Bechtel Commissioning and Start-Up Manager. The Bechtel Site Manager and/or the Bechtel Commissioning and Start-Up Manager shall approve all incident reports required to be submitted to agencies to maintain accurate records of such incidents. The Bechtel Environmental Manager shall coordinate the collection of information necessary to keep the Bechtel Site Manager and/or the Bechtel Commissioning and Start-Up Manager informed for communication to GLNG and/or regulatory agencies.

Environmental incidents, based on their severity, may also be reported to Bechtel Management per Bechtel Core Processes.

If necessary, stop work orders in certain areas shall be issued if construction activities are not in accordance with the applicable environmental requirements and have the potential to result in a significant adverse impact to the environment if the activity continues. Significant adverse impacts for the purposes of this CEMP include:

- Potential spills of reportable quantities of fuel/chemicals;
- Potential spills to water of fuel/chemicals;
- Potential for fines by regulatory agency.

All Bechtel Project team personnel, including subcontractors, have the authority to stop work in event of environmental non-compliance that may cause significant harm to the environment. If such activities occur, the Bechtel Environmental Manager must be immediately informed and shall take appropriate action to halt and correct the problem and immediately notify the Bechtel Site Manager, the Bechtel Commissioning and Start-Up Manager, relevant Field Superintendents, and the Subcontracts Manager. The construction activity in question shall not resume until corrective actions have been implemented and approval for the activity to recommence has been provided by the Bechtel Site Manager and/or the Bechtel Commissioning and Start-Up Manager.

3.6.4 Complaints

Complaints from regulatory agencies or the public shall be directed to GLNG, who will lead the investigation and response with support from Bechtel.

3.7 Document Control

Both hard and electronic copies of documents related to environmental management shall be maintained for reference at field offices and for Project archives as required. The Bechtel Environmental Manager shall maintain for quick reference and audits hard copies of all permits. Similarly, all correspondence with regulatory agencies shall be on file at the site environmental office. The Bechtel Environmental Manager shall maintain a copy of all Environmental Field Reports, Corrective Action Reports, and other environmental reports and data. Electronic copies of all environmental documents shall be either submitted to Document Control and/or electronically filed and accessible.

Permit documents and environmental contact lists shall be distributed to each field office and posted as appropriate.

3.8 Records and Reporting

The following environmental records shall be maintained in order to demonstrate compliance with the CEMP:

- Inspection reports;
- Internal audit reports;
- External audit reports;
- Reports of pollution incidents, other environmental non-conformances, complaints and follow-up action;
- Minutes of environmental review meetings,
- Evidence of action taken as a result of such meetings;
- Induction and training records;
- Records of monitoring by subcontractors.

All records associated with environmental management shall be suitably processed by Project document control so that they are readily retrievable and suitably protected from deterioration or loss.

3.9 Regulatory Reporting Requirements

Numerous construction activities shall involve specific regulatory or government reporting requirements. Bechtel shall develop specific processes with GLNG regarding responsibilities for reporting to regulatory agencies for each individual permit/requirement.

4 EMERGENCY PREPAREDNESS & RESPONSE

The Project's ESH Emergency Response & Preparedness Plan (CEMP, Att. G) describes the preparedness measures and response that will be conducted in event of an emergency. Environmental emergencies may involve spills of dangerous goods on land or water, unanticipated discovery of hazardous materials, unanticipated discovery of cultural resources, bushfire, unauthorized discharge of stormwater or other contaminated water, unauthorized release of air pollutants, and unexpected encounters with wildlife. Response to an emergency generally follows these steps:

- Stop the source of the problem;
- Contain the problem to the extent possible;
- Report the problem;
- Clean-up and remediate the affected resources.

Preparedness includes developing response procedures for anticipated emergencies, pre-positioning emergency response materials (e.g., spill kits, firefighting tools) and training/equipping adequate numbers of emergency responders. In addition to the capability available to Bechtel and subcontractors, specialty subcontractors may be available for response to exceptional emergencies, such as a large fuel spill on water. See the Project's ESH Emergency Response and Preparedness Plan (CEMP, Att. G) for information.

5 POLLUTION PREVENTION

Because of the Project's proximity to significant environmental resources pollution prevention is a major objective. Plans associated with this CEMP address air quality and dust, stormwater and erosion management, spill prevention and response, waste management (including discharge from the temporary reverse osmosis (RO) desalination plant and temporary sewage treatment plant, discharge from the permanent oily water treatment plant during commissioning), and general hazardous materials management. Monitoring will be performed as required to confirm pollution prevention measures are effective. Plans for specific potential pollutants will be modified as needed to meet the circumstances of each phase of construction and commissioning. In addition, greenhouse gas emissions will be monitored and reported by GLNG per Australian law.

5.1 Construction Discharges to Air

The largest piece of mobile construction equipment on the project that is fuel burning will consume ~40 litres per hour. The only items that will consume fuel at or above these rates are the central construction diesel generators, which for a machine typical of the 2.1MW CAT or equivalent, is ~450 litres per hour, converted to mass consumption is ~405 kg/hour with diesel at 0.9 SG.

Combined running of the generators, anticipating six (6) running at full capacity (which is greater consumption than seven (7) running at reduced capacity combinations) is ~2070 kg/hour during the dayshift and ~1035 kg/hour with three (3) machines running during the peak nightshift.

Other potential discharges to air include dust generated from various construction activities, earthmoving and emissions from various light vehicles and diesel or petrol driven equipment.

5.2 Construction Discharges to Water

The construction sewerage treatment plant (STP) and water treatment plant (WTP) will represent the two (2) main discharges to water. Stormwater during periods of rain will also be discharged to Port Curtis.

The STP for construction will be sized for approximately 2,000 population equivalent and will provide tertiary treatment of sanitary wastes. Discharge to the marine environment will be via a submerged diffuser located to the south of the Material Offloading Facility (MOF). Refer Drawing A4, Attachment A, for discharge location.

The WTP will be a reverse osmosis desalination plant. Water will be drawn from Port Curtis via a dedicated intake structure to produce up to 3,000 m^3 per day of fresh water. Reject water will be discharged to the marine environment via the submerged diffuser used for the STP effluent (see above).

Runoff water from the surrounding hills will be diverted around the site via a cleanwater perimeter drain. Two outfalls will direct this water to Port Curtis/China Bay – one to the south of the site and one to the north, near the Product Loading Facility (PLF).

The majority of water falling within the disturbed area boundary will be directed to one of three (3) sedimentation ponds, designed to remove the bulk of sedimentation before discharging to Port Curtis/China Bay. Refer to Drawing A4, Attachment A, for all stormwater outfall locations. For all areas not draining to sediment basins, appropriate erosion and sediment controls have been installed to prioritise stabilisation of these areas.

5.3 Construction Discharges to Land

Construction discharges to land are not anticipated. Waste materials generated during construction will be sorted in a centralised facility for potential reuse and recycling on site, with both normal waste and regulated waste shipped to the mainland for appropriate disposal. No contaminated water or solid waste will be discharged to land within or surrounding the disturbed area.

5.4 Commissioning Discharges

As construction transitions through commissioning to operations (upon practical completion of the second Train and the removal of the Temporary Workers Accommodation Facility, construction equipment and facilities, temporary buildings and structures) the CEMP will give way to the operations EMP. There are several specific discharges that will or may occur during commissioning that are however unique. These include:

- Flaring of various gases via the permanent plant flares:
  - While flaring may occur during operational phase, the quantity of flared gas and the frequency of flaring is likely to be higher during commissioning until the plant is operating according to design criteria;
  - Visible smoke and particulate emissions may occur during commissioning intermittently until the plant is operating in accordance with design criteria
- Flushing activities to ensure the cleanliness criteria of the permanent plant is met. These include discharge of potash used to clean the amine system: Caustic potash will be transferred to the mainland for treatment and disposal with a registered waste service provider at a licensed facility, or neutralised and recycled within the plant.
- Commissioning of the Oily Water Treatment Plant and associated infrastructure which releases effluent through WW1, including; reverse osmosis operational WTP and stormwater from the process area spill containment sumps.

Other discharges during commissioning include the gas-fired equipment such as gas turbine generators and refrigeration compressor turbines, as outlined in the Operations EMP.

6 TRAINING

Training is an essential part of achieving safety and environmental outcomes and will be provided to all Project personnel as required for their role and responsibilities. All Project personnel will receive a general site induction, including a module on environmental awareness. Training will be recorded for reporting and auditing purposes.

The following matrix indicates the primary areas of training (top row) proposed to be delivered to various sections of the project workforce. Additional topic areas will also be addressed through regular toolbox sessions. The final environmental training program will be part of an integrated ESH program managed by the Environment, Safety and Health Manager.

BECHTEL ENVIRONMENTAL TRAINING MATRIX

TARGET AUDIENCE: # / TRAINING MODULE:	New-hire Orientation	Supervisor Awareness, Modules 1-3	Spill Response & Clean-up	PASS/ASS Management	Emergency	Environmental Monitoring	Wildlife & Habitat Management	Weed & Pest Management	Mosquito & Midge Management	Erosion & Sediment Control	Snake Awareness	Abrasive Blasting EMP	HAZCOM/ Hazardous Materials	Chemical Custodian Training
All personnel	x		x										x	
Senior management	x													
Supervision	x	x												
HSE team members	x		x	x	x	x	x	x	x	x	x			
Emergency Response Team	x				x		x				x			
Earthworks crew	x			x	x		x	x	x	x	x			
Environmental crew *	x				x	x	x		x	x	x			
Heavy vehicle/equip operators	x		x				x	x		x	x			
Warehouse crew	x		x				x				x			
Electrical crews	x						x				x			
STP	x		x			x	x				x			
WTP	x		x			x	x				x			

BECHTEL ENVIRONMENTAL TRAINING MATRIX															
TARGET AUDIENCE: # / TRAINING MODULE:		New-hire Orientation	Supervisor Awareness, Modules 1-3	Spill Response & Clean-up	PASS/ASS Management	Emergency	Environmental Monitoring	Wildlife & Habitat Management	Weed & Pest Management	Mosquito & Midge Management	Erosion & Sediment Control	Snake Awareness	Abrasive Blasting EMP	HAZCOM/ Hazardous Materials	Chemical Custodian Training
Concrete crews		x		x				x			x	x			
Labourers		x						x		x		x	x		
Shoreline crews		x		x	x			x			x	x			
Workshop		x		x				x		x		x			
Fitters/Boilermakers		x						x		x		x			
Abrasive blasting crew		x						x				x	x		
Chemical Custodians		x													x
CSU Team		x		x		x								x	
Security		x				x		x				x			

* This will be a civil crew for maintaining environmental controls & sediment basin management

\# Personnel may receive additional training as required by their specific duties or as requested

The following table demonstrates the link between the above training modules and this CEMP and its associated sub-plans.

CEMP Element / TRAINING MODULE:	New-hire Orientation	Supervisor Awareness, Modules 1-3	Spill Response & Clean-up	Hazardous Materials	PASS/ASS Management	Bushfire Management	Environmental Monitoring	Water Management	Wildlife & Habitat Management	Weed & Pest Management	Mosquito & Midge Management	Cultural Heritage Management
CEMP (this document)	X	X	X	X	X	X	X	X	X	X	X	X
C – ASS/PASS Management		X			X							
D – Air Quality Management		X										
E – Bushfire Management		X				X						
F – Contaminated Soil		X		X								
G – Emergency Response		X		X		X						
H – Environmental Monitoring		X					X					
K – Landscaping & Site Rehabilitation		X										
L – Mosquito Management		X									X	
M – Noise, Visual & Lighting Control		X										
N – Spill Prevention		X		X								
O – Stormwater, Erosion & Sediment		X						X				
P – Surface/Ground Water Management		X						X				
Q – Unanticipated Discoveries		X										X
R – Waste Management		X										
S – Weed/Pest Animal Management		X								X		
T – Wildlife and Habitat Management		X							X			

An outline of proposed environmental training packages is contained in the Environmental Training Outline, Attachment J.

7 COMPLIANCE TRACKING

The goal for construction and commissioning is zero environmental incidents. In order to measure compliance with Project requirements the following will be utilized:

Subcontractor reviews	Subcontractor environmental programs will be regularly reviewed including examination of plans and procedures, evaluation of performance records, and regular meetings between Bechtel and subcontractors' environmental managers to review compliance status and upcoming work.
Inspections	Bechtel shall routinely inspect the job site to identify issues regarding environmental compliance including proper waste disposal, spill prevention and clean-up, storage of hazardous materials, noise/dust/lighting compliance, and maintenance/management of the stormwater and erosion control systems. All Bechtel inspectors have stop-work authority and the responsibility to rectify non-compliance issues as quickly as possible.
Monitoring	Monitoring will be conducted for several environmental media including air emissions and dust, noise, wildlife, groundwater, waste, seawater intake to RO plant, and discharges from sewerage treatment plants and stormwater outfalls as required.
Recordkeeping	Reports by environmental inspectors will be maintained by Bechtel at the Project site. Reports shall include written accounts of where inspections were conducted, objective accounts of what was observed, any remedial actions that were taken, and photos of pertinent matters. An Action Item list will be maintained by the Environmental Manager including issues from the inspection reports that require follow-up action.
Reporting	Specific reports will be prepared, when necessary, to inform GLNG, regulatory agencies, or subcontractors of the results of environmental inspections or required notifications.

The Environmental Monitoring Plan and Environmental Management Controls contain additional details regarding compliance tracking and communication.

8 SELF-AUDITING, EMS REVIEW AND CEMP UPDATING

This CEMP will be kept current with the advancement of construction and commissioning and other changes to Project environmental requirements by regular revision and issuance of official updated versions. The CEMP will be required reading for key Project personnel. The EM will be responsible for updating the CEMP based on Project performance and project audits and reviews.

The effectiveness of the CEMP and Project environmental management system will be assessed by risk reviews conducted by the Environment, Safety and Health Manager with Project Senior Management on at least an annual basis. Also, Bechtel Health, Safety, and Environmental services (Corporate level) will audit environmental performance to assess application of the CEMP and its success. The Environmental Management Controls contains additional information.

9 CONSTRUCTION AND COMMISSIONING COMPLIANCE

Compliance with specific environmental requirements is presented in this section. Specific plans and procedures are prepared for topics requiring extraordinary treatment to verify specific compliance requirements are met.

9.1 Air Quality & Dust

The management objectives for air quality during construction and commissioning are as follows:

- Compliance with relevant Queensland Environmental Protection Act, permits or laws and international best practice guidelines for air quality management, as applicable; and
- Minimization of emissions generated by construction and commissioning activities and equipment to the extent practicable.

Management of air quality, which is predominantly dust control during construction and emissions during commissioning, is addressed in Attachment D, Air Quality Management Plan.

9.2 Bushfire

Bushfire is a threat to construction and commissioning activities on Curtis Island because of dense natural vegetation. Fires may be caused by lightning, construction activities, or ignited off-site by non-Project related human activities. Attachment E, Bushfire Management Plan, contains details.

9.3 Cultural Resources

Cultural resources have been discovered on the Project site. Management of known cultural resources, additional cultural resources surveys, and unanticipated discovery of cultural resources during construction are the responsibility of GLNG and are discussed in the GLNG Cultural Resources Plan. Discovery of any cultural resources during construction will be treated in accordance with the Unanticipated Discoveries Procedure (CEMP, Att. Q).

GLNG has prepared two 'Approved Cultural Heritage Management Plans' as required under the *Aboriginal Cultural Heritage Act, 2004* that address the impact of construction on Aboriginal Cultural Heritage.

9.4 Vegetation Clearing and Topsoil

Significant earthworks has previously occurred at the Project site including sizeable cuts/fills. Vegetation and topsoil in the work zone has been removed. Project procedures for vegetation clearing and topsoil management are outlined in this section and were adhered to through this process. Any additional clearing required onsite will also follow these controls.

9.4.1 Vegetation Clearing

Vegetation clearing includes removing all vegetation from the construction area. Clearing consisted of removing trees by hand, falling or pushing/pulling over with tractors, brush raking shrubs, and scraping/mowing grasses and low-growing vegetation. Merchantable trees were able be taken for timber or woodchips and all other material was chipped on-site; some chips were stored for use in erosion control and site landscaping/rehabilitation and the others disposed. Naturally occurring logs on the ground (some hollow), e.g., windfalls or killed by past bushfires, were also removed; however, selected hollow logs were able to be stored for use during landscaping/rehabilitation and the remainder chipped/disposed.

9.4.2 Wildlife Management during Clearing

A plan for managing wildlife during site clearing is contained in Attachment T, Wildlife and Habitat Management Plan. In addition, the Federal EPBC Approval contains the following conditions regarding pre-clearance surveys that were addressed by GLNG prior to clearing vegetation onsite:

20 At least one week before the commencement of clearance of native vegetation associated with the construction and operation of the LNG facility, the proponent must undertake pre-clearance surveys to verify the presence or absence of listed ecological communities, listed threatened species, listed migratory species, their habitat, and species identified as contributing to the

World Heritage and National Heritage values of the Great Barrier Reef World Heritage Area.

21 Pre-clearance surveys must:

a) be undertaken consistent with the Department's survey guidelines in effect at the time of the survey. This information can be obtained from http://www.environment.gov.au/epbc/guidelines-policies.html#threatened;
b) take account and reference previous ecological surveys undertaken by the proponent for the area and relevant new information on likely presence or absence of MNES;
c) be undertaken by a suitably qualified ecologist approved in writing by the Department;
d) document the survey methodology, targeted species and ecological communities, results and significant findings in relation to MNES; and
e) apply best practice site assessment and ecological survey methods appropriate for each listed threatened species, listed migratory species, their habitat, and listed ecological communities. Pre-clearance survey reports (which document the methods used and the results obtained) must be published by the proponent on the internet before commencement and provided to the Department on request.

22 If a listed ecological community or threatened species or migratory species or their habitat, is found during the verification surveys undertaken as required by condition 20, and is not specified in conditions 32-39[1] inclusive, the proponent must submit a separate management plan for each such species, ecological community or other MNES, to manage the impacts of construction and operation of the LNG facility. Each such plan must be submitted before the commencement of construction of the LNG facility. Each plan must include:

a) a map of the location of species or species or ecological communities' habitat in relation to the LNG Facility and its associated infrastructure;
b) a description of the measures that will be employed to avoid impact on the species or ecological communities habitat
c) where impacts are unavoidable, and if an impacted species or ecological community is not specified in conditions 32-39 inclusive, propose offsets to compensate for the impact on the population or impact on the species or ecological communities habitat

[1] Conditions 32-39 refer to the Water Mouse and Marine Turtles, which require separate environmental management plans under Referral No. EPBC 2008-4057.

9.4.3 Topsoil Management during Clearing

Topsoil shall be salvaged in areas where topsoil is present in sufficient thickness to enable removing it with construction equipment. Recommended depths of topsoil clearing have been calculated for various locations of the Project site based on soil surveys. Topsoil will be salvaged and stored in stockpiles to be used during site landscaping and rehabilitation (see Attachment K, Landscaping and Site Rehabilitation Plan). Topsoil stockpiles will be placed in defined areas. Stockpiles may serve as noise or visual barriers. Topsoil stockpiles will be:

- Located away from drainage ways where possible. If topsoil stockpiles are within the vicinity of drainage ways appropriate erosion and sediment control measures should be implemented;
- Not obstructing wildlife movement, impacting live trees, or blocking access to site areas requiring inspection/maintenance;
- Not over three (3) m tall;
- Stabilized by mulch, vegetation, erosion control blanket, or other suitable means;
- Protected from stormwater erosion by surface water management and sediment control measures;
- Protected from wind erosion by watering or other means;
- Clearly signed as being 'Topsoil';
- Protected from vehicles driving on them to avoid compaction;
- Protected from use for other than landscape/rehabilitation purposes;
- Regularly inspected for erosion, encroachment or weeds and necessary maintenance performed.

Workers will be advised regarding the location and management of topsoil stockpiles.

9.5 Spill Prevention and Response

Prevention of fuel, oil, and chemical spills is a major effort involving careful selection of products used, locations for storage and use, training of workers, and provision for appropriate tanks, tools, and containments. Workers will also be trained in spill response and necessary spill response/clean up materials will be readily available throughout the Project site. A diligent inspection and reporting program will be conducted to certify spill prevention measures are in place and effective. Attachment N, Spill Prevention, Control, and Countermeasures Plan, contains details.

9.6 Stormwater, Erosion, and Sediment Control

Extensive vegetation clearing and earthworks on the Project site increases the potential for accelerated soil erosion. Stormwater pollution prevention methods are described in Attachment O, Stormwater Management and Erosion and Sediment Control Plan.

9.7 Unanticipated Discoveries

Unanticipated discoveries may occur during construction and include archaeological/paleontological artefacts, naturally contaminated soil or water, man-caused contaminated soil or water, or other unexpected finds, such as unexploded munitions (ordnance) or buried utilities. Discoveries or encounters with wildlife or rare plant species are discussed in Attachment T, Wildlife and Habitat Management Plan. The procedure for unanticipated discoveries is contained in Attachment Q, Unanticipated Discoveries Procedure.

9.8 Waste

Several types of waste will be generated during construction and commissioning. Disposal for waste from Curtis Island will be on the mainland at existing disposal/treatment facilities and recycled or reused where possible. Waste will be transported to the mainland by a registered operator which is appropriately licensed. Waste minimization is a major goal of the project. Attachment R, Waste Management Plan, describes details for waste handling, recycling, reuse and disposal.

9.9 Surface Water and Groundwater

Surface water resources include stormwater, existing livestock watering ponds, ephemeral drainage channels, and the Port of Gladstone. Groundwater may be encountered during site excavations, but no extraction of groundwater for construction purposes is anticipated. Attachment P, Surface Water and Groundwater Management Plan, describes surface water and groundwater management.

9.10 Contaminated Soil and Dredge Spoil

Contaminated soil and dredge spoil may be encountered because of excavation into geologic formations that contain naturally high levels of contaminates or by excavating areas polluted by past land use practices, such as mining and livestock handling. Attachment F, Contaminated Soil Plan, and Attachment C, Actual/Potential Acid Sulphate Soil Management Plan, describe handling and treatment of contaminated soil and dredge spoils.

At the Materials Offloading Facility (MOF), dredging has been undertaken near shore in accordance with a Dredge Management Plan. The dredge spoil has been disposed by direction of GLNG to both the Fishermans Landing and the Offshore

East Banks disposal area managed by Gladstone Port Corporation. If future dredging is required it will be undertaken in accordance with a Dredge Management Plan and required permits.

9.11 Weed & Plant Pathogen Management Plan

Management for weed and pest animals on Curtis Island, including coordination with the Australia Quarantine and Inspection Service is described in Attachment S, Weed & Plant Pathogen Management Plan.

9.12 Wildlife and Habitat Protection

The Project's potential impacts to marine and terrestrial wildlife and habitats were assessed during preparation of the GLNG Environmental Impact Statement. Management measures for wildlife and habitat are contained in Attachment T, Wildlife and Habitat Management Plan.

9.13 Hazardous Materials

All hazardous substances and petroleum products, hereafter termed hazardous materials, shall be managed in accordance with the requirements described in this section of the CEMP and in Attachment N, Spill Prevention, Control, and Countermeasures Plan, in order to minimise the potential for threats to human health and the environment.

The common hazardous materials that may be used, generated, or become waste during the course of construction and commissioning are:

- Gasoline/diesel fuel and oils (including hydraulic oils);
- Oil filters;
- Solvents and thinners;
- Batteries;
- Caustics (e.g., battery acid);
- Paints (toxic or flammable);
- Resins and glues;
- Chemicals used to operate the temporary Sanitary Treatment Plant and the Water Treatment Plants;
- Construction and commissioning chemicals (where these contain toxic or flammable components);
- Welding fuel gases, e.g., acetylene, LPG;
- Welding ignition sources;

- Tyres;
- Potash;
- Amine solution;
- Radiation Devices (NDT subcontractors or other users will be required to comply with all the applicable Australian government requirements regarding use of radiation).

Bechtel and its subcontractors will develop and implement measures to minimise the amount of hazardous materials brought on-site and used in order to prevent spills (and associated wastes which may be classed as hazardous). This forms part of the Environmental Plan produced by individual subcontractors. Specifically, hazardous materials will need to be approved by Bechtel prior to being brought on-site. When applicable, Bechtel will suggest that less hazardous materials be substituted for the selected material.

Prior to bringing a hazardous material on-site, a request in writing requesting approval from Bechtel Environment Team to use the material on-site. The request shall include the name of the material, quantity and type and the Safety Data Sheet (SDS). Bechtel shall verify that the hazardous material is not banned or a restricted-use chemical in Australia and that spill response materials are sufficient to address potential spills. Subcontractors are required to obtain their own permits/licenses (if required by Australian regulations) to transport or use hazardous materials.

The Bechtel Environment, Safety and Health Manager will review each request for use of hazardous material and approve only those materials that are allowed.

All hazardous materials and petroleum products(including used oil) storage tanks and containers must be compatible with the materials to be stored within them, in accordance with their respective SDS. Under no circumstances will on-site storage tanks and containers be reused or refilled with hazardous materials different from those originally held in the tank or container without certified retreatment/cleaning. Hazardous wastes will be stored in containers with appropriate labelling.

To minimise the possibility of inadvertent mixing of incompatible materials during handling, incompatible materials will be segregated (e.g., by using distance, curbing, or berms) in storage areas. Materials shall only be used in accordance with the manufacturer's directions and the product SDS recommendations. All containers must be appropriately labelled.

The following information will be available with the SDS and will be inspected to verify a copy of SDSs, inspection records, transportation documents and waste logs is maintained. Additionally, the Environment, Safety and Health Manager will maintain a copy of each SDS at the site. Information available on-site will include:

- Chemical and physical properties of the substance;
- The degree of risk of the contained substance and its Australian hazard classification;
- Chemical safety guidelines for handling or dealing with the chemicals, especially during any incident or emergency;
- Purpose of use of the contents and expiration date;
- Full name and address of the manufacturer or producer;
- Storage instructions relating to temperature, pressure, light, etc.;

All workers handling hazardous materials shall be educated about the risks and use, and trained to clean up material(s) in the instance of a spill. Diligent inspections by environmental staff shall confirm that hazardous materials are properly stored, used and disposed of.

9.14 Traffic

Traffic management for the Project has several elements, including travel on public roads on the mainland, boat traffic in the Port of Gladstone from the mainland to Curtis Island, boat traffic from outside of the Port of Gladstone to the mainland or Curtis Island, and traffic on Curtis Island. A Project Traffic and Logistics Plan will be prepared and maintained to help manage road and harbour traffic generated by the Project. Safety and health issues related to traffic are addressed in the Project's Environmental, Safety and Health Plan.

9.15 Noise/Vibration, Visual/Aesthetics & Lighting

There are several potential sources of environmental impact from Project-related noise/vibration, visual/aesthetics issues, and lighting. The GLNG Environmental Impact Statement outlines several strategies for dealing with these issues and they are addressed in Attachment M, Noise/Vibration, Visual/Aesthetics & Lighting Plan.

9.16 Construction and Commissioning Sanitary Wastewater & Desalination Plant Management

Waste water from the construction phase sewerage treatment plant (STP) and desalination water treatment plant (WTP) will be discharged to Port Curtis during construction and commissioning. For further details, refer to CEMP Att. R, Waste Management Plan.

The sewerage treatment plant will treat wastewater from the island's camp services, offices, and wash-down facilities. Water treatment will be to a standard per requirements set forth in permits obtained from the Queensland Department of Environment and Heritage Protection (EHP). Treated water will be discharged into the Port of Gladstone via Outfall Diffuser WW2.

The water treatment plant will use reverse osmosis to produce potable water from sea water taken from the Port of Gladstone offshore of the Project site. The desalination plant will produce brine (highly saline water) as a by-product that will be discharged to the Port of Gladstone via Outfall Diffuser WW2.

Operators of the STP and the WTP will be trained in proper use and recovery during upset conditions. Regular monitoring, including laboratory analysis of discharge waters will be performed to confirm compliance with the approved discharge standards.

For the operational phase of the Project, raw sewerage will be discharged into the GRC wastewater line.

9.17 Oily Water Treatment Plant, Operations Water Treatment Plant and Stormwater from the Process Area Spill Containment Sump Management

Effluent from the Oily Water Treatment Plant, Operations WTP and stormwater from the process area spill containment sumps will be discharged to Port Curtis during commissioning and operations via outfall diffuser WW1. For further details, refer to CEMP Att. R, Waste Management Plan.

The Oily Water Treatment Plant will treat wastewater from permanent plant processes including the stormwater from the process area spill containment sumps. Water treatment will be to a standard per requirements set forth in permits obtained from the Queensland department of Environment and Heritage Protection (EHP). Treated water will be discharged into the Port of Gladstone via Outfall Diffuser WW1.

The Operational Water Treatment Plant will use reverse osmosis to produce demineralised water taken from the Gladstone Area Water Board (GAWB) pipeline. Condensate water produced at the Turbine Inlet Air Chilling (TIAC) will also be utilised as source water. Condensate water will have characteristics similar to rainwater. The resulting demineralised water is used as make-up water in the Acid Gas Removal System and also as gas turbine blade wash water. Waste streams from the Operational Water Treatment Plant are pumped to diffuser WW1.

Operators of the permanent plant will be trained in proper use and recovery during upset conditions. Regular monitoring, including laboratory analysis of discharge

waters will be performed to confirm compliance with the approved discharge standards.
Stormwater from the process area spill containment sumps will also be discharged through WW1 during commissioning. Collected stormwater will be free of contaminants.

9.18 Water Conservation

The sources of potable water on Curtis Island during construction are limited to treatment of seawater by a desalination plant and bringing water to the island from the mainland. Management of the camp facility has water conservation as a primary goal. Water used for construction purposes will be managed to limit quantities used and water will be reused wherever possible. Seawater may be used for some construction and/or commissioning purposes. Where possible, replacing water use with other measures will be carried out.

All workers will be advised in proper water use and signage and follow-up training will be constant reminders of the importance of water conservation techniques.

9.19 Landscaping & Site Rehabilitation

All temporarily disturbed areas will be rehabilitated, either concurrent with construction as areas are no longer required for construction or at the end of construction during final site rehabilitation as described in Attachment K, Landscaping and Site Rehabilitation Plan.

Decommissioning and final site restoration is not anticipated for several decades and is beyond the scope of this CEMP.

10 DEFINITIONS

Construction: means in relation to the LNG plant the period when the construction of the LNG plant takes place on Curtis Island, and during commissioning

Commissioning: the point at which, following the completion of the construction of the first LNG train, it is tested to verify if it functions according to its design objectives or specifications

Normal Operating Conditions: means the conditions maintained during the ongoing operation of the LNG facility following the commissioning period

Operation: means the ongoing operation of the LNG plant following the commissioning period

11 ABBREVIATIONS

Acronym	Description
A/PASS	Actual and Potential Acid Sulfate Soils
AC	Asphalt Concrete
AQIS	Australian Quarantine and Inspection Service
ASS	Acid Sulfate Soils
BQCC	Biosecurity Queensland Control Centre
Bti	Bacillus thuringiensis serovar israelensis
CAR	Corrective Action Report
CAS	Chemical Abstract Services
CEMP	Construction Environmental Management Plan
CGR	Coordinator General's Report
DEEDI	Department of Employment, Economic Development, and Innovation
DEHP	Department of Environment and Heritage Protection
DIP	Department of Infrastructure and Planning
DOR	Division of Responsibilities
EIS	Environmental Impact Statement
EMC	Environmental Management Controls
EMP	Environmental Management Plan
EP	Environmental Procedure
EPC	Engineering, Procurement, and Construction
ERP	Emergency Response Plan
GHG	Greenhouse Gas
GLNG	Gladstone LNG
HSE	Health, Safety, and Environmental
HSEM	Health, Safety, and Environmental Manager
IUCN Red List	Intl. Union for Conservation of Nature (List of threatened species)
JHA	Job Hazard Analysis
LNG	Liquefied Natural Gas
MCU	Mosquito Control
MOF	Material Offloading Facility
SDS	Safety Data Sheet
NDT	Non Destructive Testing

Acronym	Description
OSH	Occupational Health and Safety
PCC	Portland Cement Concrete
PLF	Product Loading Facility
PM10	Particulate Matter with an aerodynamic diameter of less than 10 micrometre
PMT	Project Management Team
PPE	Personal Protective Equipment
PPM	Project Permits Manager
RO	Reverse Osmosis
SAA	Satellite Accumulation Areas
EM	Environmental Manager
SIMP	Social Impact Management Plan
SM	Site Manager
STARRT	Safety Task and Risk Reduction Talk
STP	Sewerage Treatment Plant
TSS	Total Suspended Solids
TWAF	Temporary Worker Accommodation Facility
VOC	Volatile Organic Compounds
WHMP	Wildlife and Habitat Management Plan
WMA	Waste Management Areas
WMS	Waste Management Subcontractor
WSA	Waste Storage Area
WTP	Water Treatment Plant

Attachment A

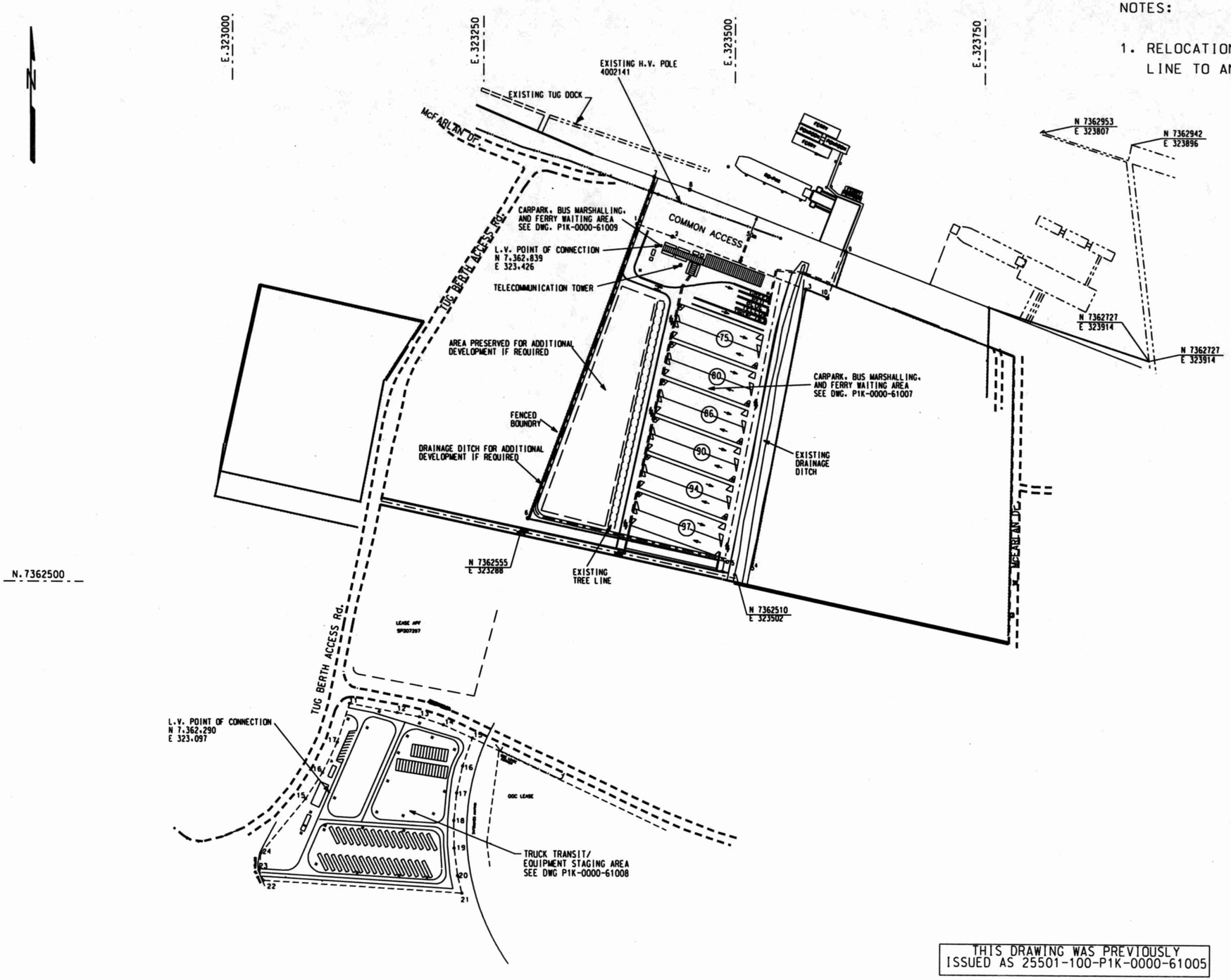
List of Drawings

Ref #	Site/Area	Title	Drawing No.	Revision
Figure A1	Mainland	Port Central Layout	P1K-0000-61005	Rev. B
Figure A2	Mainland	RG Tanna Overall Plot Plan	P1K-0000-61001	Rev. A
Figure A3	Curtis Island	Train 1 Overall Site Plan	100-P1-0000-00001	Rev. 6
Figure A4	Curtis Island	Air and Water Discharge Points	100-HKK-0000-00001	Rev. H
Figure A5	Curtis Island	Civil Site Development Overall Site Drainage Plan	100-CG-0000-00009	Rev. 6
Figure A6	Curtis Island	Civil Site Development Perimeter Ditch Surfacing Plan	100-CG-0000-00013	Rev. 12
Figure A7	Curtis Island	Materials Offloading Facilities General Arrangement	25577-100-V21-CM00-00001	Rev. R8
Figure A8	Curtis Island	Barge Ramp and Ferry Terminal Berth – Dredging Layout	25577-100-V21-CM00-00057	Rev. ZA
Figure A9	Curtis Island	Bulk Aggregate, LOLO and RORO Berths – Dredging Layout	25577-100-V21-CM00-00150	Rev. C
Figure A10	Curtis Island	Temporary Facilities Plot Plan – Plan C – General Arrangement	P1K-0000-61013	Rev. H
Figure A11	Curtis Island	Temporary Facilities Plot Plan – Plan C – Quarantine Area and Related Facilities – General Arrangement	P1K-0000-61004	Rev. I

NOTES:

1. RELOCATION OF AN EXISTING HV OVERHEAD POWER LINE TO AN UNDERGROUND LOCATION

POINT	EASTING	NORTHING
1	323402.068	7362860.552
2	323437.354	7362848.203
3	323571.614	7362796.427
4	323518.332	7362516.914
5	323492.831	7362523.444
6	323294.467	7362565.861
7	323419.187	7362907.436
8	323454.579	7362895.049
9	323611.145	7362834.673
10	323593.184	7362788.108
11	323117.975	7362379.194
12	323165.452	7362370.332
13	323187.583	7362366.224
14	323211.304	7362358.279
15	323239.982	7362345.256
16	323230.423	7362317.340
17	323224.520	7362290.348
18	323221.774	7362262.855
19	323222.112	7362235.227
20	323225.615	7362207.820
21	323229.873	7362190.382
22	323031.873	7362202.174
23	323027.696	7362212.628
24	323029.266	7362229.267
25	323074.137	7362283.698
26	323091.057	7362309.956
27	323105.887	7362340.389



PRELIMINARY

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METERS

THIS DRAWING WAS PREVIOUSLY ISSUED AS 25501-100-P1K-0000-61005

NO.	DATE	REVISION	BY	CHK'D	APP.	PEM	NO.	DATE	REVISION	BY	CHK'D	APP.	PEM
00A	17-JUNE-10	ISSUED FOR REVIEW	NP	SD	BH	SD							
00B	11-APR-10	ISSUED FOR REVIEW	NP	PRCH		XD							

LNG

BECHTEL 25376-100

GLNG PLANT PROJECT

PORT CENTRAL LAYOUT

GLNG DWG NO.	REV.
3361-50-SK005	00B
SCALE: AS NOTED	
DRAWING NO.	REV.
DRAWING NO. P1K-0000-61005	00B

TRUE NORTH

ITEM	DESCRIPTION
1	HARDSTAND AREA & TEMPORARY FACILITIES
2	GLNG SCALES
3	GLNG TEMPORARY OFFICES
4	BULK MATERIALS AREA (CRUSHED STONE & AGGREGATE)
5	BARGE SLIP
6	HAUL ROUTES

0 100 200 300 400
METERS

NO.	DATE	REVISION	BY	CHK'D	APP.	PEM	NO.	DATE	REVISION	BY	CHK'D	APP.	PEM
00A	4/15/2010	ISSUED FOR REVIEW	NP	RB	SD								

BECHTEL 25501-100

GLNG

RG TANNA

OVERALL PLOT PLAN

GLNG DWG NO.	REV.
3361-50-SK001	
SCALE: AS NOTED	
DRAWING NO.	REV.
DRAWING NO. P1K-0000-61001	00A

CAD FILE:

DATE:

PLANT / TRUE NORTH / NORTH

PREVAILING WIND

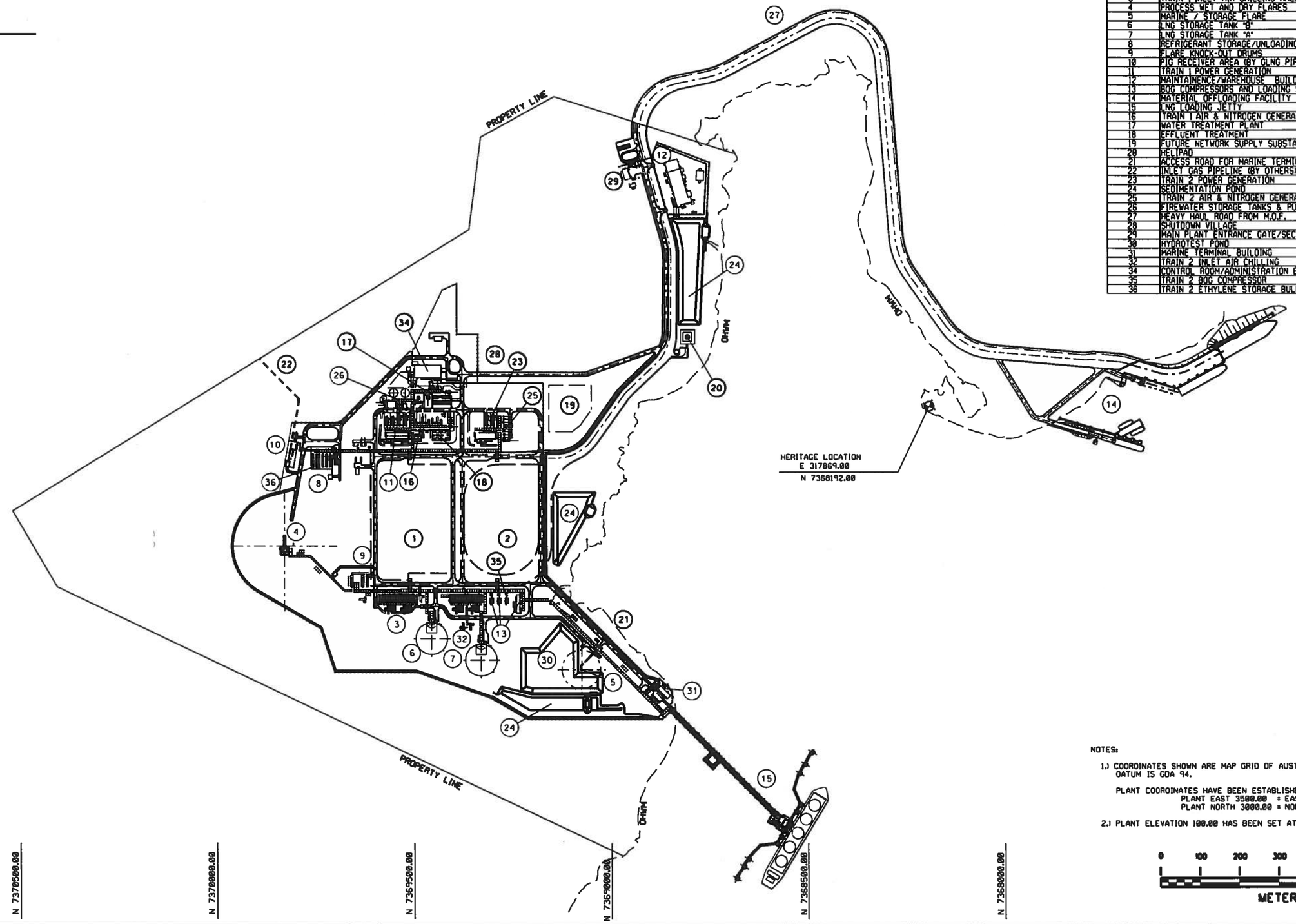
E 318500.00

E 318000.00

E 317500.00

E 317000.00

WIND ROSE



N 7370500.00
N 7370000.00
N 7369500.00
N 7369000.00
N 7368500.00
N 7368000.00

INDEX	
ITEM No.	DESCRIPTION
1	LNG-TRAIN 1
2	LNG-TRAIN 2
3	TRAIN 1 INLET AIR CHILLING AREA
4	PROCESS WET AND DRY FLARES
5	MARINE / STORAGE FLARE
6	LNG STORAGE TANK "B"
7	LNG STORAGE TANK "A"
8	REFRIGERANT STORAGE/UNLOADING AREA
9	FLARE KNOCK-OUT DRUMS
10	PIG RECEIVER AREA (BY GLNG PIPELINE CONTRACTOR)
11	TRAIN 1 POWER GENERATION
12	MAINTAINENCE/WAREHOUSE BUILDING
13	BOG COMPRESSORS AND LOADING SUBSTATION
14	MATERIAL OFFLOADING FACILITY
15	LNG LOADING JETTY
16	TRAIN 1 AIR & NITROGEN GENERATION
17	WATER TREATMENT PLANT
18	EFFLUENT TREATMENT
19	FUTURE NETWORK SUPPLY SUBSTATION
20	HELIPAD
21	ACCESS ROAD FOR MARINE TERMINAL
22	INLET GAS PIPELINE (BY OTHERS)
23	TRAIN 2 POWER GENERATION
24	SEDIMENTATION POND
25	TRAIN 2 AIR & NITROGEN GENERATION
26	FIREWATER STORAGE TANKS & PUMPS
27	HEAVY HAUL ROAD FROM M.O.F.
28	SHUTDOWN VILLAGE
29	MAIN PLANT ENTRANCE GATE/SECURITY BLDG/FIRE & MEDICAL BL
30	HYDROTEST POND
31	MARINE TERMINAL BUILDING
32	TRAIN 2 INLET AIR CHILLING
34	CONTROL ROOM/ADMINISTRATION BUILDING
35	TRAIN 2 BOG COMPRESSOR
36	TRAIN 2 ETHYLENE STORAGE BULLET

NOTES:

1.) COORDINATES SHOWN ARE MAP GRID OF AUSTRALIA (MGA) ZONE 56. DATUM IS GDA 94.

PLANT COORDINATES HAVE BEEN ESTABLISHED FOR THIS FACILITY AS FOLL
PLANT EAST 3500.00 = EAST 318000.00
PLANT NORTH 3000.00 = NORTH 7369000.00

2.) PLANT ELEVATION 100.00 HAS BEEN SET AT AUSTRALIAN HEIGHT DATUM 11.

0 100 200 300 400 500 600
METERS

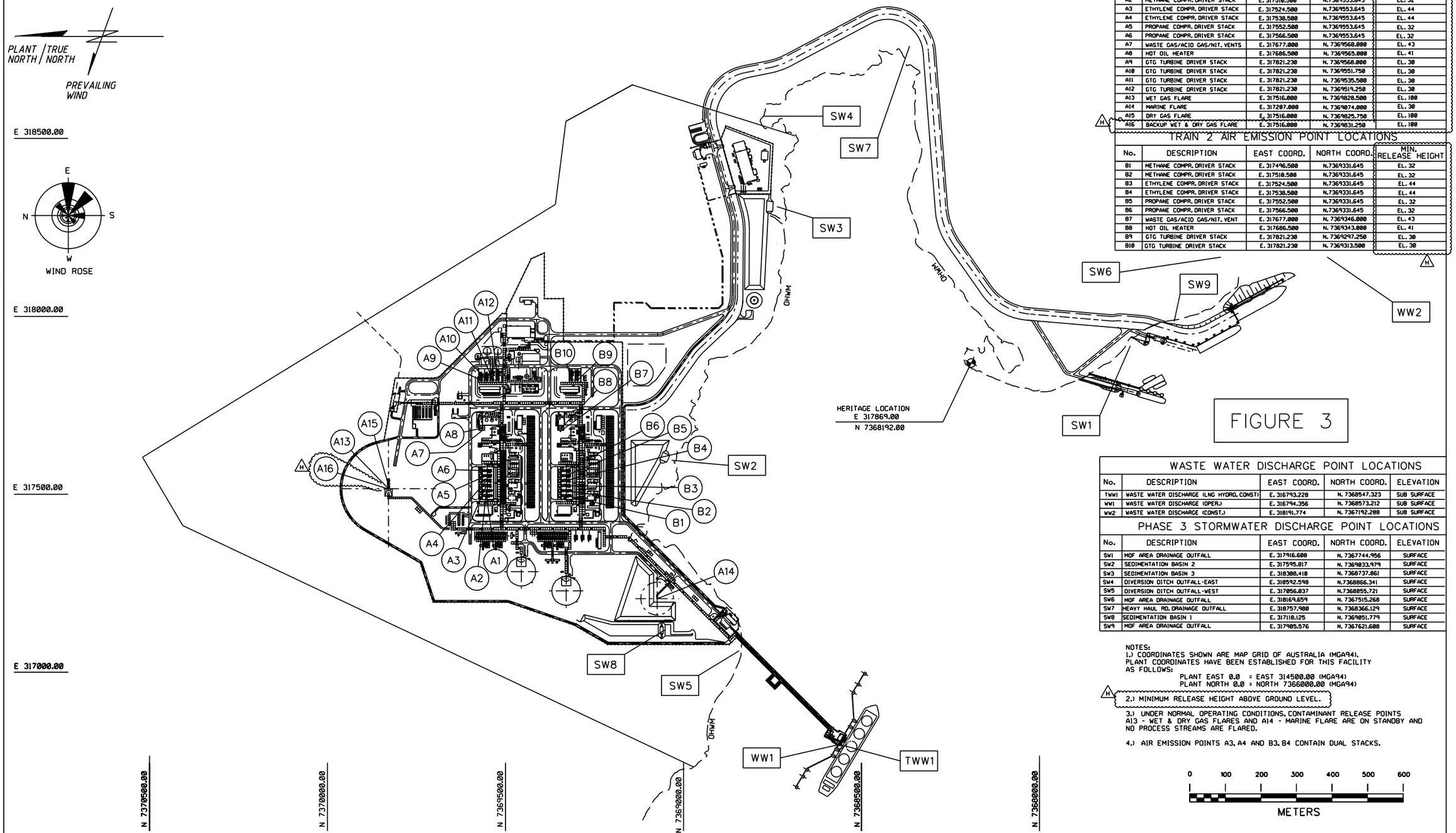
NO.	DATE	REVISION	BY	CHK'D	APP.	PEM	CLIENT ACC.
005	Dec-07-2011	ISSUED FOR CONSTRUCTION	DRL	JB	SM/SK	WL	
006	May-21-2013	RE-ISSUED FOR CONSTRUCTION	BLB	MB	SM	WL	
001	Sept-10-10	ISSUED FOR FEED DESIGN - PLAN C	DRL	DG	SM/LH	WL	
002	Jan-04-2011	RE-ISSUED FOR FEED DESIGN - PLAN C	DRL	DG	SM/LH	WL	
003	Feb-08-2011	RE-ISSUED FOR FEED DESIGN - PLAN C WITH ADDENDUM	DRL	FN	SM/LH	WL	
004	July-15-2011	ISSUED FOR DESIGN	JG	DRL	SM/LH	WL	

BECHTEL 25576

GLNG PLANT PROJECT

TRAIN 1
OVERALL SITE PLAN
CURTIS ISLAND AUSTRALIA

GLNG DWG NO. 3310-50-001
SCALE: 1:10,000 ON 11 X
DRAWING NO. 100-PI-0000-00001
CAD FILE:
DATE: JUNE 09,2



TRAIN 1 AIR EMIISSION POINT LOCATIONS

No.	DESCRIPTION	EAST COORD.	NORTH COORD.	MIN. RELEASE HEIGHT
A1	METHANE COMPR. DRIVER STACK	E. 317496.500	N.7369553.645	EL. 32
A2	METHANE COMPR. DRIVER STACK	E. 317510.500	N.7369553.645	EL. 32
A3	ETHYLENE COMPR. DRIVER STACK	E. 317524.500	N.7369553.645	EL. 44
A4	ETHYLENE COMPR. DRIVER STACK	E. 317538.500	N.7369553.645	EL. 44
A5	PROPANE COMPR. DRIVER STACK	E. 317552.500	N.7369553.645	EL. 32
A6	PROPANE COMPR. DRIVER STACK	E. 317566.500	N.7369553.645	EL. 32
A7	WASTE GAS/ACID GAS/NIT. VENTS	E. 317677.000	N. 7369568.000	EL. 43
A8	HOT OIL HEATER	E. 317686.500	N. 7369565.000	EL. 41
A9	GTG TURBINE DRIVER STACK	E. 317821.230	N. 7369568.000	EL. 30
A10	GTG TURBINE DRIVER STACK	E. 317821.230	N. 7369551.750	EL. 30
A11	GTG TURBINE DRIVER STACK	E. 317821.230	N. 7369535.500	EL. 30
A12	GTG TURBINE DRIVER STACK	E. 317821.230	N. 7369519.250	EL. 30
A13	WET GAS FLARE	E. 317516.000	N. 7369828.500	EL. 100
A14	MARINE FLARE	E. 317207.000	N. 7369074.000	EL. 30
A15	DRY GAS FLARE	E. 317516.000	N. 7369825.750	EL. 100
A16	BACKUP WET & DRY GAS FLARE	E. 317516.000	N. 7369831.250	EL. 100

TRAIN 2 AIR EMISSION POINT LOCATIONS

No.	DESCRIPTION	EAST COORD.	NORTH COORD.	MIN. RELEASE HEIGHT
B1	METHANE COMPR. DRIVER STACK	E. 317496.500	N.7369331.645	EL. 32
B2	METHANE COMPR. DRIVER STACK	E. 317510.500	N.7369331.645	EL. 32
B3	ETHYLENE COMPR. DRIVER STACK	E. 317524.500	N.7369331.645	EL. 44
B4	ETHYLENE COMPR. DRIVER STACK	E. 317538.500	N.7369331.645	EL. 44
B5	PROPANE COMPR. DRIVER STACK	E. 317552.500	N.7369331.645	EL. 32
B6	PROPANE COMPR. DRIVER STACK	E. 317566.500	N.7369331.645	EL. 32
B7	WASTE GAS/ACID GAS/NIT. VENT	E. 317677.000	N. 7369346.000	EL. 43
B8	HOT OIL HEATER	E. 317686.500	N. 7369343.000	EL. 41
B9	GTG TURBINE DRIVER STACK	E. 317821.230	N. 7369297.250	EL. 30
B10	GTG TURBINE DRIVER STACK	E. 317821.230	N. 7369313.500	EL. 30

FIGURE 3

WASTE WATER DISCHARGE POINT LOCATIONS

No.	DESCRIPTION	EAST COORD.	NORTH COORD.	ELEVATION
TWW1	WASTE WATER DISCHARGE (LNG HYDRO. CONST)	E. 316793.228	N. 7368547.323	SUB SURFACE
WW1	WASTE WATER DISCHARGE (OPER.)	E. 316794.356	N. 7368573.212	SUB SURFACE
WW2	WASTE WATER DISCHARGE (CONST.)	E. 318191.774	N. 7367192.288	SUB SURFACE

PHASE 3 STORMWATER DISCHARGE POINT LOCATIONS

No.	DESCRIPTION	EAST COORD.	NORTH COORD.	ELEVATION
SW1	MOF AREA DRAINAGE OUTFALL	E. 317916.688	N. 7367744.956	SURFACE
SW2	SEDIMENTATION BASIN 2	E. 317595.817	N. 7369033.979	SURFACE
SW3	SEDIMENTATION BASIN 3	E. 318388.418	N. 7368737.861	SURFACE
SW4	DIVERSION DITCH OUTFALL-EAST	E. 318592.598	N.7368866.341	SURFACE
SW5	DIVERSION DITCH OUTFALL-WEST	E. 317056.837	N.7368855.721	SURFACE
SW6	MOF AREA DRAINAGE OUTFALL	E. 318169.659	N. 7367515.268	SURFACE
SW7	HEAVY HAUL RD. DRAINAGE OUTFALL	E. 318757.980	N. 7368366.129	SURFACE
SW8	SEDIMENTATION BASIN 1	E. 317118.125	N. 7369051.779	SURFACE
SW9	MOF AREA DRAINAGE OUTFALL	E. 317985.576	N. 7367621.688	SURFACE

NOTES:
1.) COORDINATES SHOWN ARE MAP GRID OF AUSTRALIA (MGA94). PLANT COORDINATES HAVE BEEN ESTABLISHED FOR THIS FACILITY AS FOLLOWS:
PLANT EAST 0.0 = EAST 314500.00 (MGA94)
PLANT NORTH 0.0 = NORTH 7366000.00 (MGA94)

H 2.) MINIMUM RELEASE HEIGHT ABOVE GROUND LEVEL.

3.) UNDER NORMAL OPERATING CONDITIONS, CONTAMINANT RELEASE POINTS A13 - WET & DRY GAS FLARES AND A14 - MARINE FLARE ARE ON STANDBY AND NO PROCESS STREAMS ARE FLARED.

4.) AIR EMISSION POINTS A3, A4 AND B3, B4 CONTAIN DUAL STACKS.

0 100 200 300 400 500 600
METERS

NO.	DATE	REVISION	BY	CHK'D	APP.	PEM	CLIENT ACC.
00G	10/30/2013	RE-ISSUED FOR PERMITTING	MXJ	KD	WL		
00H	02/21/2014	RE-ISSUED FOR PERMITTING	MXJ	KD	WL		
00C	08/12/2011	RE-ISSUED FOR PERMITTING	DRL	FN	RR		

NO.	DATE	REVISION	BY	CHK'D	APP.	PEM	CLIENT ACC.
00D	Apr/11/2012	RE-ISSUED FOR PERMITTING	BLB	KD	WL		
00E	Nov/14/2012	RE-ISSUED FOR PERMITTING	BLB	KD	WL		
00F	Mar/5/2013	RE-ISSUED FOR PERMITTING	BLB	KD	WL		

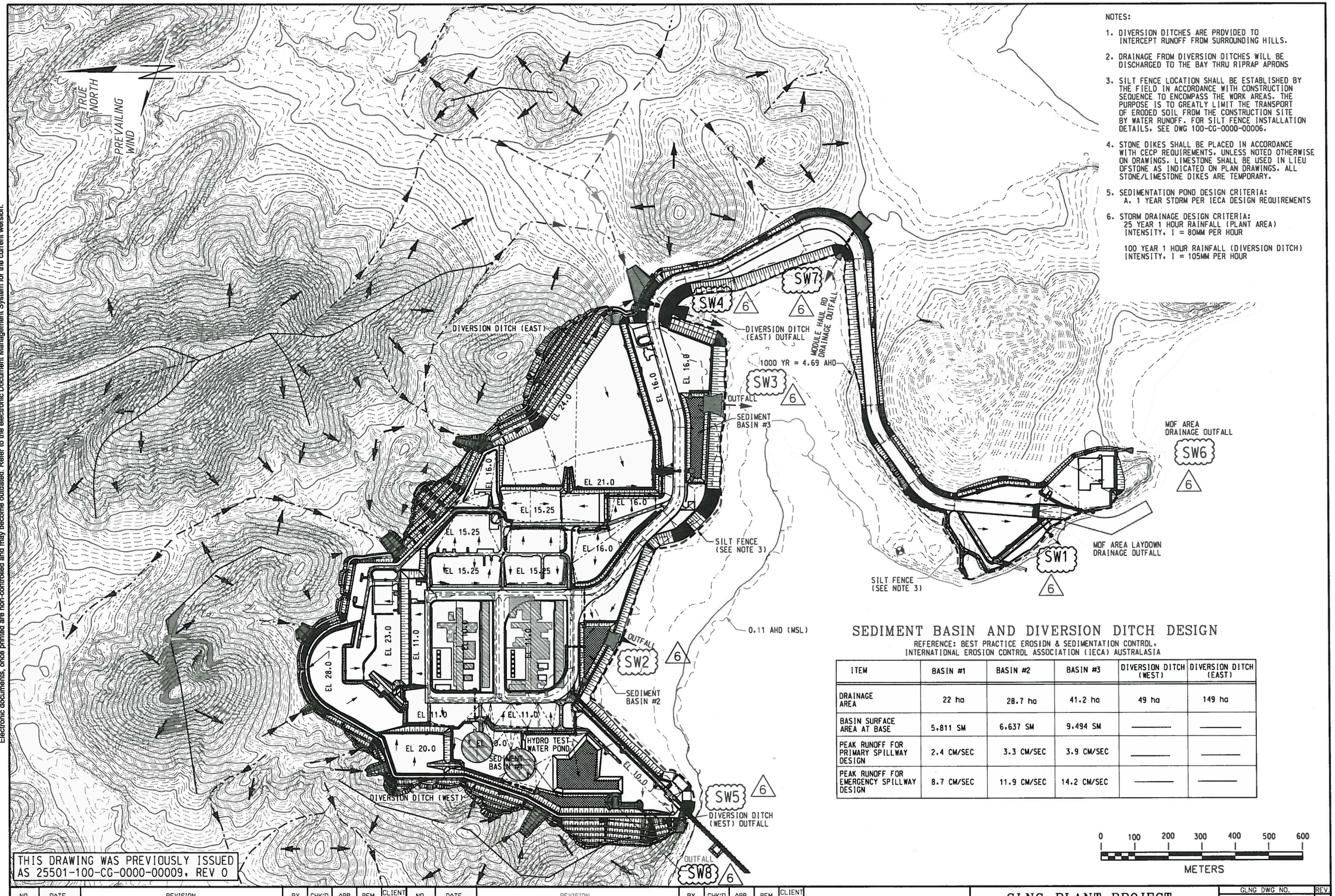
BECHTEL 25576

GLNG PLANT PROJECT

AIR AND WATER DISCHARGE POINTS
CURTIS ISLAND AUSTRALIA

GLNG DWG NO.	REV.
3310-50-SK001	H
SCALE: 1:10,000 ON 11 X 17	
DRAWING NO.	REV.
100-HKK-0000-00001	00H

CAD FILE: 25576-100-HKK-0000-00001.DGN
DATE: AUG 05,2010



NOTES:

1. DIVERSION DITCHES ARE PROVIDED TO INTERCEPT RUNOFF FROM SURROUNDING HILLS.
2. DRAINAGE FROM DIVERSION DITCHES WILL BE DISCHARGED TO THE BAY THRU RIPRAP APRONS
3. SILT FENCE LOCATION SHALL BE ESTABLISHED BY THE FIELD IN ACCORDANCE WITH CONSTRUCTION SEQUENCE TO ENCOMPASS THE WORK AREAS. THE PURPOSE IS TO GREATLY LIMIT THE TRANSPORT OF ERODED SOIL FROM THE CONSTRUCTION SITE BY WATER RUNOFF. FOR SILT FENCE INSTALLATION DETAILS, SEE DWG 100-CG-0000-00006.
4. STONE DIKES SHALL BE PLACED IN ACCORDANCE WITH CECP REQUIREMENTS. UNLESS NOTED OTHERWISE ON DRAWINGS, LIMESTONE SHALL BE USED IN LIEU OFSTONE AS INDICATED ON PLAN DRAWINGS. ALL STONE/LIMESTONE DIKES ARE TEMPORARY.
5. SEDIMENTATION POND DESIGN CRITERIA:
   A. 1 YEAR STORM PER IECA DESIGN REQUIREMENTS
6. STORM DRAINAGE DESIGN CRITERIA:
   25 YEAR 1 HOUR RAINFALL (PLANT AREA) INTENSITY, I = 80MM PER HOUR
   100 YEAR 1 HOUR RAINFALL (DIVERSION DITCH) INTENSITY, I = 105MM PER HOUR

SEDIMENT BASIN AND DIVERSION DITCH DESIGN

REFERENCE: BEST PRACTICE EROSION & SEDIMENTATION CONTROL, INTERNATIONAL EROSION CONTROL ASSOCIATION (IECA) AUSTRALASIA

ITEM	BASIN #1	BASIN #2	BASIN #3	DIVERSION DITCH (WEST)	DIVERSION DITCH (EAST)
DRAINAGE AREA	22 ha	28.7 ha	41.2 ha	49 ha	149 ha
BASIN SURFACE AREA AT BASE	5,811 SM	6,637 SM	9,494 SM	———	———
PEAK RUNOFF FOR PRIMARY SPILLWAY DESIGN	2.4 CM/SEC	3.3 CM/SEC	3.9 CM/SEC	———	———
PEAK RUNOFF FOR EMERGENCY SPILLWAY DESIGN	8.7 CM/SEC	11.9 CM/SEC	14.2 CM/SEC	———	———

0 100 200 300 400 500 600
METERS

THIS DRAWING WAS PREVIOUSLY ISSUED AS 25501-100-CG-0000-00009, REV 0

NO.	DATE	REVISION	BY	CHK'D	APP.	PEM	CLIENT ACC.
0	4/26/10	ISSUED FOR FEED DESIGN	RAC	PKM	RES	WAL	
6	25Mar13	REVISED AS NOTED, REISSUED FOR CONSTRUCTION	RS	RR	RES	WAL	
2	1/20/11	REVISED OUTFLOWS, ISSUED FOR CONSTRUCTION	RAC	PKM	RES	WAL	
3	7JUL11	REVISED TABLE, ISSUED FOR CONSTRUCTION	RAC	PKM	RES	WAL	
4	17FEB12	INCORPORATE FCD-00059, REISSUED FOR CONSTRUCTION	RS	RR/PKM	RES	WAL	
5	15NOV12	REVISED TABLE, ISSUED FOR CONSTRUCTION	RS	RR	RES	WAL	

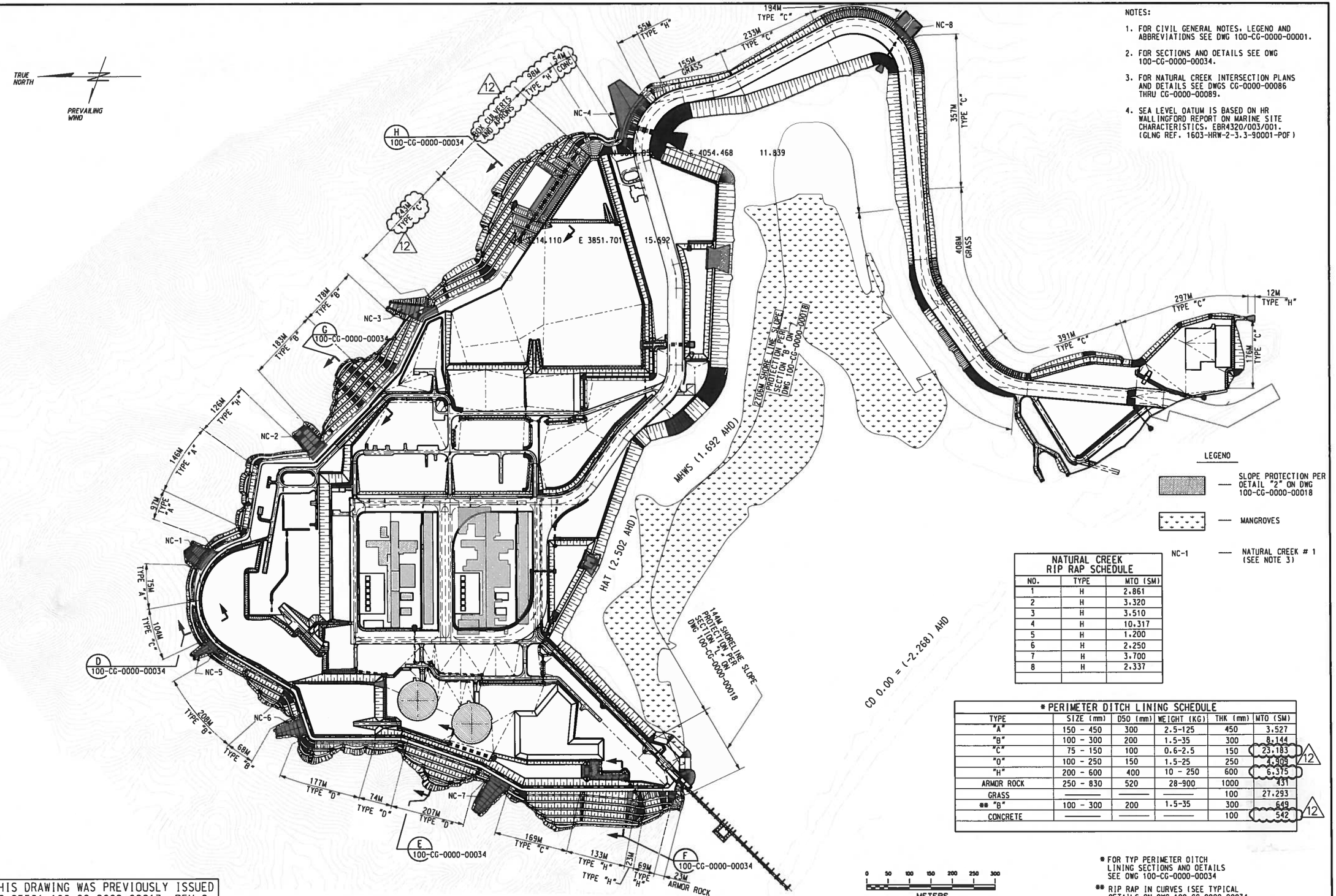
BECHTEL 25576

GLNG PLANT PROJECT

CIVIL
SITE DEVELOPMENT
OVERALL SITE DRAINAGE PLAN

GLNG PROJECT — CURTIS ISLAND, AUSTRALIA

GLNG DWG NO.	REV.
3310-40-8009	6
SCALE: 1:5000	
DRAWING NO.	REV.
100-CG-0000-00009	6



NOTES:

1. FOR CIVIL GENERAL NOTES, LEGENO AND ABBREVIATIONS SEE DWG 100-CG-0000-00001.
2. FOR SECTIONS AND DETAILS SEE DWG 100-CG-0000-00034.
3. FOR NATURAL CREEK INTERSECTION PLANS AND DETAILS SEE DWGS CG-0000-00086 THRU CG-0000-00089.
4. SEA LEVEL DATUM IS BASED ON HR WALLINGFORD REPORT ON MARINE SITE CHARACTERISTICS. EBR4320/003/001. (GLNG REF. 1603-HRW-2-3.3-90001-POF)

LEGENO

- SLOPE PROTECTION PER DETAIL "2" ON DWG 100-CG-0000-00018
- MANGROVES
- NC-1 — NATURAL CREEK # 1 (SEE NOTE 3)

NATURAL CREEK RIP RAP SCHEDULE

NO.	TYPE	MTO (SM)
1	H	2,861
2	H	3,320
3	H	3,510
4	H	10,317
5	H	1,200
6	H	2,250
7	H	3,700
8	H	2,337

* PERIMETER DITCH LINING SCHEDULE

TYPE	SIZE (mm)	D50 (mm)	WEIGHT (KG)	THK (mm)	MTO (SM)
"A"	150 - 450	300	2.5-125	450	3,527
"B"	100 - 300	200	1.5-35	300	8,144
"C"	75 - 150	100	0.6-2.5	150	23,183
"D"	100 - 250	150	1.5-25	250	4,905
"H"	200 - 600	400	10 - 250	600	6,375
ARMOR ROCK	250 - 830	520	28-900	1000	431
GRASS	——	——	——	100	27,293
** "B"	100 - 300	200	1.5-35	300	649
CONCRETE	——	——	——	100	542

12

* FOR TYP PERIMETER DITCH LINING SECTIONS AND DETAILS SEE DWG 100-CG-0000-00034

** RIP RAP IN CURVES (SEE TYPICAL DETAILS ON DWG 100-CG-0000-00034

THIS DRAWING WAS PREVIOUSLY ISSUED AS 25501-100-CG-0000-00013, REV 0

NO.	DATE	REVISION	BY	CHK'D	APP.	PEM	CLIENT ACC.
0	4/26/10	ISSUED FOR FEED DESIGN	RAC	PKM	RES	WAL	
11	30DEC12	REVISED RIPRAP, REISSUED FOR CONSTRUCTION	RS	RR	RES	WAL	
12	10Jul13	REVISED AS NOTED, REISSUED FOR CONSTRUCTION	RS	RR	RES	WAL	
8	13Oct11	ADDED NOTE 4, REISSUED FOR CONSTRUCTION	RAC	PKM	RES	WAL	
9	9MAR12	REVISED AS NOTED, REISSUED FOR CONSTRUCTION	RS	RR/PKM	RES	WAL	
10	25APR12	REVISED RIPRAP, REISSUED FOR CONSTRUCTION	FKB	RR/PKM	RES	WAL	

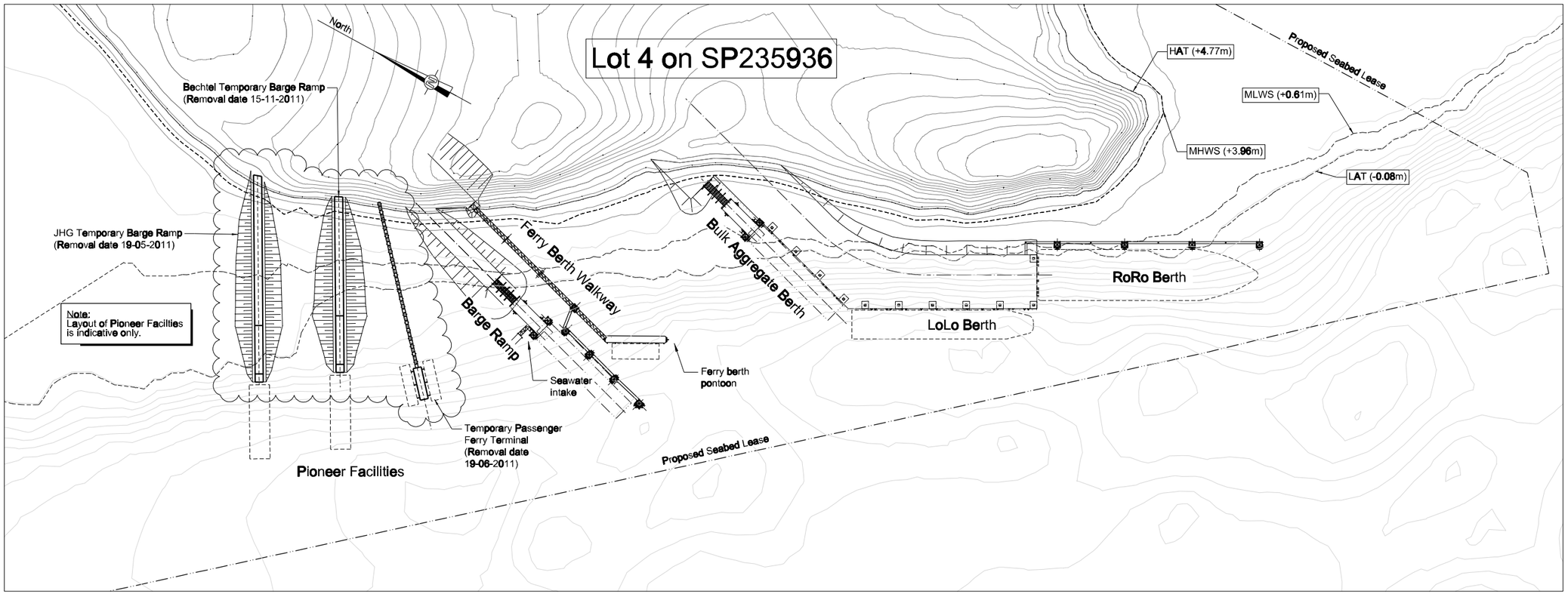
BECHTEL 25576

GLNG PLANT PROJECT

CIVIL
SITE DEVELOPMENT
PERIMETER DITCH SURFACING PLAN

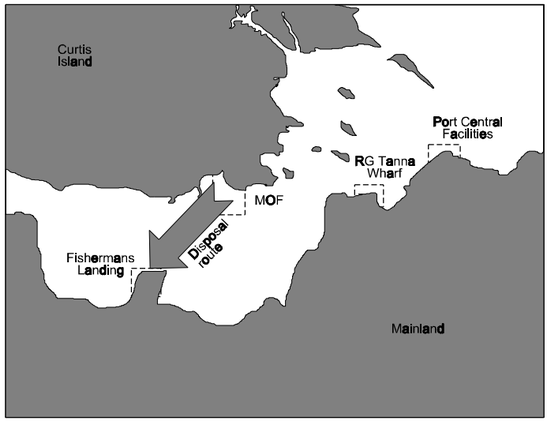
GLNG PROJECT — CURTIS ISLAND, AUSTRALIA

GLNG DWG NO.	REV.
3310-40-8013	12
SCALE: 1:7000	
DRAWING NO.	REV.
100-CG-0000-00013	12

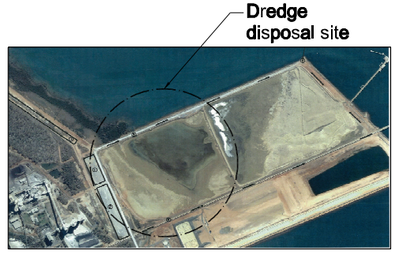


General Arrangement of Marine Offloading Facilities

Note:
All Infrastructure for this Application occurs within the Curtis Coast CMD.



Key Plan of MOF and Mainland Facilities



Fishermans Landing Disposal Site

25577-100-V21-CM00-00001 002

Supplier Document Status CODE: 1

Code 1 = Work may proceed.
Code 2NC = Revise and Resubmit; Work May Proceed.
Code 2EX = Revise and Resubmit; Work May Proceed; Expedite Return
Code 2CR = Revise and Resubmit; Work May Proceed; Priority Return.
Code 3 = Revise and resubmit; Work may not proceed.
Code 4 = Review not required; Work may proceed.
Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods, or materials developed or selected by the Supplier and does not relieve the Supplier from full compliance with contractual obligations.

Responsible Engineer- Myrick_James
Date Issued- 08/26/2011 EEHA- no
VPTL- VPTL-3227 Doc Cat Code -
Equipment No.-
Client Doc No.- 3310-BTH-3-3.3-96391-1
Client Dwg Code: 3310-40-96391-1

Tide Levels

Water Level* RL m	Tidal Plane
+4.77	HAT
+3.96	MHWS
+3.08	MHWN
+2.35	MSL
+1.49	MLWN
+0.61	MLWS
-0.08	LAT

+0.0m

* Still water level at Santos Berth

NOT FOR CONSTRUCTION

Note:

Bathymetry is based on information received from Bechtel on 10-02-03, CombinedOnshoreOffshoreContours MGA56 mLAT2.dwg.

Bathymetry is subject to change as a result of survey currently in progress.

All temporary works are to be removed. The final condition of areas affected by temporary works is to achieve the original surface contours as far as possible.

Approved by:
Ian McRobbie

RPEQ. No. 102998

Issue	Date	By	Chkd	Appd	Description
R8	14/03/11	JWH	CA	IMR	Re-Issued for Permitting
R8	16/11/10	BRH	CM	IMR	Released for Permitting
R7	04/11/10	JWH	CM	IMR	Released for Permitting
R6	28/10/11	JWH	CM	IMR	Released for Permitting

Client
BECHTEL AUSTRALIA PROPRIETARY LIMITED

Bechtel Document No.:
25577-100-V21-CM00-00001
GLNG Base No.:
3310-BTH-3-3.3-96391-1
GLNG Drawing Code:
3310-40-96391-1

Job Title
GLNG
Material Offloading Facilities

Scale at A1

Discipline

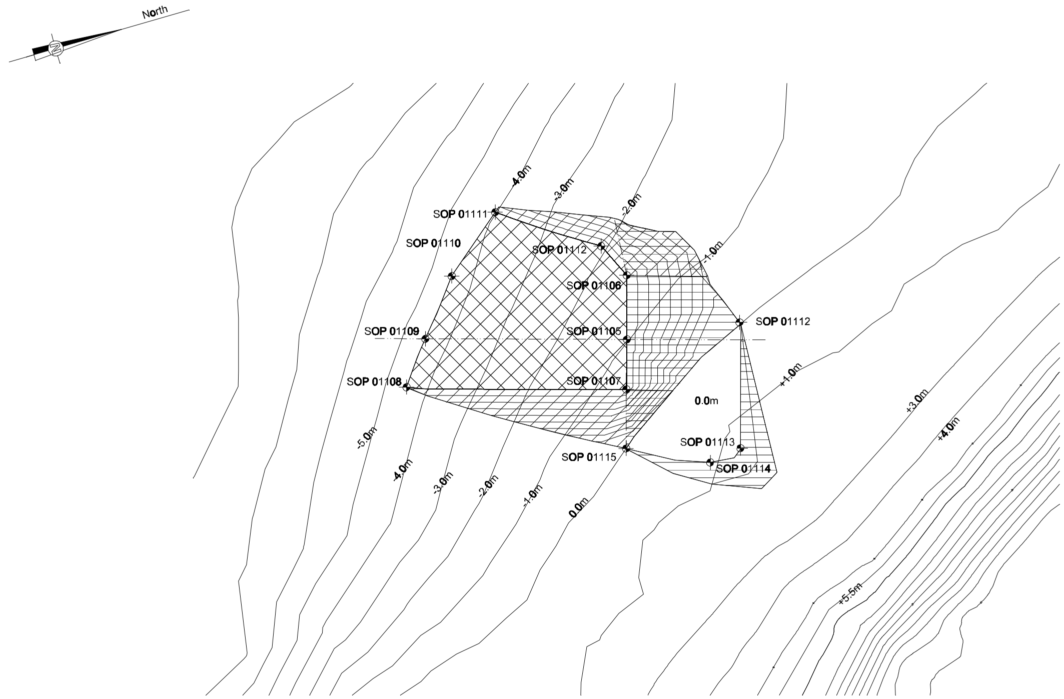
ARUP
John Holland
CONSULT AUSTRALIA Member Firm
Arup Pty Ltd ABN 18 000 966 165
11 Harvest Terrace, West Perth, Australia
PO Box 618, West Perth, WA 6872
Tel +61 (08) 9322 1400 Fax +61 (08) 9481 1334
www.arup.com.au

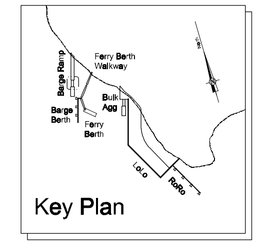
Drawing Title
Marine Offloading Facilities
General Arrangement

Drawing Status
Released for Permitting

Job No	Drawing No	Issue
220822	P-001	R8

Do not scale





Legend

- Denotes dredge to -4.5m
- Denotes Variable slope (Max. 1 : 3 slope)
- Denotes 1:3 slope
- Denotes 1:5 slope

Note: Slopes are called up as Vertical: Horizontal

Setting out Points	
No.	E, N
SOP 01105	317798.763m, 7367776.771m
SOP 01106	317784.605m, 7367780.863m
SOP 01107	317809.778m, 7367773.409m
SOP 01108	317795.260m, 7367724.846m
SOP 01109	317785.706m, 7367732.144m
SOP 01110	317773.475m, 7367742.030m
SOP 01111	317762.125m, 7367755.750m
SOP 01112	317776.430m, 7367777.030m
SOP 01113	317802.645m, 7367802.968m
SOP 01114	317830.316m, 7367794.872m
SOP 01115	317822.972m, 7367769.521m

ZA

25577-100-V21-CM00-00057
005

Supplier Document Status
CODE: 1

Code 1 = Work may proceed.
Code 2NC = Revise and Resubmit; Work May Proceed.
Code 2EX = Revise and Resubmit; Work May Proceed; Expedite Return
Code 2CR = Revise and Resubmit; Work May Proceed; Priority Return.
Code 3 = Revise and resubmit; Work may not proceed.
Code 4 = Review not required; Work may proceed.

Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods, or materials developed or selected by the Supplier and does not relieve the Supplier from full compliance with contractual obligations.

Responsible Engineer-Myrick_James
Date Issued -10/17/2012 EEHA -No
VPTL-VPTL-14173 Doc Cat Code -
Equipment No.-
Client Doc No.-3361-BTH-3-3.3-93359-57
Client Dwg Code.-3361-40-93359-57

ZA

I hereby certify that this drawing is a factual representation of all "As Constructed" works.

Signed: JH Manager Approval

I hereby certify this drawing containing our original design and subsequent modifications as provided by JH in accordance with the design intent.

Signed:
RPEQ No. 3753 Date: 22/06/12

ZA

Tide Levels	
Water Level* RL m	Tidal Plane
+4.77	HAT
+3.96	MHWS
+3.08	MHWN
+2.35	MSL
+1.49	MLWN
+0.61	MLWS
+0.00	CD
-0.08	LAT

* Still water level at Santos Berth
** All levels are relative to Chart Datum (CD) at Auckland Point.

0 5 10 20 Metres
Scale 1:500

AS CONSTRUCTED

Notes:
1. Refer to Dwg. No. 00100 for General Notes.

Issue	Date	By	Chkd	Appd	Description
ZA	21/09/12	RVM	ET	BOS	Re-Issued As Constructed
Z	22/06/12	RVM	SR	BOS	As Constructed
B	24/05/11	JWH	SR	RN	Re-issued for Construction - TQ 47
A	15/04/11	JAS	SR	IMR	Issued for Construction
R2	17/12/10	RVM	TA	IMR	Issued for Review
R1	1/10/10	JWH	JO	IMR	Issued for Review

Client
BECHTEL AUSTRALIA PROPRIETARY LIMITED

Bechtel Document No.: 25577-100-V21-CM00-00057
GLNG Base No.: 3361-BTH-3-3.3-93359-57
GLNG Drawing Code: 3361-40-93359-57

Job Title
GLNG
Material Offloading Facilities

Scale at A1 1:500
Discipline Structures

ARUP

11 Harvest Terrace, West Perth, Australia
PO Box 829, West Perth, WA 6872
Tel +61 (08) 9322 1400 Fax +61 (08) 9481 1334
www.arup.com.au

John Holland

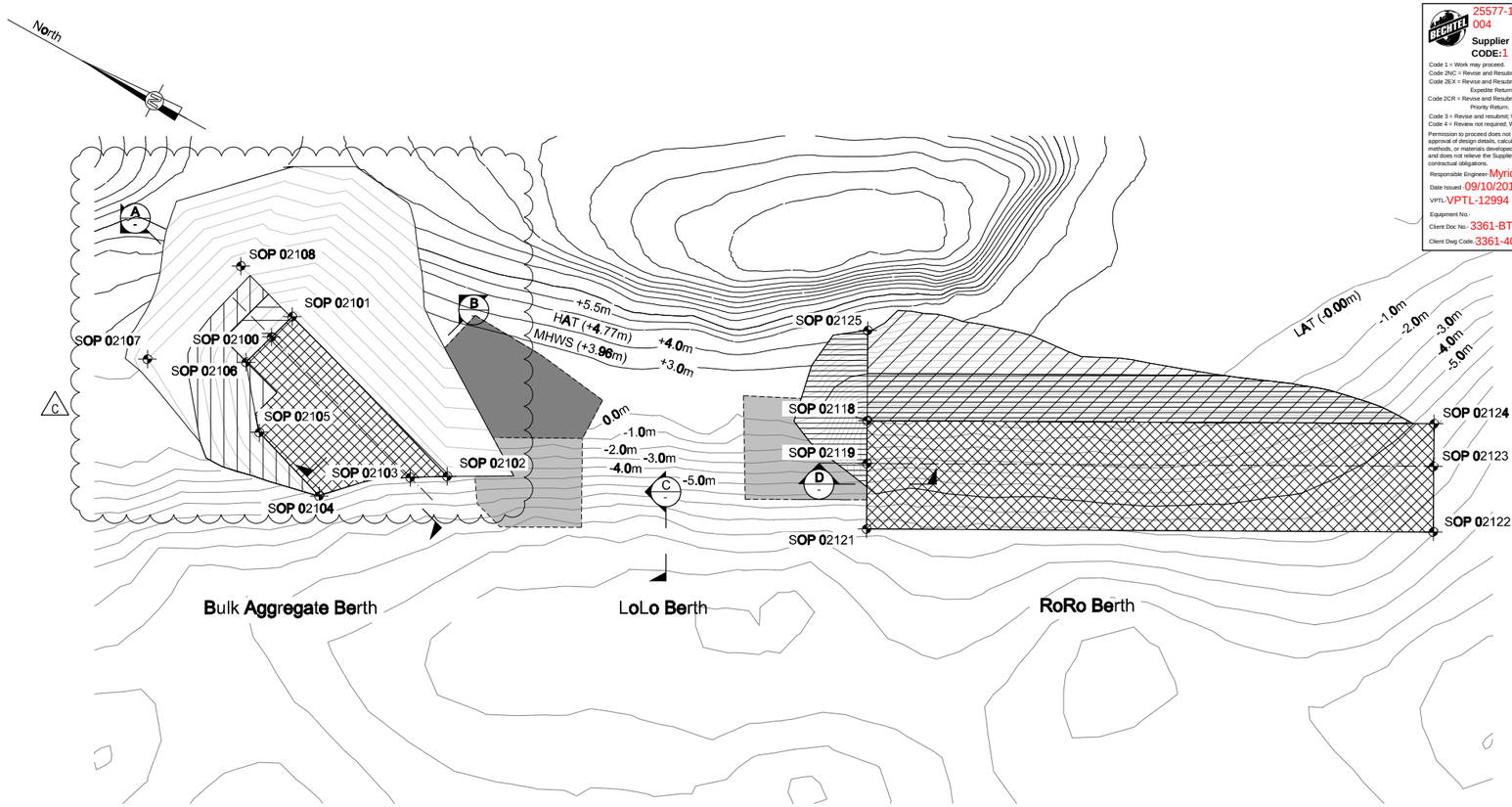
CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title
Barge Ramp and Ferry Terminal Berth Dredging Layout

Drawing Status
As Constructed

Job No	Drawing No	Issue
220822	01100	ZA

Do not scale



25577-100-V21-CM00-00150 004

Supplier Document Status CODE: 1

Code 1 = Work may proceed.
Code 2NC = Revise and Resubmit; Work May Proceed.
Code 2EX = Revise and Resubmit; Work May Proceed; Expedite Return
Code 2CR = Revise and Resubmit; Work May Proceed; Priority Return.
Code 3 = Revise and resubmit; Work may not proceed.
Code 4 = Review not required; Work may proceed.

Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods, or materials developed or selected by the Supplier and does not relieve the Supplier from full compliance with contractual obligations.

Responsible Engineer: Myrick_James
Date Issued: 09/10/2012
EIEHA: No
VPTL: VPTL-12994
Doc Cat Code: -
Equipment No.: -
Client Doc No.: 3361-BTH-3-3.3-93359-150
Client Dwg Code: 3361-40-93359-150

Legend

- Denotes 1:2 slope
- Denotes dredge to -6.0m
- Denotes dredge to -4.5m
- Denotes 1 : 3 slope
- Denotes Variable slope (Max. 1 : 3 slope)
- Denotes 1:5 slope
- Denotes Area of soft material removal to 1m below NGL
- Denotes area of soft material removal to 0.5m below NGL

Note: Slopes are called up as Vertical: Horizontal

NOTES:

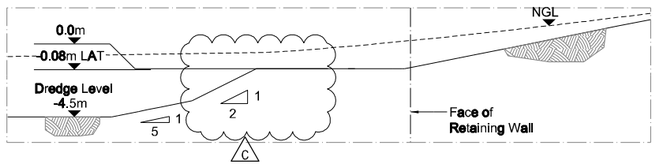
1. All levels are in metres relative to Lowest Astronomical Tide (LAT).
2. This drawing is based on topographic and hydrographic survey information supplied by Bechtel in file named "CombinedOnshoreOffshoreContours_MGA56_mLAT2."
3. The dredging plan presented is based on the bathymetric survey data shown which is assumed to be accurate.
4. The dredging plan presented assumes that installation of the MOF retaining wall occurs after dredging has been completed.
5. Zones of soft material are indicative only and removal is to be confirmed on site by an experienced geotechnical engineer, following de-watering and exposure of the ground surface.

Setting out Points for Bulk Aggregate Berth

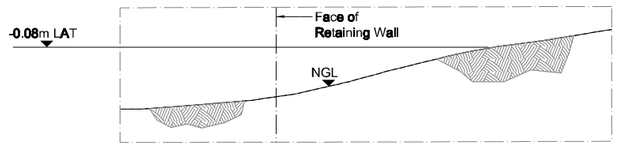
No.	Easting	Northing
SOP 02100	317935.667m,	7367673.754m
SOP 02101	317946.297m,	7367670.606m
SOP 02102	317921.695m,	7367589.276m
SOP 02103	317914.496m,	7367601.395m
SOP 02104	317891.442m,	7367628.420m
SOP 02105	317901.689m,	7367660.502m
SOP_02106	317922.543m,	7367677.641m
SOP_02107	317905.560m,	7367711.068m
SOP 02108	317953.548m,	7367697.027m

Setting out Points for RoRo Berth

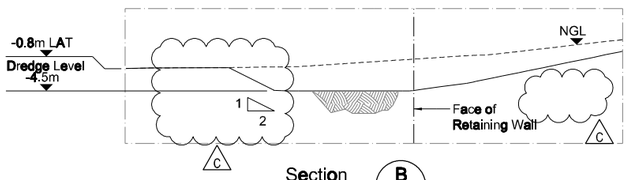
No.	Easting	Northing
SOP 02118	318018.082m,	7367459.359m
SOP 02119	318003.750m,	7367451.492m
SOP 02121	317981.820m,	7367439.487m
SOP 02122	318085.697m,	7367249.684m
SOP 02123	318107.628m,	7367261.687m
SOP 02124	318121.970m,	7367269.536m
SOP 02125	318048.253m,	7367475.853m



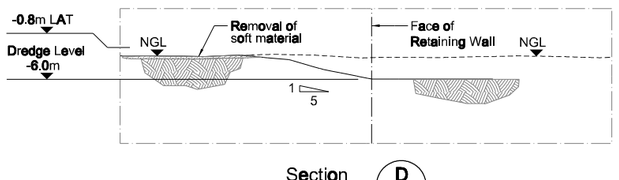
Section A
Scale 1:250



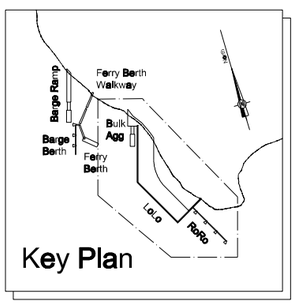
Section C
Scale 1:500



Section B
Scale 1:500

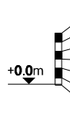


Section D
Scale 1:500



Tide Levels

Water Level* RL m	Tidal Plane
+4.77	HAT
+3.96	MHWS
+3.08	MHWN
+2.35	MSL
+1.49	MLWN
+0.61	MLWS
-0.08	LAT



* Still water level at Santos Berth

ISSUED FOR CONSTRUCTION

Notes:
1. Refer to Dwg. No. 00100 for General Notes.

Approved by:
Peter Burnton
RPEQ. No. 3753

Issue	Date	By	Chkd	Appd	Description
C	28/08/12	RVM	JG	BOS	Revised slope at BAB
B	24/05/11	JWH	SR	RN	Issued for Construction - TQ47
A	15/04/11	JAS	SR	IMR	Issued For Construction
R1	11/11/10	BM	TA	IMR	Issued for Review

Client: BECHTEL AUSTRALIA PROPRIETARY LIMITED
Bechtel Document No.: 25577-100-V21-CM00-00150
GLNG Base No.: 3361-BTH-3-3.3-93359-150
GLNG Drawing Code: 3361-40-93359-150

Job Title: GLNG Material Offloading Facilities
Scale at A1: 1:1000
Discipline: Structures

ARUP
Level 7, Wellington Central, 848 Wellington Street, West Perth, WA 6005, Australia
Tel +61 (0)8 9227 8000 Fax +61 (0)8 9481 1334
www.arup.com.au
CONSULT AUSTRALIA Member Firm
Arup Pty Ltd ABN 18 000 966 165

Drawing Title: Bulk Aggregate, LoLo and RoRo Berths Dredging Layout
Drawing Status: Issued for Construction
Job No: 220822
Drawing No: 02100
Issue: C

Do not scale
© Arup

NOTES:
1) COORDINATES SHOWN ARE MAP GRID OF AUSTRALIA (MGA94).
PLANT COORDINATES HAVE BEEN ESTABLISHED FOR THIS FACILITY AS FOLLOWS:
PLANT EAST 0.0 = EAST 314500.00 (MGA94)
PLANT NORTH 0.0 = NORTH 7366000.00 (MGA94)

2) PLANT ELEVATION 100 HAS BEEN SET AT AUSTRALIAN HEIGHT DATUM 16.0

PLANT NORTH / TRUE NORTH

PREVAILING WIND

WIND ROSE

0 100 200 300 400 500 600
METERS

E 316500.00
E 316000.00
E 317500.00
E 317000.00

N 7370500.00
N 7370000.00
N 7369500.00
N 7369000.00
N 7368500.00
N 7368000.00

N 7367500.00
N 7367000.00

PROPERTY LINE
PROPERTY LINE
WATER
WATER

HERITAGE LOCATION
E.317869.00
N.7368192.00

INDEX

ITEM	DESCRIPTION	AREA-TR. 1	AREA-TR. 2	REMARKS
1	PROCESS AREA LAYDOWN YARD	4.2	--	
2	OFFICES & MED. BLD.	1.0	1.0	
3	CENTRALIZED POWER GENERATION AREA	0.4	0.4	
4	CONCRETE PRODUCTION FACILITIES	1.2	1.2	
5	LAYDOWN AREA	1.0	1.0	
6	TANKS LAYDOWN AREA	1.8	1.8	
7	WATER TREATMENT / DESALINATION PLANT	1.5	1.5	
8	FUEL STORAGE	0.2	0.2	
9	ACCOMODATION FACILITY	12.6	12.6	
10	FIRE WATER TANKS & MULTIUSE SHOP	0.6	0.6	
11	MATERIAL OFFLOADING FACILITY			
12	HYDROTEST POND	2.0	2.0	
13	EARLY CIVIL WORKS ACCESS ROAD			
14	SEWAGE TREATMENT PLANT	0.4	0.4	
15	WAREHOUSE LAYDOWN YARD	0.6	0.6	
16	JETTY AREA LAYDOWN YARD	0.2	0.2	CONSTRUCTION LAYDOWN FOR TR. 2
17	LAYDOWN YARD	1.3	0.75	
18	LAYDOWN YARD	0.9	--	BECOMES TRAIN 2 CRIB HUT AREA
19	WASTE MANAGEMENT AREA	0.7	0.7	
20	MAINTENANCE SHOPS & SHOP PARKING	0.9	0.9	
21	SEA BED FLOOR LEASE			
22	OVERSIZE LOAD INSPECTION & WASHDOWN	1.0	1.0	
23	WATER TREATMENT AREA STORAGE	0.84	0.84	
24	BRINE & EFFLUENT DISCHARGE			
25	SEA WATER INTAKE			
26	CRIB HUT CH-15	0.1	0.1	
27	CRIB HUT CH-14	0.1	--	REMOVE OFF SITE
28	CRIB HUT CH-12 & CH-13	0.3	0.3	RELOCATE TO AREA 18 FOR TR. 2
29	CRIB HUT CH-11	0.1	--	REMOVE OFF SITE
30	CRIB HUT CH-10	0.1	--	REMOVE OFF SITE
31	CRIB HUTS CH-7, CH-8, & CH-9	0.5	0.5	RELOCATE TO AREA 18 FOR TR. 2
32	CRIB HUT CH-6	0.1	--	REMOVE OFF SITE
33	CRIB HUT CH-16	0.1	0.1	
34	CRIB HUT CH-5	0.1	--	REMOVE OFF SITE
35	CRIB HUT CH-4	0.1	0.1	
36	CRIB HUT CH-3	0.1	0.1	RELOCATE TO AREA 35 FOR TR. 2
37	CRIB HUT CH-2 & FIRE HOUSE	0.2	0.2	
38	CRIB HUT CH-1	0.84	0.84	
39	INTERIM MODULE & MATERIAL STAGING AREA	1.5	1.5	
40	BUS LOADING/UNLOADING, & TURNSTILES	1.5	1.5	
41	LAYDOWN YARD	0.3	0.3	
42	MISC. S/C & HEAVYHAUL LAYDOWN YARD	0.9	0.9	
43	CONSTRUCTION WAREHOUSE	0.5	0.5	
44	TEMPORARY BATCH PLANT AREA	0.5	0.5	
45	AQIS AREA REGULAR LOAD INSPECTION	0.5	0.5	
46	QUARANTINE AREA	0.5	0.5	

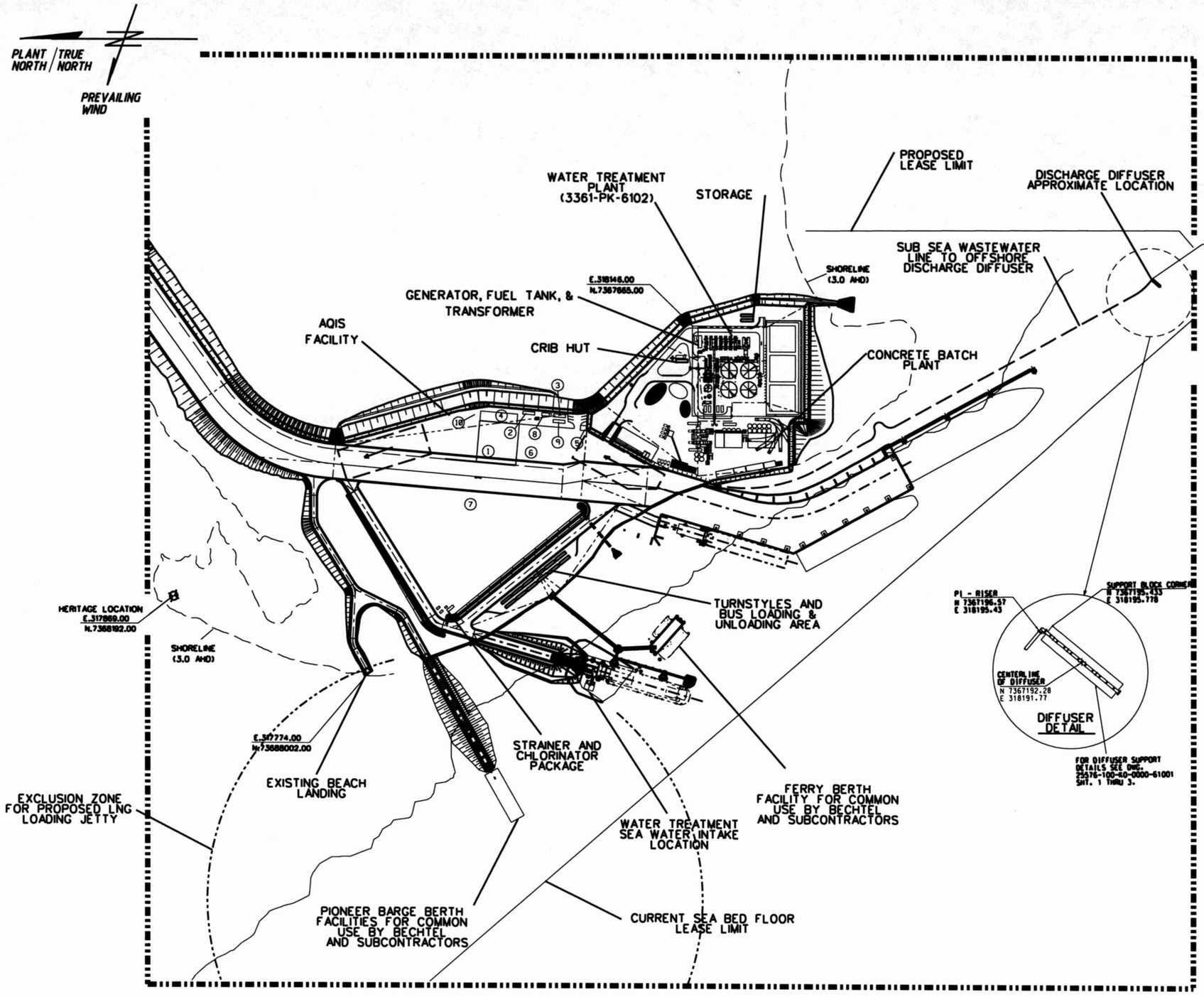
NO.	DATE	REVISION	BY	CHK'D	APP.	PEM
00C	08/02/10	ISSUED FOR REVIEW	NP	SD	BH	SD
00D	08/05/10	ISSUED FOR REVIEW	NP	SD	BH	SD
00E	11/15/10	RE-ISSUED FOR REVIEW	NP	SD	BH	SD
00F	01/13/11	ISSUED FOR DESIGN	NP	GH	SD	SD
00G	05/2/11	RE-ISSUED FOR DESIGN	NP	GH	CT	GH
00H	06/23/11	RE-ISSUED FOR DESIGN	NP	BT	GH	AD

BECHTEL 25576-100

GLNG PLANT PROJECT

TEMPORARY FACILITIES PLOT PLAN - PLAN C
GENERAL ARRANGEMENT
CURTIS ISLAND AUSTRALIA

GLNG DWG NO. 3361-50-SK013 REV. 00H
SCALE: AS NOTED
DRAWING NO. P1K-0000-61013 REV. 00H



AQIS FACILITIES :

1.) Module Washdown/Fumigation pad with 150mm Bunded (curb). (40 x 42m)- Asphalt or Concrete
2.) Washdown/Water Treatment Equipment (12 x 3) with:
   - Silt Trap and Filtration Sediment Disposal
   - Waste water holding tank required.
   - Sealed sump pit.
3.) AQIS Offices (36 m2) with first aid cabinet.
4.) Container Ramp/Inspection Area Collection (splash
5.) Quarantine Dunnage & Waste Bins/Truck Pickup Area
6.) Pre-inspection Laydown Area (4800 m2)
7.) Overflow/Hold Laydown Area (14,900 m2)
8.) Washroom and Toilet Block (18 m2)
9.) Various Representatives Office (36 m2):
   - Licensed Disposal Representative to dispose of quarantine waste.
   - Pest Control Representative
   - Licensed Fumigator.
10.) AQIS Oily Water Seperation System (PK-6125)

NOTES:
- AQIS Facilities shall be fenced and appropiate signage shall be provided.
- Final Location of AQIS offices to be agreed upon by proper authorities. May be relocated to Module Jetty.

GENERAL NOTES :

1.) Land area allocated to AQIS can be used initially for Contractor laydown.

0 50 100 150 200 250 300
METERS

NO.	DATE	REVISION	BY	CHK'D	APP.	PEM
00C	07/14/10	RE-ISSUED FOR REVIEW	NP	SD	BH	SD
00D	08/12/10	RE-ISSUED FOR REVIEW	NP	SD	BH	SD
00E	11/15/10	RE-ISSUED FOR REVIEW	NP	SD	BH	SD
00F	12/06/10	RE-ISSUED FOR REVIEW	NP	SD	BH	SD

NO.	DATE	REVISION	BY	CHK'D	APP.	PEM
00G	01/13/11	ISSUED FOR DESIGN	NP	GH	SD	SD
00H	04/27/11	RE-ISSUED FOR DESIGN	NP	GH	TC	GH
001	09/21/11	RE-ISSUED FOR DESIGN				

BECHTEL 25576 - 100

GLNG PLANT PROJECT

TEMPORARY FACILITIES PLOT PLAN - PLAN C
QUARANTINE AREA & RELATED FACILITIES
GENERAL ARRANGEMENT

GLNG DWG NO.	REV.
3361-50-SK004	001
SCALE: AS NOTED	
DRAWING NO.	REV.
PK-0000-61004	001

Attachment B

List of Forms

The following forms will be maintained by the site HSE Department and available as required.

Form #	Title
1	Environmental Contact List
2	Environmental Field Report
3	Corrective Action Request (CAR)
4	Corrective Action Report Log (CAR Log)
5	Trend Analysis For Environmental Corrective Actions
N1	Environmental Incident Log
N2	Environmental Incident Report
O1	Erosion And Sediment Control Inspection Checklist
Q1	Latent Site Conditions Report
Q2	Unanticipated Discovery Report
R1	Waste Transfer Forms
S1	Weed & Pest Report
W2	Dewatering Permit

Form 1
ENVIRONMENTAL CONTACT LIST
Current as of 02 December 2013

Bechtel Corporation

Name	Title	Phone/Pager	Mobile
Bechtel Corporate		415 768 3840	
Security		415 768 3841	
Off-Hours Legal			
Charlie Cappello	Corporate ESH Manager	301 228 3641	
Bruce Colvin	Corporate Environmental Manager	301 228 6081	
Jeff Shoop	OG&C ESH Manager	713 235 4816	
Andrey Polunin	Senior Project Manager	713 235 2504	
Bill Liucci	Engineering Manager	713 235 2034	
Bobby Ferrell	Construction Manager	713 235 5369	
Jeff Weldon	ESH Manager	+61 7 4836 9694	+61 411 302 050
Kundan Desai	Environmental Engineering Lead	713 235 3891	
Emily Russell	Site Environmental	+61 7 4836 8322	+61 481 236 475
Gerry McKendry	Security Manager	+61 7 4836 8314	+61 478 308 131
Chris Short	Emergency Response Manager		+61 478 494 386

GLNG

Name	Title	Phone/Pager	Mobile
GLNG			
Chris Pearce	Construction Manager	07 4978 8432	+61 417 554 812
Brian Rafter	ESH Manager	07 4978 8415	+61 407 128 724

Form 2: Environmental Field Report

(see instruction on back)

EFR # _____

Location: _____ Date: _____

Station: _____ Subcontractor: _____ Time: _____

Construction Activities: _____

Environmental Conditions: _____

Description	Status(1)	Comments/Reference Document/DR/CAR
Dust Control/Air Quality		
Noise/Vibration Control		
Sediment and Erosion Controls		
Surface Water Protection		
Dewatering Operations		
Wetland//Wildlife/Forest Protection		
Historic Resource Protection		
Archaeological Site Protection		
House Keeping and Containers		
Traffic Controls/Access		
Soil Reuse and Management		
Hazardous Materials Management		
Weeds and Pests		
Spill Prevention		
Other		

(1) AC = Acceptable; NI = Needs Improvement; UA = Unacceptable; NA = Not Applicable

Remarks

Environmental Inspector:	(Print Name)	(Signature)	(Date)
Reviewed By:	(Bechtel Environmental Mgr)	(Signature)	(Date)

Conducting Environmental Site Inspections

- Effective environmental inspections are important for maintaining environmental compliance as required by laws, permits, and project commitments. Construction Superintendents should implement the following actions and encourage a preventative approach for environmental compliance.
- Know the contract and permit requirements for the particular location and construction activity; ask the HSE department for help if you are not sure. Make sure that environmental controls are in the work plan.
- Be especially alert to environmental issues during initial site mobilizations; excavations; or work within or near wetlands/waterways, near known archaeological/historic sites, or near residences.
- Incorporate environmental compliance topics into work site observations made daily; note observations in the Daily Field Report.
- For subcontract work, conduct an environmental inspection weekly with the HSE department and with the subcontractor's representative.
- Include all pertinent environmental topics in the inspection – noise control, dust control, erosion control, housekeeping, protection of archaeological and historic resources, hazardous waste, and limits of disturbance. (See check-list guideline for topics.)
- Write down observations and use a camera to document deficiencies or problem circumstances needing resolution.
- Review observations with the direct-hire supervisor or subcontractor representative at the conclusion of each inspection; identify corrective actions and discuss needed mitigation practices for upcoming work. Set a schedule for completing corrective actions and monitor compliance.
- Keep the Bechtel Environmental Manager informed of major or environmentally-sensitive construction actions, so that coordination and monitoring is appropriately established.
- Contact the HSE department by phone or radio for assistance with problem resolution, mitigation methods, or interpretation of requirements.
- For major or repetitive compliance problems, prepare a Corrective Action Report (CAR) and attach the Environmental Field Report to it (if one exists). Forward the original CAR to the Contracts Manager for transmittal to the subcontractor and forward a copy to the HSE department.
- Use a Corrective Action Report form to document a serious environmental problem, such as a hazardous waste spill or emergency response situation.

BECHTEL ENVIRONMENTAL - CORRECTIVE ACTIONS REPORT

LOCATION	
DATE OF INSPECTION	
INSPECTED BY	

PHOTO	DESCRIPTION	ACTION/ COMMENTS	RESPONSIBLE PERSON	DUE DATE	DATE COMPLETED

PHOTO	DESCRIPTION	ACTION/ COMMENTS	RESPONSIBLE PERSON	DUE DATE	DATE COMPLETED

Form 4: CORRECTIVE ACTION REPORT LOG (CAR Log)

CAR NUMBER	DATE ISSUED	DESCRIPTION / REMARKS	DATE TO BE COMPLETED	DATE CONFIRMED CLOSED	CLOSED BY

Form 5: Trend Analysis for Environmental Corrective Actions

TREND PERIOD:	**From:**						**To:**				
TYPE OF CAUSE	**CAR Numbers:**										**Sum**
Verbal Communications											
Written Procedure and Documents											
Poor Equipment Design											
Conditions of Work Area											
Weather											
Type/Extent of Controls											
Timeliness of Corrective Actions											
Work Schedule											
Work Practices											
Work Organisation/Planning											
Supervisory Methods											
Training/Qualification											
Available Resources											
Managerial Methods											
Engineering Error											
Vendor or Equipment Manufacturer											
Maintenance											
External											
Subjects:											
Erosion											
Dust											
Water											
Soils											
Archaeology											
Traffic											
Wetlands/Wildlife/Forests											
Noise/Vibration											
Waste											
Hazardous Waste											
COMMENTS/RECOMMENDATIONS:											
PROJECT ENVIRONMENTAL INSPECTOR:								DATE:			

Form N1 – Environmental Incident Log

The Bechtel environmental manager is responsible for maintaining a copy of the Environmental Incidents Summary.

Environmental Incident Log

ID	DATE	TIME	Period of Day	Location	Category	Equipment	Est. Volume (litres)	Response	Subcontractor	Brief Comments
						`				

Form N2 – Environmental Incident Report

ENVIRONMENTAL INCIDENT REPORT FORM							
Date Reported				Date of Incident			
Incident Reported By (the person filling out this form)							
Position				Company			
Project				Function			
Phone Number				Email			
Witness (additional witnesses can be recorded on an attached sheet)							
Position				Company			
Phone Number				email			
Subcontractor Involved							
General Incident Details Only							
Approximate Time		☐ am ☐ pm		Project Area			
Location of the incident?							
Spills / Overflow Events Only							
Time of Release		am / pm	Time Released Stopped			am / pm	
Product Type	☐ Hydraulic Fluid	☐ Oil	☐ Diesel	☐ Paint	☐ Solvents	☐ Stormwater	
Other (Please specify)				Product ID/ CAS No.			
Approximate Area Effected (M^2)				Total Vol. Released (L)			
Did the Release Reach Surface Water?	☐ Yes	☐ No					
Complete for all incidents							
Incident description (What happened?)							

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How could it have been prevented?
What Immediate Actions or Controls were taken?
Corrective/ Preventative Actions Implemented?

Est. Total Direct Cost ($AU)		Est. Total Indirect Cost ($AU)	

Declaration	
I declare the information in this form to be a true account of the incident. I acknowledge that Bechtel may need to disclose details of this report, including relevant personal details, to relevant third parties.	
Signature	
To be completed by Environmental Manager/ Coordinator/ Advisor	

Weather / Ocean Conditions							
Wind Speed (m/s)		Direction		Prev. 24 hr rainfall			
Sea Current Speed (m/s)		Sea Current Direction		Physical State of Sea			
Notification Requirements							
Is the incident reportable under relevant legislation or approval conditions?						☐ Yes	☐ No
Incident Category		☐ Level 1	☐ Level 2	☐ Level 3		☐ Serious (0.60)	
Who requires notification?							
GPC/ EHP/ GLNG	Notified By				Date		
Internal Only	Notified By				Date		
Other	Notified By				Date		
Name / Position	Rob Ferguson, Environmental Manager						
Signature							
To be completed by Site Manager							
Name	Bobby Ferrell						
Signature					Date		

Form O1
SAMPLE – EROSION AND SEDIMENT CONTROL INSPECTION CHECKLIST

TYPE OF INSPECTION:

ROUTINE [ ]
RAINFALL EVENT (BEFORE) [ ]
RAINFALL EVENT (AFTER) [ ] _____ (cm of rain/time period that fell)
INTERMITTENT DEWATERING [ ]

AREA INSPECTED: _____

INSPECTED BY: _____ **DATE:** _____

		Is Condition Acceptable?		
	INSPECTION ITEMS	**YES**	**NO**	N/A
1	Have the Management Practices identified in the Stormwater Management and Erosion and Sediment Control Plan, as noted in Items 4 thru 7 below, been installed according to specification and in the proper locations?			
2	Is there any evidence that sediment is leaving the construction site? If yes, specify.			
3	Is there any evidence of erosion on cut or fill slopes, temporary soil stockpiles? If yes, specify.			
4	Do any sediment trapping/filtering devices (i.e., silt fence, straw bale dikes, temporary sump or permanent riser) require repair or clean-out to maintain proper function? If yes, identify.			
5	Do any velocity reduction devices (i.e., rip rap aprons or spillways) require repair or clean-out to maintain proper function? If yes, identify.			
6	Do any runoff diversion features (i.e., gravel-lined swales, storm drain inlet protection) require repair or clean-out to maintain proper function? If yes, identify.			
7	Do any areas in which temporary or permanent vegetative stabilization measures are being taken show signs of bare spots, insufficient growth or germination? If yes, identify locations and specify remedial action (e.g., irrigation, fertilization, seeding, mulching, maintenance).			
8	Are on-site traffic, parking, equipment laydown, supply and waste storage restricted to those areas specifically designated for those purposes?			
9	Is there any evidence of sediment, debris or mud track-out on adjacent public roads?			
10	Do vehicle tyre washing stations require repair or clean-out? Is any runoff present and is it being controlled?			

Note: Attach additional sheets if needed to identify plans for corrective actions, and if action shall be delayed due to site conditions (e.g., inaccessible to equipment) or safety issues - expected date of implementation, who is to perform work, and other specifics.

FORM Q1 – LATENT SITE CONDITIONS REPORT

Date: _____ Incident Number: _____

Location (Attach drawings and/or photos to this report):

Work Stopped: Yes [ ] No [ ]

Bechtel Representative:

As-Found Condition:

Action Required to Continue Work:

Action Taken:

Customer Representative Notified (who, when, how):

Follow-up Actions:

Printed Name of Person Completing Report:

Signature: _____

Date: _____

FORM Q2 – UNANTICIPATED DISCOVERY REPORT

[ ] INITIAL FINDINGS REPORT [ ] FOLLOWUP REPORT [ ] FINAL REPORT [ ] ATTACHMENT

DATE AND TIME EVENT REPORTED: NATURE OF EVENT: LOCATION: BECHTEL CONTACT: CUSTOMER CONTACT:	DATE AND TIME OF REPORT: REPORT PREPARED BY: REPORT PROVIDED TO:

PERSONNEL PRESENT OR CONTACTED DURING ON-SITE VISIT (NAME, TITLE, COMPANY)

DESCRIBE WHAT WAS OBSERVED AND/OR THE FIELD INVESTIGATION FINDINGS (INCLUDE TIMES)

DESCRIBE MONITORING OR SAMPLE TAKING: [ ] AIR [ ] WATER [ ] SOIL [ ] OTHER: _____

CONCLUSION BY BECHTEL ESH MANAGER:

1. [ ] **THE EVENT DESCRIBED ABOVE IS JUDGED NOT TO POSE A RISK TO PERSONNEL, EQUIPMENT, OR THE ENVIRONMENT.**
   [ ] Work can continue without taking any additional measures. No follow-up required.
   [ ] Work can continue if the measures recommended in the following section are taken. No follow-up required.
   [ ] Work can continue if the measures recommended in the following section are taken. Follow-up required.

2. [ ] **THE EVENT DESCRIBED ABOVE IS JUDGED TO POSE A RISK TO PERSONNEL, EQUIPMENT, OR THE ENVIRONMENT.**
   Work cannot continue until the measures recommended in the following section are taken. Follow-up required.

RECOMMENDATION(S) AND FOLLOW-UP

COMMENTS (INCLUDE EXPLANATION OF ATTACHMENTS)

CUSTOMER REPRESENTATIVE ACKNOWLEDGED BECHTEL REPRESENTATIVE ACKNOWLEDGED

PRINTED NAME DATE PRINTED NAME DATE

Form R1: WASTE TRANSFER FORM

(GLNG Project – To be Used for Waste Transfer from subcontractors to WMS)

SECTION A **Date/Time:** _____ / _____ **Company Name:**	**Name/ Title (Subcontractor):** (Print) **Signature:**
Waste Description:	
☐ Camp Generated Waste	☐ Project Generated Waste
☐ Camp Waste ☐ Food Waste	☐ Non-hazardous ☐ Hazardous ☐ Recycle
Estimated Volume:	Name of Transporter (if different than generator): ☐ NA
SECTION B: (To be completed by Waste Management Area Supervisor):	
Containers Used: ☐ Barrel ☐ Roll-Off/Bin ☐ Dump Truck ☐ Other **How Many**:	**Describe Other**:
Disposal Method: ☐ Off-site Disposal ☐ ☐ Bury ☐ Incinerator ☐ Off-site Recycler	Date/Time of Scheduled Transfer:
Treatment Prior To Disposal: ☐ Crush Containers ☐ Evaporate Prior to Disposal Notes: _____	**Instructions to Off-site Disposal/Recycler**: ☐ **NA**
HSE Approval	**Waste Management Area Supervisor**:
(Print Name)	(Print Name)
(Signature)	(Signature)

FORM S1 - WEED/PEST REPORT FORM

Incident ID No.: Date of Incident: Date of Report:

Contractor Name: Time of Incident: Time of Report:

Location of weed/pest:

Regulatory Agencies Notified:

Photographs Taken:

Incident Classification (circle one): Noxious Weed or Animal Pest

Other (Specify):

			Contractor Job Supervisor or Foreman:
Name:	ID:	Employer:	Name: ID:
Name:	ID:	Employer: Bechtel	Employer:

Description of Weed/Pest: (Attach Additional Page if Necessary)

Immediate Corrective Action Taken:

Comments & Recommendations to Prevent Recurrence:

Report Prepared By:

Name: Phone: Date:

Bechtel Env Mgr: Date:

W2

No.

Dewatering Permit

Location:		**Date Issued:**	
Construction Activities:		**Time Issued:**	
Valid To:		**Environmental Conditions:**	

Information Description	Comments / Reference Document / DR / CAR
Source of the discharge	
Area discharge point	
Approximate quantity of water for discharge	
Has the water been treated? (Flocculent added, oil water separation).	
Water quality measured?	
Inlet pipe set to prevent intake of sludge sediment?	
Does the outlet pipe have scour protection?	Yes ☐ No ☐ - Describe:
Controls in place to prevent contamination from refuelling of pumps?	

Water Quality

Time	Location	pH (6.5 - 8.5)	Check Daily Limit - Turbidity (NTU)	Total Hydrocarbon (<10mg/L = No Visible Sheen)

Environmental Officer: _____ (Print Name) _____ (Signature) _____ (Date)

Issued To: _____ (Bechtel Supervisor) _____ (Signature) _____ (Date)

White Copy: Environmental Team **Green Copy:** Supervisor **Blue Copy:** Remains in Book

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GLNG

ACID SULFATE SOILS MANAGEMENT PLAN

(Attachment C of CEMP)

3	05-Dec-13	Issued for Update	ER	PN	BF	HH	BT
2	12-Apr-2013	Issued for Annual Review and Update	RJF	SMP	BF	RR	BT
1	1-Nov-11	Updated for Publication	RW	RR	BF	BT	AP
REV	**DATE**	**REASON FOR REVISION**	**BY**	**CK'D**	**Site Mgr**	**APE**	**PM**
0	31-May-11	Issued for Use	RW	RRR	CJK	BF	BT / APB
C	2-Feb-11	Incorporate client provided reports; Reissue for Permit	RW	CJK	WL	JJM	BT / APB
B	20-Jul-10	Client comments incorporated Issue for Permit	RW	CJK	WL	JJM	ABP
A	7-Oct-09	Issue for Review	RW	GE	WL	WW	BT
REV	**DATE**	**REASON FOR REVISION**	**BY**	**CK'D**	**Site Mgr**	**APE**	**PM**

BECHTEL OG&C INC.		**JOB NO. 25576**	
	ACID SULFATE SOILS MANAGEMENT PLAN	**DOCUMENT NO.**	**REVISION**
		100-GPP-GCE-00003	**3**
		GLNG Doc No. 3310-BTH-3-3.3-6503-PDF	

TABLE OF CONTENTS

ABBREVIATIONS

AHD	Australian Height Datum
ASS	Acid Sulfate Soil. For purposes of this Plan acid sulfate soil includes all onshore and offshore actual and potential acid sulfate soil and sediment
DEHP	Department of Environment and Heritage Protection (Queensland)
EC	Electrical conductivity
EIS	Environmental Impact Statement
EPC	Engineer, Procure, Construct
pH	A measure of the acidity or alkalinity of a soil or water body on a logarithmic scale of 0 to 14; a pH <7 is acid, pH 7 is neutral, and pH >7 is alkaline. Note that one unit change in pH is a ten-fold change in acidity.
SPOCAS	Suspended Peroxide Oxidation-Combined Acidity and Sulfate

1 PURPOSE

This Acid Sulfate Soils Management Plan is Attachment C of the Construction Environmental Management Plan (CEMP) for the Gladstone LNG Plant Project and shall be read and interpreted in conjunction with the CEMP (ref. 25576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617), in particular section 1.1.

The purpose of this document is to address technical and execution solutions to handling acid sulfate soils (ASS) and other acidic soils that have the potential to produce acidic runoff and other detrimental effects that require controls. This document is not intended to address legal responsibility. Legal responsibility will be addressed in the EPC contract.

It is the objective of the GLNG Plant Project to avoid acid sulfate soil (ASS) where possible, contain acid soil, and treat or dispose of ASS per Queensland regulations. This plan presents general guidance for ASS and specific actions for individual occurrences of ASS will be modified as necessary to maintain compliance. Other acid soils will be managed by controls to prevent acid runoff into Gladstone Harbour.

2 INTRODUCTION

Investigations by geotechnical consultants Butler (2010), Coffey (2009) and GeoCoastal (2009) at the Curtis Island LNG Facility site have determined that ASS occurs in selected area on the margin of the GLNG Plant Project site and potential ASS occurs in offshore sediment. Acidic soils resulting from natural geologic processes may also be found in upland areas of the site (Butler, 2010). Further investigations for ASS and acid soil will be performed as part of specific construction activities at spots where ASS and acid soil might occur.

This ASS Management Plan is subject to revision based on discovery of conditions different from those identified in the above referenced reports (see section 8, References).

ASS in the near-shore areas is generally associated with mangroves and low-lying coastal landforms below five (5) m Australian Height Datum (AHD). Early geotechnical soil investigations by GeoCoastal (2009) described ASS as widespread laterally throughout the area of the shoreline continuing down-sequence to at least a two (2) m below soil surface depth. However, more detailed site specific investigations by Butler (2010) concluded it is unlikely any ASS will be encountered during construction. Figure 1, summarising results from Coffey (2009) and GeoCoastal (2009), provides ground sampling locations that indicate potential occurrence of ASS, groundwater well locations, and areas below five (5) m AHD that may potentially be affected by construction activities. Figure 2 (Butler (2010), Drawing 1) shows additional sampling

in 2010 that demonstrated there was only a slight chance of encountering ASS in intertidal areas indicated on the drawing as Construction Areas 1A, 1B, 11 and 12.

Current project design calls for only limited excavation along the shoreline below approximately four (4) m AHD (and this only in selected spots) and it is unlikely ASS will be encountered. Fill may be placed along some edges of the shoreline and excavation is planned for stormwater outlet structures and boring for concrete piles.

Offshore, ASS may be disturbed by pile-driving, sheet-piling or dredging for the Materials Offloading Facility (MOF) or the Product Loading Facility (PLF). These works are however the subject of specific Tidal Works permits, which require an approved Dredge Management Plan that includes description of how ASS in dredge spoils will be managed. Consequently, this ASS Management Plan does not deal further with construction of the MOF or PLF.

The report by Butler (2010) indicated that acidic soils may be encountered in upland areas of the site. Butler based this on general knowledge of the Curtis Island soils and did not conduct any sampling and testing in the upland areas (refer Figure 2). Work by Coffey (2009) showed that overburden and extremely weathered materials in the upland areas had an average pH value of 6.0 (samples ranged from 5.0 to 7.1), while upland topsoils had an average pH of 5.1 (samples ranged from 4.5 to 5.4). It is therefore possible that acidic soils will be encountered in upland areas during construction. If such acidic soils are encountered during the performance of the work, then they will be controlled per the methods described in this Plan.

2.1 Regulatory Guidance

The management strategies in this plan are based on data from field investigations and the following Queensland/Australian guidelines:

- Ahern, C.R., Ahern, M.R. and Powell, B. (1998, Rev 4.0) *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998*. QASSIT, Department of Natural Resources, Resource Sciences Centre, Indooroopilly. 42 pp.;
- Dear, S. E., Moore, N. G., Watling, K. M., Fahl, D. and Dobos, S. K. (2002) *Queensland Acid Sulfate Soil Technical Manual, Soil Management Guidelines*, 71 pp.;
- *Instructions for the Treatment and Management of Acid Sulfate Soils (2001)*, Queensland Government, 25 pp.;
- *New South Wales Acid Sulfate Manual* (1998), 9 pp.;
- *State Planning Policy 2/02 Planning and Managing Development Involving Acid Sulfate Soils*, Queensland Government (DERM), 54 pp.;

- *Site Contamination – Acid sulfate soil materials*, South Australian EPA, November 2007, 15 pp. http://www.epa.sa.gov.au/xstd_files/Site%20contamination/Guideline/guide_sc_acid.pdf

2.2 Safety

Handling and treatment of ASS presents a risk of exposure to low pH (acidic) water, testing chemicals including hydrogen peroxide (30% H_2O_2), and treatment materials such as finely ground limestone. Personal protective equipment will be issued to anyone exposed to any of these hazards and only trained personnel will participate. Work and treatment areas involving ASS will be barricaded and signed to limit entrance.

3 SOIL & WATER ASSESSMENT

Soil and groundwater testing of the site commenced in 2008 by GLNG. During construction site specific soil samples will be collected to identify suitability of the material for construction use. ASS will be assessed in selected locations described in the Butler (2010) report as having a potential to contain ASS using the field methods described in *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998* and the following steps:

Field indicators for *actual* acid sulfate soil materials and conditions

- Unusually clear or milky blue-green drainage water within or flowing from the area (aluminium released by the acid sulfate soils acts as a flocculating agent).
- Extensive iron stains on any drain or pond surfaces, or iron-stained water and ochre deposits.
- Water of pH <4 in adjacent streams, drains, groundwater or ponding on the surface.
- Soil pH <3.5−4.
- Jarosite containing horizons (a pale yellow mineral deposit which can precipitate as pore fillings and coatings on fissures) or iron oxide mottling in auger holes or recently dug surfaces. With a fluctuating water table, jarosite may be found along cracks and root channels in the soil. Jarosite is not always found in actual acid sulfate soils.
- Jarosite present in surface encrustations or in any material dredged or excavated and left exposed.
- Dominance of mangroves, reeds, rushes and other swamp-tolerant vegetation.
- Sulfurous (H_2S) smell after rain following a dry spell, or when the soils are oxidised or disturbed.

Field indicators for *potential* acid sulfate soil conditions

- Typically waterlogged, unripe muds (soft, buttery texture, blue grey or dark greenish grey) or estuarine silty sands or sands (mid to dark grey) or bottom sediments of estuaries and tidal lakes (dark grey to black).
- A pH of 6−8.
- Positive peroxide test.
- Offensive odour, predominantly due to 'rotten egg gas' (hydrogen sulfide, H_2S).

Acid soil in upland areas can also be identified by measurement of soil and runoff pH. Sampling will generally be conducted along the face of an excavation or in test pits. The frequency of sampling for pH will depend on the specific site condition, but regular sampling will occur under the direction of the environmental lead sufficient to characterise the material and test effectiveness of controls.

4 CONSTRUCTION ACTIVITIES AND ACID CONTROLS

ASS occurs on the margin of the construction site in limited locations [Butler (2010)]. In upland areas, naturally occurring acidic soils may be encountered. Control of acidic runoff and leachate from both ASS and acidic soils is described below, based on the type of construction activity where the materials could be found.

4.1 General Control Strategy

Several control measures will be used to identify and treat acidic runoff/leachate and acid-forming soil conditions. The hierarchy of controls include avoidance, minimisation, neutralisation, runoff/stormwater control, leachate control, and compaction.

The majority of earthwork activities are planned for the dry winter months and the natural drainages on the site will be thoroughly altered early in the earthworks program by creation of a site-surrounding diversion ditch upslope of the main construction area so that no stockpiles or work occur in the flow paths of stormwater. Stormwater management measures will be installed in association with all construction activities to divert runoff away from exposed soils and control erosion (see CEMP Attachment O, Stormwater Management and Erosion and Sediment Control Plan).

The following is a description of construction activities where acidic materials or conditions may be encountered and an explanation of how resulting acidity will be managed in each case. In general, acidic soils (low pH) will be treated in a similar manner to ASS. Treatment will typically be in-situ, using compaction (to avoid water penetration and prevent acidic leachate) or addition of lime to neutralise the acidity.

4.2 Specific ASS/acid soil controls

Construction Activity	Control
Vegetation clearing: vegetation will be pushed/felled by tractors, stick-raked, and chipped.	• Rootwads of large trees may create holes when they are pushed over. These holes will be refilled to contour to avoid ponding water. • Chips will be used onsite for erosion control or landscaping or removed offsite.
Test pits: excavations will explore the exact nature of material prior to general cutting. Potential select fill, general fill, or armour rock may be segregated.	• Immediately ahead of site earthworks test pits will be excavated with a dozer or excavator to investigate the possible uses of material and how specific areas may be worked. A geologist/geotechnical engineer will examine each excavation and perform laboratory tests if deemed necessary, including additional acidity tests. • Test pits will be opened for less than 14 days and refilled or the area will immediately be cut by ongoing earthworks.
Topsoil removal & storage: topsoil will be collected and stockpiled.	• Acidic topsoil will be treated with aglime at a rate to achieve a pH of 6.0 – 7.0 at the time it is stockpiled. • Topsoil stockpiles will be stabilised with vegetation and runoff controls and maintained for use during site rehabilitation.
Sediment basins: basins will be installed to cleanse stormwater.	• Sediment basins will be constructed to reduce sediment load in stormwater runoff. • The pH of water in sedimentation basins will be monitored during rain events. • If testing shows low pH, hydrated lime will be added in the sediment basins to adjust the pH, aglime or gypsum may be used to treat acidity. • Regular water monitoring, including pH and for selected metals, will determine if additional control measures are needed for acid runoff control in basins.

Stockpiling cut material temporarily: cut material will generally be immediately placed in fill areas and compacted. In some cases stockpiling may occur for up to two weeks until the material is placed.	• Containment bunds constructed of cut material will be created to contain any stormwater runoff at the stockpile.
	• Material will be tested for acidity. If testing reveals acidic soils:
	  ○ Stockpiles will be placed on aglime (10 kg/m^2) that is spread on the ground.
	  ○ Aglime (10 kg/m^2) will be spread on the ground beneath of and on top of the containment bund to control any acid runoff.

Construction Activity	Control

Stockpiling cut material longer-term: cut material may be suitable for specialised use, including select fill or rock crushing and stockpiled for many weeks.	• Containment bunds constructed of cut material will be created to contain any stormwater runoff at the stockpile.
	• Material will be tested for acidity. If testing reveals acidic soils:
	  ○ Stockpiles will be placed on aglime (10 kg/m^2) that is spread on the ground.
	  ○ Aglime (10 kg/m^2) will be spread on the ground beneath of and on top of the containment bund to control any acid runoff.
	  ○ Aglime (10 kg/m^2) will be spread on the surface of long-term stockpiles.

Steep slope cuts: perimeter slopes may be cut up to 40 m high and stabilised	• Cut slopes up to 40 m high will be created at the upland perimeter of the construction site; • These slopes will generally be at 1:1.5 and stabilised based on site-specific assessment by a geologist/geotechnical engineer for each slope. Stabilisation may include erosion control blankets and vegetation, geosynthetics, shot-crete, rock bolts/anchors, or other methods. • Runoff from these slopes will be diverted around the construction site by a permanent diversion ditch.
Fill placement/compaction: cut material will be placed as fill in many locations	• Excavated material may be sorted depending upon the type of material encountered (select fill, general fill, armour rock, etc.) and the need onsite for certain material. Some material may be stockpiled for later use and some may be crushed for immediate use or stockpiling. The greatest need onsite is for general fill. • Excavated material will typically be directly placed in fill areas and compacted if the field sample test result meets the project specification for the fill. Aglime layers will not be included with fill because (1) the fill material is natural to the site, and (2) compaction will prevent acid runoff. • Fill material will be compacted in accordance with AS 1289, making it essentially impermeable. • Fill from mainland quarries that is not acidic will be used in some areas. • Fill will be placed up to the edge of the shoreline with a seaward slope of 3:1. The seaward face will be rock armoured.
Surface treatment of fill: several controls will stabilise and manage runoff on the final surface of the site	• Some site roads will be gravel surfaced and others bitumen sealed; • Permanent structures will cover a significant amount of the site with concrete, paving or roofing. • A permanent stormwater system will prevent ponding (outside of designed basins) and quickly convey stormwater from the site.

Construction Activity	Control

Augering pile holes: piles along the shoreline may require augered holes that produce waste material.	• Augered soil will be collected and tested for ASS
	• Non-ASS materials will be used as fill material
	• Ass materials will be treated in a designated area, as follows:
	  ○ The ASS treatment area will have a material containment bund at least 1 m tall and runoff controls.
	  ○ Aglime will be incorporated to a depth of 0.5 m at the treatment area and the containment bund.
	  ○ ASS material will be limed at a rate of 5 kg/m^3 to neutralise acidity. Lime will be incorporated into material in lifts not to exceed 0.3 m at a time.
	  ○ A leachate/runoff collection system will be included in the design;
	  ○ ASS shall be treated with lime until testing demonstrates pH of leachate/runoff is between 6.5 and 8.5 for 24 hrs;
	  ○ Stockpiles and bunds will be inspected at least daily to ensure they are functioning and materials/leachate are not causing contamination outside the treatment site;
	  ○ Sufficient amounts of lime and other materials shall be procured for neutralization and emergency situations;
	  ○ Stockpiles and treated material will be kept moist or otherwise stabilized to prevent blowing and to inhibit oxidation.

5 LEACHATE CONTROL

Water exposed to acid-forming soil and found to have a pH <6.0, including water generated from ASS treatment, will require collection and management. Any leachate generated during the treatment operations shall be directed to collection tanks/ponds and treated in the following manner:

- Leachate and runoff from excavations, stockpiles, or ASS treatment areas will be contained or directed to leachate treatment tanks/ponds prior to discharge. Valves/gates will be installed at the discharge locations for all treatment tanks and operated manually by trained personnel. Water will be pumped and monitored from the ponds per Environmental Authority permit. This may be from standalone ponds into the sites sediment basins or directly from the sites sediment basins to authorised discharge points. Containment bunds will control runoff from stockpiles;
- Treatment and neutralization may be accomplished with hydrated lime, quicklime or other suitable reagents, with the dosing rate determined following assessment of actual pH levels. Discharge of leachate/runoff may occur when the pH of the leachate/runoff has been steady for 24 hours at a pH of 6.5 to 8.5;

- If hydrated lime or quicklime is utilized for neutralization, controls will be implemented, such as regular pH testing, to ensure that overdosing does not occur so pH of the leachate does not rise above pH 8.5;
- Personnel conducting ASS and leachate treatment shall be trained in handling of chemicals and test equipment;
- Groundwater in excavation areas will be tested prior to release per the permit to discharge system. Leachate released must have a pH between pH 6.5 to 8.5 for a period of at least 24 hours or be treated or otherwise disposed;
- pH of leachate/runoff treated in-situ in excavations will be measured daily or whenever the flow rate changes for some reason. pH results will determine the application rate for neutralization lime and amount of treatment in the project's pond system prior to discharge;
- Treated leachate resulting from stormwater inflows will be discharged through the project stormwater system;
- Incident reporting procedure 25576-100-GPP-GHX-00112, Environmental Incident Management Procedure' details how to record, investigate and report any spills, unscheduled discharges or other environmental incident. When an incident occurs, or is discovered, it will be immediately reported to the Bechtel site Environmental Manager, who will coordinate efforts with Project Managers and construction personnel (including subcontractors) to correct the condition. The site Environmental Manager will report incidents as per reporting protocol to ensure incidents are reported to regulatory or other authorities based on project permit/approval requirements. Contingency measures will be developed (e.g., erection of bunds around excavation areas, linings for drainage systems, treatment of upslope areas with aglime), based on an assessment of any incident by the environmental lead, to eliminate future occurrences;
- If acid affected groundwater contains contaminants, including heavy metals, it shall be disposed offsite at an appropriate treatment facility.

A truck wash-down area comprising a hardstand of base course with drainage shall be constructed for trucks/equipment handling ASS adjacent to a temporary leachate tank/pond so that truck wash-down water can be collected for treatment. Leachate collection ponds shall be constructed to accommodate the leachate/water that would be generated by rainfall over at least a three day period. This is to account for rainfall/surface water runoff which may occur during a non-work period (i.e., long weekend).

Water should be appropriately treated, including for low pH or other contaminants, prior to disposal as required based on the laboratory results and in accordance with any license/permit.

Water requiring off-site discharge shall be disposed of in accordance with project licenses/permits.

6 MONITORING

Regular visual monitoring of work areas should be undertaken to identify signs of acid oxidation. This monitoring should include detecting:

- Unexplained scalding, degradation or death of vegetation;
- Unexplained death or disease in aquatic organisms;
- Formation of the mineral jarosite and other acidic salts in exposed or excavated soils;
- Areas of green-blue water or extremely clear water indicating high concentrations of aluminium;
- A transition to, or establishment of, a community dominated by acid tolerant plant species;
- Invasion of a community or area by acid tolerant plant species;
- Rust coloured deposits on plants and on the banks of drains, water bodies and watercourses indicating iron precipitates;
- Excessive corrosion of concrete and/or steel structures in contact with soil or water;
- Black to very coloured waters indicating de-oxygenation; and
- Any sulfurous smells; e.g., hydrogen sulfide or rotten egg gas.

Water samples will be regularly collected from the site drainage system including site sediment basins and assessed for pH. Low pH values in site runoff will be addressed by modification or greater use of the controls described in Section 4.

7 CLOSEOUT OF ASS TREATMENT AREA

Closeout (decommissioning) of the ASS stockpile areas, treatment pads, leachate/runoff tanks/ponds and associated channels will be accomplished once all ASS excavations and treatment of stockpiled material is complete. The issues to be addressed during closeout include:

- Bunding and underlying materials shall be neutralized as determined through soil/water sampling of these areas;
- In-situ neutralization shall be conducted prior to discharge of residual leachate in drains from ASS stockpile areas, treatment pads, and leachate treatment ponds, following stabilization at pH between 6.5 and 8.5 for a period of 24 hours using lime or other material;
- Restoration of the ASS leachate treatment tank/pond area following soil sampling to determine if treatment is required to complete neutralization. Backfill material may be from treatment and stockpile areas which have been validated as ASS-free;
- Restored treatment areas shall be revegetated or used for another approved post-treatment land use;
- At the end of final treatment and restoration a closeout report will be submitted to the regulatory authority.

REFERENCES

Butler (2010). Acid Sulfate Soil Investigation Gladstone LNG Project; Butler Partners Pty Ltd, report/project 010-213D, 23 Dec 2010; prepared for GLNG Operations Pty Ltd.

Coffey (2009). GLNG – Preliminary Acid Sulfate Soils Investigation Report; Coffey Geotechnics Pty Ltd, report GEOTNEWS20350AA-BS-00, 4 Nov 2009; prepared for Bechtel OG&C, Inc.

GeoCostal (2009). Terrain Soils and Land Capability Gladstone LNG Facility – Final Report; GeoCoastal (Australia) Pty Ltd, report 42626224, 12 Feb 2009, prepared for Santos Ltd; published as Appendix L4 of the Environmental Impact Statement for the GLNG Project, prepared by URS (2009).

Figure 1. Acid Sulfate Soils field investigation, 2008-09

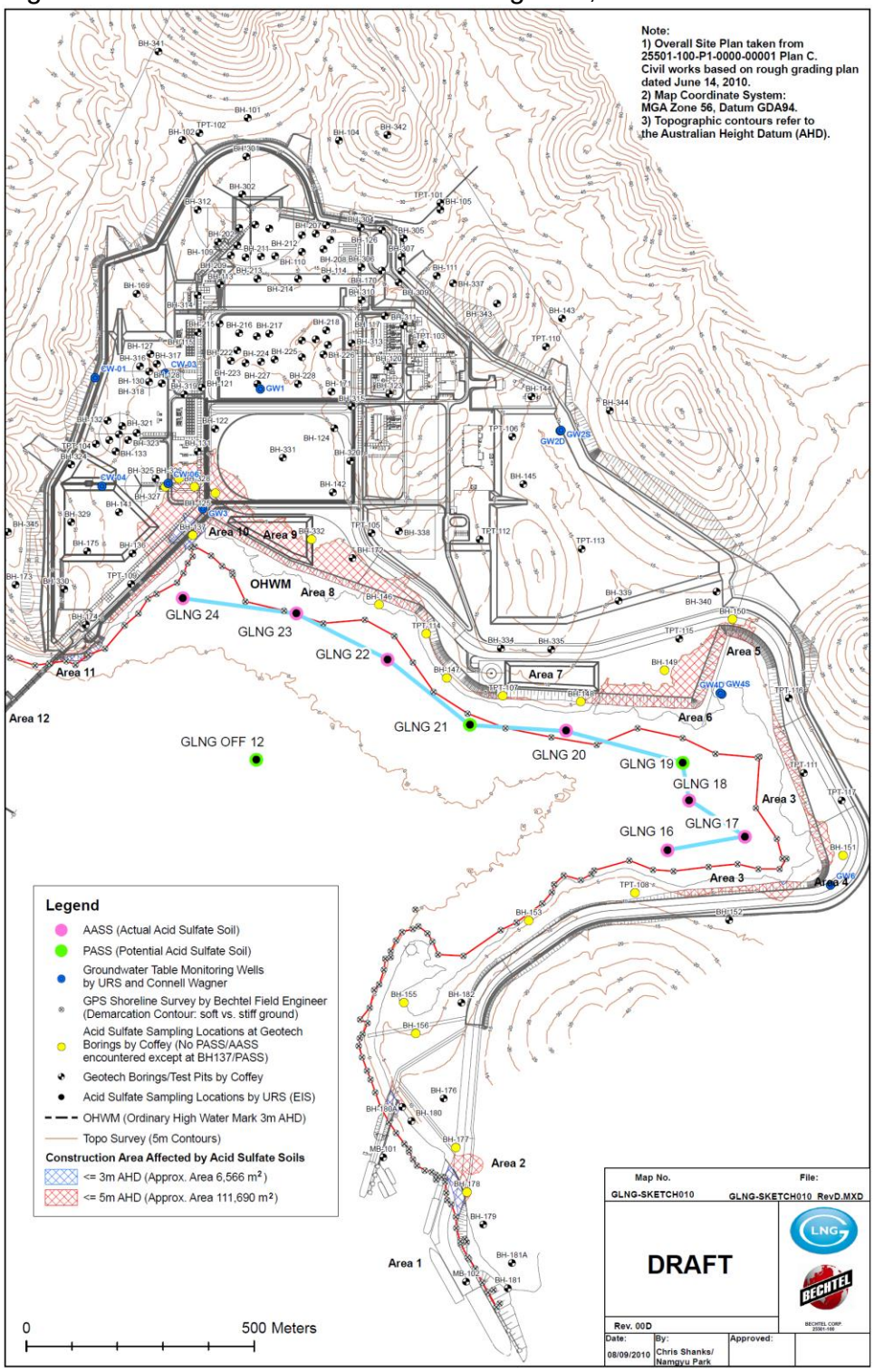
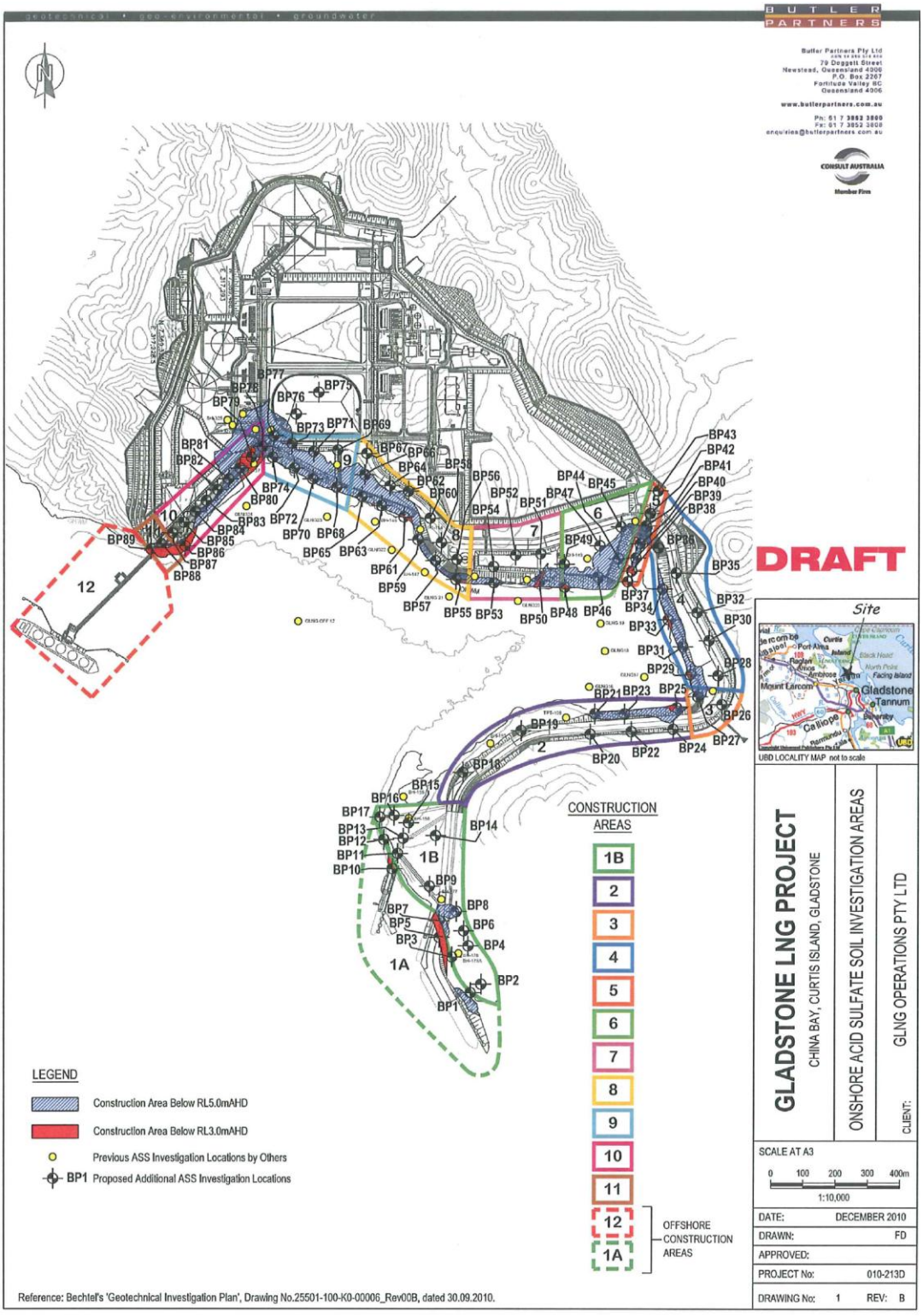


Figure 2. Acid Sulfate Soils Field Investigation, 2010



GLNG

AIR QUALITY MANAGEMENT PLAN

(Attachment D of CEMP)

REV	DATE	REASON FOR REVISION	BY	CK'D	Site Mgr	APE	PM
3	05-Dec-13	Issued for Update	ER	PN	BF	HH	BT
2	12-Apr-13	Issued for Annual Review and Update	RJF	SMP	BF	RR	BT
1	1-Nov-11	Updated for Publication	RW	RR	BF	BT	AP
0	19-May-11	Issued for Use	RW	RRR	BF	CJK	BT / AP
B	11-Aug-10	Client comments incorporated; Issued for Permit	RW	CJK	JJM	CJK	BT / AP
A	21-Jun-10	Issue for Review	RW	CJK	JJM		ABP

BECHTEL OG&C INC.		JOB NO. 2557625576	
BECHTEL	AIR QUALITY MANAGEMENT PLAN	DOCUMENT NO.	REVISION
		100-G01-GHX-00018	3
		GLNG Doc No. 3310-BTH-3-3.3-6818	

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1 INTRODUCTION

1.1 Purpose

This Air Quality Management Plan (the Plan) is Attachment D of the Construction Environmental Management Plan (CEMP) for the Gladstone Liquefied Natural Gas (GLNG) Plant Project (the Project) and shall be read and interpreted in conjunction with the CEMP (ref. 2557625576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617), in particular section 1.1.

The purpose of this Plan is to detail the requirements, objectives and strategies for the management of dust emissions, noxious or offensive odours, and other noxious or offensive airborne contaminates during the construction and commissioning phases of the Project.

The management objectives of this Plan are:

- Compliance with relevant Queensland Environmental Protection legislation, and permits for air quality management, as applicable; and
- Minimization of emissions generated by construction and commissioning activities and equipment to the extent practicable
- Managing air quality as to not cause an environmental nuisance at any sensitive or commercial place.

1.2 Scope

This Plan addresses the actual and potential air quality impacts associated with construction and commissioning activities, as identified in the GLNG Environmental Impact Statement.

This Plan provides guidance for mitigation of potentially adverse air quality impacts and should be read in conjunction with the Project CEMP and other relevant supplementary management plans. The guidelines used in this Plan shall give due consideration to site-specific environmental and social conditions.

This Plan is applicable to the construction and commissioning phases of the Project only. Air quality management during operations will be addressed in the Operational Environmental Management Plan (OEMP). Ongoing dust control and air quality management during the operations and close-out phases of the Project will be carried out by the Project owner or their chosen contractor(s).

2 MANAGEMENT STRATEGIES

The management strategies to be implemented include:

- Compliance with Project permits and approvals in regards to the management of dust and/or particulate matter resulting from construction and commissioning activities at any nuisance sensitive or commercial place;
- Facility design and selection of equipment that will result in less detrimental emissions;
- Implementation of dust control measures, concentrating on prevention techniques;
- Maximization of energy use efficiency to reduce fuel consumption;
- Implementation of emission control techniques for plant and equipment operation;
- Implementation of a Spill Prevention, Control and Countermeasures Plan and associated Project procedures to assist in the control of spills, odours and emissions;
- Implementation of a Stormwater Management and Erosion and Sediment Control Plan to assist in the control of stormwater, soil erosion and dust management; and
- Encouragement of emission best practice and innovation of design, procedure and practice across the Project.

3 REQUIREMENTS AND STANDARDS

3.1 Standard Construction Practices

The following general construction practices will be used during construction of the LNG facility:

- Minimize dust emissions;
- Reduce emissions from combustion sources;
- Minimize generation of emissions known to be particularly harmful to people and/or detrimental to the environment; and
- Employ standard dust control measures, such as watering and avoiding excessive dust-causing activities on exceptionally windy days.

3.2 Performance Targets

The Coordinator General's Report Conditions Schedule B – Air Emissions included with the Project's Environmental Authority (EPPG00712213) Conditions B1-B21.

During construction Condition B3 will be the most relevant since the activity inherently suspends dust and particulate matter from movement of heavy machinery. The condition stipulates that dust and particulate matter shall not exceed any of the following levels when measured at any "nuisance sensitive or commercial place":

a) Dust deposition of 120 milligrams per square metre per day over a 30-day averaging period, when monitored in accordance with Australian Standard AS 3580.10.1 of 2003 (or more recent editions); or

b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) (PM10) suspended in the atmosphere of 50 micrograms per cubic metre (with five one day exceedances allowed in any one year period); and over a 24 hour averaging time, at a dust sensitive place downwind of the licensed place, when monitored in accordance with:

   i. Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet - Gravimetric method'; or

   ii. Any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority.

Note: The above 5 days exceedances per year are based on the expected frequency of natural events such as bushfires and dust storms.

3.3 Legislation and Guidelines

Curtis Island. Queensland EHP Environmental Authority No. EPPG00712213 for the GLNG Plant Project stipulates conditions pertaining to dust control and combustion emissions, which shall be followed.

Port Facilities. The most significant sources of air pollutants from port operations include combustion emissions from ship propulsion systems and auxiliary engines and boilers, followed by combustion source emissions from vehicles and land-based engines and boilers, contributing similar pollutants. This Project will include the construction and operation of port facilities, for the shipping and handling of equipment and bulk goods as well as the export of LNG. Best management practices and Project and approval conditions pertaining to air quality at Port

Facilities (RG Tanna, Port Central and Fishermans Landing) and shipping operations shall be followed.

4 AIR QUALITY IMPACTS

While dust and particulate emission occurs as a baseline condition in the Project area, construction and transport (including vehicular traffic, air travel and heavy machinery associated with the Project may increase these existing levels. Additionally, fuels and the operation of heavy equipment, trucks and vehicles will produce greenhouse gas emissions and particulate emissions during the construction stage.

As the Project evolves from construction to commissioning it is expected that the types of emissions will change over time. Commissioning activities which have the potential to impact air quality include system start-up, gas venting and flaring activities. Emissions expected to be released during commissioning include but are not limited to; nitrogen oxides (NO_X), carbon monoxide (CO), carbon dioxide (CO_2), and minor amounts of methane (CH_4), hydrogen sulphide (H_2S) , propane (C_3H_8), ethylene (C_2H_4), and hydrocarbon vapour.

These activities are described below.

4.1 Construction Activities

Emissions during early works and construction are minimised to the extent possible through the implementation of effective environmental management practises. The success of environmental controls is measured through site inspections which focus on identifying opportunities for improvement.

Primary sources of emissions during construction are identified below.

4.1.1 Dust Mitigation

The majority of emissions during construction result from activities which are at risk of causing dust nuisance in the receiving environment. These activities include, but are not limited to:

- Earthwork activities (e.g., ground clearing, grading, excavating);
- Drilling;
- Blasting and concurrent reclamations;
- Construction of erosion/sediment control structures to include drainage swales and sediment traps/ponds;

- Soil screening;
- Washing/crushing of rock;
- Wheel-generated dust from haul road traffic and light vehicle traffic on-site on unpaved roads;
- Materials handling, loading and transport, particularly soil; and
- Wind eroded dust from non-vegetated site disturbances, uncovered stockpiles and dried surfaces.

Management of emissions resulting from these activities is through the implementation of effective dust mitigation measures, These are described in Section 5.1.

4.1.2 Plant and Equipment

Emissions from the use of plant and equipment onsite (including vehicle exhausts and on-site power generation) will be comprised of particulates and Greenhouse gases. The emissions will be minimised where possible as described in Section 5.1.

4.1.3 Temporary Sanitary Treatment Plant (STP)

Other emissions which have the potential to impact the receiving environment include odours from the temporary sanitary treatment plant (STP). Odours from the temporary STP are managed by the operators as part of the STP process as described in section 5.1.

4.2 Commissioning Activities

Emissions during commissioning are minimised to the extent possible through tuning, however fluctuations in emissions during commissioning may occur until commissioning activities are complete and the plant is in normal operation.

Primary sources of emissions during commissioning are identified below.

4.2.1 Purging vessels and piping

Piping and vessels will be purged with inert nitrogen to remove any residual air prior to commissioning. The use of an inert gas rather than fuel gas will ensure that the activity will not release greenhouse gas to the environment affecting ambient air quality. Nitrogen is generated from ambient air using a temporary nitrogen generator in order to conduct this activity.

4.2.2 Hot Oil Start-up Heaters

The Hot Oil Start-up Heaters are used for start-up and commissioning until the waste heat recovery system is put on-line. The Heaters are a part of a closed loop hot oil system which provides the process heating requirements for the plant. During normal operating conditions process heat is recovered from the ethylene compressor gas turbine exhausts via the Waste Heat Recovery Units. This is then the primary provider of heat except that Start-up Heaters are kept on hot standby, operating at a much lower load, in case of emergencies. Fuel gas is used to fire the start-up heaters and emissions are minimised by firing them at a reduced rate and utilizing waste heat recovery during normal plant operation.

4.2.3 Gas venting to the atmosphere (excludes flaring)

Sources of vented emissions during commissioning include emissions from the Acid Gas Rejection Unit (AGRU), the Nitrogen Rejection Unit (NRU) and from equipment maintenance venting. Vented emissions may also arise from the storage of bulk refrigerants onsite.

4.2.4 Compressor gas turbines and Gas Turbine Generators

The primary pollutants from the Compressor Gas Turbines and Gas Turbine Generators (GTG) are emissions which are relative to the operating load of the system and also particulate matter. To mitigate the environmental impact the gas turbines are equipped with Dry Low Emissions (DLE) fuel combustion systems to minimise emissions. The DLE systems use lean pre-mix combustion technology that pre-mixes the fuel with combustion air prior to ignition. This design enables the turbine control system to maintain a more consistent mixture and fuel distribution. This in turn ensures a much more uniform flame temperature. With a consistent flame temperature, the turbine can operate within a temperature band which minimizes emissions caused by the “hot” and “cold” zones of conventional combustion turbines.

The gas turbines also have a lube oil system which vents to the atmosphere.

4.2.5 Regeneration Gas Heaters

A portion of the vent gases from GTGs is sent to the Regeneration gas heaters to heat molecular sieve regeneration gas that removes moisture. The moisture removed from the regeneration gas is then vented. The emission from this source has been accounted with emissions from GTGs.

4.2.6 Flaring

Flaring may occur during the commissioning of the LNG Plant. Flaring emissions from wet/dry and marine flares will occur during the commissioning phases of train 1 and train 2. Flaring during commissioning may potentially result from:

- Process upsets resulting in unplanned shutdown of plant;
- Cool down of plant equipment and LNG ship; and
  Planned venting to the flare test equipment

Wet/dry and marine flares are designed to minimise particulate emissions during normal operating conditions. During commissioning visible smoke and particulate emissions may occur.

5 AIR QUALITY MANAGEMENT MEASURES

5.1 Air Quality Mitigation Measures During Construction

As per the management strategies previously outlined in this Plan, mitigation measures will be undertaken to minimize air quality impacts during the construction phase of the Project with particular emphasis on prevention measures. Mitigation measures will target the control of dust as well as emissions from combustion sources.

The following general measures will be implemented during construction:

- Vehicles and machinery will be fitted with exhaust systems and emission control devices. The devices will be maintained in good working order;
- Vehicles will be operated in a fuel efficient manner;
- Construction sites and access roads will be watered on an as required basis to minimise the potential for environmental nuisance due to dust. Watering frequency will be increased during periods of high risk (e.g., high winds). Chemical dust suppressants may be used in association with or in lieu of watering;
- The extent and period of exposure of bare surfaces will be minimized;
- Where practical, vegetation clearing or earthworks activities will be rescheduled if necessary to avoid periods of high wind;
- Roads will be appropriately surfaced as soon as possible after construction;
- Haul vehicles carrying dusty materials moving outside the construction site will be covered;
- Vehicle speeds on-site will be limited to minimize the generation of dust on unsealed roads and exposed surfaces.

- STP odour will be managed through daily monitoring, observations and managing the process by plant operators. The STP is functioning as per design and is being managed per operating procedures. There should not be any nuisance odours since instrumentation is provided to prevent septic conditions that can create odours.

- The vicinity of the facility and associated access areas will be regularly inspected to assess the effectiveness of dust control measures;
- Regular visual monitoring of dust emissions will be conducted and watering frequency altered as required
- Maintenance schedules will be reviewed regularly to verify that the frequency and durations of breakdowns of equipment and machinery is minimized.

- Records of inspections and resulting corrective actions will be maintained;
- All justifiable dust complaints will be recorded in the incident/complaint register by the Health, Safety and Environment Manager (HSEM) and will be dealt with in accordance with the provisions of the incidents and complaints procedures; and
- Significant air quality performance information will be reported to the Department of Environment and Heritage Protection (DEHP) in accordance with the regulatory requirements of any permits.

Environmental inspections and visual monitoring will be conducted to verify that mitigation measures are implemented and maintained. Inspection, monitoring and recording details are discussed in section 7.

5.1.1 Dust

Specific mitigation measures for dust emissions (fugitive dust and other particulate matter) that shall be incorporated by the Project during the construction phase include:

- Provide adequate water supply on-site for dust suppression;
- Use water or chemical stabilizers, sealants, emulsions, or sand & gravel binders for control of loose materials on paved or unpaved road surfaces;
- Use water suppression techniques for open materials storage piles;
- Spray trafficable areas with water using a water cart/truck;
- Conduct air extraction and treatment through a baghouse or ‘cyclone’ for material handling sources such as conveyors and bins;

- Provide conveyor systems with covers and equipped with measures to clean return belts;
- Maintain construction vehicles to prevent loss of load, whether dust, liquid or soils and use appropriate dust control covers or devices where needed;
- Provide facilities at exit points of all construction sites/compound to minimize tracking of mud, dirt or other material onto public roads or footpaths;
- Sweep-up mud or soil which has been tracked onto public roads;
- Manage traffic patterns and speeds: all vehicles travelling on-site will follow designated routes and limit speed for safety and to minimize dust generation. Truck drivers will be closely monitored and advised to minimize speeds especially during dry weather periods;
- Stabilize disturbed areas including stockpiles using water, vegetation or geo-matting as applicable;
- Minimize surface area of stockpiles (subject to health and safety and visual constraints regarding slope gradients and visual intrusion) to reduce area of surfaces exposed to wind pick-up;
- Minimize dry-cargo pile heights and contain piles with perimeter walls where possible;
- Disturb new areas only when necessary and perform reclamation and stabilization in a timely manner; and
- Contain and remove any spilled material as soon as practical.

5.1.2 Combustion Sources

Shipping. Emission mitigation measures for combustion sources on ships include:

- Use of low-sulphur fuels in port, wherever practical, or as required by regulations;
- Navigation of port access areas at partial power, achieving full power only after leaving the port area;
- Avoidance or limitation of the practice of blowing soot from tubes or flues on steam boilers while in port or during unfavourable atmospheric conditions; and
- Where Port facilities provide onshore power for vessels, reduction of shipboard power use during loading/unloading activities, by requiring vessels to shut down power plants (go “cold iron”) if docked above a specified time threshold.

Land-Based Activities. Mitigation measures for land-based activities at port and island sites shall include:

- Keeping transfer equipment (e.g., cranes, forklifts, and trucks) in good working condition;
- Encouraging storage planning to avoid or minimize re-storage and reshuffling of cargo;
- Selecting, where practicable, Project trucks and vehicles that use less-polluting alternative fuels and fuel mixtures;
- Encouraging reduction in engine idling during on and off-loading activities: trucks and heavy equipment will not idle for extended periods (e.g., longer than five minutes) adjacent to residential and commercial buildings. Trucking schedules will be established to minimize queues; and
- Prohibiting unauthorized burning of materials anywhere on-site.

Emissions from fuel storage and transfer activities shall be minimized by:

- Equipment selection, such as the use of floating top storage tanks or vapour recovery systems for fuel storage, loading/offloading, and fuelling activities (depending on the type of material to be stored); and
- Adoption of management practices, such as limiting or eliminating loading/unloading during poor air quality episodes or implementing tank and piping leak detection and repair programs.

5.2 Air quality mitigation measures during commissioning

As per the management strategies previously outlined in this Plan, mitigation measures will be undertaken to minimize air quality impacts during the commissioning phase of the Project with particular emphasis on prevention techniques.

The following general implementation strategies apply to the commissioning phase of the plant operation in addition to normal operation:

The design of the LNG facility incorporates Best Available Technology Not Entailing Excessive Costs (BATNEEC). In line with this commitment, measures to reduce air quality emissions will include the following:

- Generation of on-site power during the later stage of commissioning will utilise methane gas for the electricity requirements which will lower the amount of diesel powered electricity generation;

- Use of DLE technology in refrigeration compressor drivers and power generation turbines to reduce NO_x emissions;
- Incorporation of waste heat recovery units on gas turbine exhausts to provide process heat rather than using the fired heater;
- Use of flares designed per Environmental Authority stipulations to improve aesthetics of the plant,
- Boil off gas from LNG storage will be recycled back into the process
- Point-source air emission sources will be managed through operator control to minimise emissions;
- Stack emission points within the plant will be provided with monitoring ports where necessary; and
- Commissioning engineers will be trained to monitor all systems during commissioning activities, respond to any potential upsets and implement corrective actions if necessary.
- Gas detection system will be online for permanent plant and will alarm operators to any leaks of gases so leaks can be investigated and mitigated as soon as practicable.

5.3 Contingency Plans for Non-Compliance

In the event that there are air quality non-compliance issues or if public complaints occur related to air quality matters, the following options shall be investigated:

- Reviewing mitigation measures; and/or
- Reviewing work methods/timing.

6 GREENHOUSE GAS

There are several sources of greenhouse gas (GHG) emissions during construction, with the greatest being fuel for power generation, fuel for boats/vehicles/equipment, and decomposition of waste products. Also, clearing the project site may cause an increase in atmospheric carbon through decay of downed vegetation; this is short-term carbon-cycle carbon versus long-term sequestered carbon, though removal of any area with vegetation results in loss of a carbon sink.

GHG emissions during construction will be managed by using fuel efficient vehicles and equipment, limiting travel to necessary trips, keeping vehicles/equipment maintained, and enforcing speed limits and idling of vehicles. Waste will be reduced and disposal/treatment will strictly follow the permitted methods. Site vegetation will be left intact to the extent possible, and site landscaping and rehabilitation will re-establish vegetation to the extent possible.

During commissioning the primary sources of GHG emissions will be through refrigeration turbines and power generators exhaust stacks. Flaring may also occur during this period that will also release GHG emissions to air. Fugitive emissions are not anticipated to have a significant impact on GHG volumes released.

Records of fuel use and waste production will be maintained by Bechtel and its subcontractors.

Reporting GHG emissions to the Australian government will be the responsibility of GLNG. GHG issues related to operation of the plant are beyond the scope of this Plan.

7 MONITORING

Refer to the CEMP, Att. H, Environmental Monitoring Plan.

GLNG

BUSHFIRE MANAGEMENT PLAN

(Attachment E of CEMP)

REV	DATE	REASON FOR REVISION	BY	CK'D	Site Mgr	APE	PM
3	05-Dec-13	Issued for Update	ER	PN	BF	HH	BT
2	12-Apr-13	Issued for Annual Review and Update	RJF	SMP	BF	RR	BT
1	1-Nov-11	Updated for Publication	RW	RR	BF	BT	AP
0	19-May-11	Issued for Use	RW	RRR	BF	CJK	BT / AP
C	09-FEB-11	Client comments incorporated; Reissued for Permit	RW	CJK	JJM	CJK	BT / AP
B	11-Aug-10	Client comments incorporated; Issued for Permit	RW	CJK	JJM	CJK	BT / AP
A	26-Jul-10	Issue for Review	RW	CJK	JJM	CJK	ABP

BECHTEL OG&C INC.		JOB NO. 25576	
BECHTEL	BUSHFIRE MANAGEMENT PLAN	DOCUMENT NO.	REVISION
		100-G01-GHX-00019	3
		GLNG Doc No. 3310-BTH-3-3.3-6819	

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1 INTRODUCTION

This Bushfire Management Plan is Attachment E of the Construction Environmental Management Plan (CEMP) for the Gladstone LNG Project and shall be read and interpreted in conjunction with the CEMP (ref. 25576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617), in particular section 1.1.

There is a risk of bushfire at the Curtis Island site either originating from construction and commissioning activities or originating outside the project site and burning towards the site. This plan has been developed to identify the major risks of bushfire and how these will be managed.

2 BUSHFIRE SOURCES

The following are the likely scenarios regarding bushfire at the project site.

2.1 Lightning Strike

The most likely natural cause of bushfire is lightning during thunderstorms. There is no way to prevent this ignition source in vegetated areas. The on-site risk in regards to bushfire caused by lightning strike has diminished due to vegetation being cleared within the construction footprint. The forest surrounding the project site has a significant fuel load which increases the possibility of bushfires starting from lightning with seasonal variance. To assist in the management of a bushfire within the forest surrounding the Project site a fire break has been constructed which traverses the perimeter of the LNG Facility.

2.2 Third Party Fire Source

Human-induced fires that are started outside of the project site are a risk to the Project site. These may be caused by negligence from island inhabitants or visitors at the community of South End, recreational visitors to the island (fishing and camping are popular near the project site). Other construction projects on Curtis Island also increase the risk of the possibility of a fire that may potentially burn towards or into the project site.

2.3 Construction Activities

The following are the most likely sources/causes of fire during construction and commissioning at the Project site.

2.3.1 Vegetation Clearing

Vegetation clearing requires large construction equipment to access heavily vegetated areas of the project site. Handheld saws and other tools have also been used in and around living or dead vegetation. This has posed a risk of bushfire due to the possibility of ignition from the contact of dry vegetation with hot machinery, fuel/oil fire on machinery, spontaneously from chip stockpiles, or from cigarette butts being improperly extinguished. These risks have been managed during clearing works to date by regular inspections during clearing operations and readily available response from the Emergency Response Team on site.

2.3.2 Facility Construction

There is a low chance of bushfire during facility construction due to the completion of vegetation clearing within the construction footprint. Perimeter roads and drains will serve as firebreaks between the construction site and remaining vegetative areas.

Ignition sources during construction have evolved from the vegetation clearing stage to be primarily caused from hot works (e.g., welding, torches, hot machinery), however; these can generally be restricted to fire-safe areas. Smoking also presents a level of risk. These ignition sources are managed by designating hot-work and smoking areas. Ensuring the proper storage of fuel/oil/chemicals, efficient cleanup of spills, and implementing effective waste management practices will also be undertaken to lower the risk of fire and assist in the management of fires onsite in the advent of an incident.

2.3.3 Camp Operations

The project camp will have kitchens that are a potential source of fire. Also, workers smoking could result in accidental fires in living quarters. The camp area will be clear of vegetation and will be kept clean of potential fuel by regular waste removal. Smoking will be allowed in designated smoking areas.

2.3.4 Facility Commissioning

During commissioning of the LNG facility systems will be energized with natural gas which increases the risk of accidental fire. To mitigate this risk the facility's permanent fire control system will be activated and available for use with support from the Emergency Response Team.

Additional information on the management of fire's during the Commissioning stage have been addressed CEMP Attachment G – Emergency Preparedness and Response Plan.

3 GOVERNMENT BUSHFIRE RESOURCES

Bushfires in rural areas are typically fought by local fire brigades, generally consisting of professionals and volunteers, managed by the Rural Fire Service. The Rural Fire Service is part of the Queensland Fire and Rescue Service, which is under the Department of Community Safety (along with the Queensland Ambulance Service and Emergency Management Queensland).

The Rural Fire Service also appoints volunteer Fire Wardens whose major role is approving/issuing permits for outdoor burning, including prescribed burns for vegetation management. The Fire Warden for Curtis Island, who lives near the community of South End, can be contacted on (0409 473 190 or 07 4972 0222)
The Rural Fire Service has access to modern fire fighting equipment including aerial tankers. Response time for a bushfire at or near the project site could be several hours.

For emergency assistance, always dial 000. Contact numbers for routine communication may change and are available via Department of Community Safety website.

4 BUSHFIRE PREVENTION ACTIONS

Prevention and suppression of small fires are key components of the site strategy for preventing bushfire.

4.1 Prevention

The following ignition source and fuel management actions shall be instituted for bushfire prevention:

- Educate all workers in the danger of bushfire;
- No unauthorised burning is allowed on the project site;
- Insect repellents that require burning may only be used in designated non-flammable containers and never around vegetation;
- Establish designated smoking areas, install fire preventative disposal containers, and equip these areas with fire fighting equipment;
- Establish designated hot-work (welding, etc.) areas and equip these with fire fighting equipment;
- High-risk activities, such as welding or torching in high-risk areas, shall always use a fire lookout;

- Maintain the site perimeter roads and drainage ditch to be free of vegetation to serve as a fire break;
- Place fire fighting equipment in designated vehicles and locations including extinguishers, backpack pumps, and shovels;
- Trim or cleanup living or downed vegetation, including overhanging tree branches and bushes, around work areas;
- Instruct all workers on the risks of fire fighting during site orientation training;
- Train a designated fire fighting crew with access to pumps, hoses, trucks and other specialized fire fighting equipment;
- Provide a water supply in tanks and/or basins to battle a bushfire;
- Keep areas litter free and remove trash, especially combustibles such as oily rags, on a regular basis;
- Store fuel and flammables in proper containers in designated locations;
- Cleanup any fuel/oil/chemical spills immediately;
- Park hot equipment in designated areas with no contact between the vehicle and vegetation;
- Barbeques may only be used in designated areas that have been prepared and have fire fighting equipment available;
- Regularly check that water systems, pumps and/or generators are in good working order;
- Site personnel shall be informed of the nearest safe or escape zone;
- Verify fire fighting vehicles can obtain access to all high fire risk areas of the project site; and
- Regular inspections by the Health, Safety and Environmental staff and construction management shall assess fire danger. Appropriate actions, including site maintenance or delaying selected high-risk work activities, shall be implemented as necessary.

4.2 Fire Suppression

In event of a fire the following suppression actions shall be taken:

- Verify everyone is safe;
- Fight the fire if safe to do so with available equipment;
- Call for help if needed - inform others of the location and extent of the fire;
- Listen to the radio for information and updates;
- Check for embers or flare-ups away from the main fire and extinguish or call for help, as necessary;
- Once the fire is out inform the Site Manager about the fire and cooperate in the incident investigation – all fires must be reported; and
- Be sure to drink plenty of water and report to the clinic if necessary for treatment of burns, smoke inhalation, or exhaustion.

If a fire that starts on the project site burns outside of the site boundary suppression efforts shall continue as long as it is safe to do so. Queensland Emergency Services and others will be contacted as appropriate (see Section 5 Emergency Notifications).

If a bushfire is approaching the project site from outside the project boundary the project may deploy fire fighting crews at the discretion of the Site Manager and/or the Commissioning and Start-Up Manager and in conjunction with Queensland Emergency Services.

4.3 Fire Fighting Crew

Because the project site is remote and there are few government resources quickly available to fight a bushfire the project shall train and equip a fire fighting crew. The crew shall be selected and consist of site workers who have an aptitude and interest in fire fighting and can meet the physical demands of fire fighting. Expert consultants may be used to develop the fire fighting crew and the size and capability of the crew shall change according to the project's needs. The fire fighting crew shall coordinate with the Queensland Rural Fire Service, but can only work within the confines of the Contract scope of work and environmental regulatory requirements. Refer to the Emergency Response & Preparedness Plan for more information on the fire crew formation, training and responsibilities.

5.0 EMERGENCY NOTIFICATIONS

The following agencies may be contacted in event of a bushfire:

Name	Role	Number
Queensland Emergency Services	**Warning and fire fighting capability**	**000**
Alan Smith	Curtis Island Fire Warden	0409 473 190
Other LNG projects	Warning & mutual assistance	APLNG – 0481 000 811 QCLNG – 0478 300 987
Bechtel Emergency Response Team	Fire Fighting Capability	Construction Channel 1 0411 313 889
Bechtel - Boat/ferry Service	Evacuation	Construction Channel 1 0411 313 889
Bechtel - Helicopter	Evacuation	Construction Channel 1 0411 313 889
GLNG Site Representative	GLNG – Duty Manager	0407 890 638

GLNG

CONTAMINATED SOIL PLAN

(Attachment F of CEMP)

REV	DATE	REASON FOR REVISION	BY	CK'D	Site Mgr	APE	PM
3	05-Dec-13	Issued for Update	ER	PN	BF	HH	BT
2	12-Apr-13	Issued for Annual Review and Update	RJF	SMP	BF	RR	BT
1	1-Nov-11	Updated for Publication	RW	RR	BF	BT	AP
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C	09-Feb-11	Client comments incorporated; Reissued for Permit	RW	CJK	JJM	CJK	BT / AP
B	11-Aug-10	Client comments incorporated; Issue for Permit,	RW	CJK	JJM	CJK	BT / AP
A	16-Jul-10	Issue for Review	RW	MD	JM		BT

BECHTEL OG&C INC.		JOB NO. 25576	
BECHTEL	CONTAMINATED SOIL PLAN	DOCUMENT NO.	REVISION
		100-G01-GHX-00021	3
		GLNG Doc No. 3310-BTH-3-3.3-6821	

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1 INTRODUCTION

This Contaminated Soil Plan is Attachment F of the Construction Environmental Management Plan (CEMP) for the Gladstone LNG Project and shall be read and interpreted in conjunction with the CEMP (ref. 25576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617), in particular section 1.1.

Geotechnical investigations of the Curtis Island project site revealed the presence of Acid Sulphate Soils (ASS). Past land uses, especially livestock management may also have resulted in soil contamination as a result of pesticide and chemical spillage. Contaminated soil could also arise from oil/fuel/chemical spills during construction and commissioning activities. This Plan describes the Project's methods for addressing contaminated soil. ASS management is discussed in a separate management plan (CEMP, Att. C – 25576-100-GPP-GCE-00003).

2 SOIL CONTAMINATED BY CHEMICALS

No known areas of contaminated soil exist on the project site, though one area of soil apparently contaminated with chemicals by livestock dipping was found adjacent to the site. Potentially contaminated areas have been identified on the project site based on past land use practices including mining, logging, and livestock handling.

2.1 Management of Contaminated Soil

The EIS (EIS Supplement 13.16.9) directs a strategy for dealing with contaminated areas that has been adapted for use in this Plan:

2.1.1 Prevention

- Avoid the disturbance of any known areas of contamination. If avoidance is not possible, the contaminated material shall be excavated and be remediated or disposed of at an approved facility. Work to be undertaken in accordance with the Department of Environment and Heritage Protection (EHP) requirements;
- Construction of appropriate spill containment facilities will be provided for all chemicals and fuel storage areas (in accordance with relevant Australian Standards Including but not limited to AS 1940, AS 4452, and AS 3780);

- Workshop areas, chemical stores, fuel tanks, waste disposal/storage areas and other areas will be designed to minimize land and groundwater contamination. The areas will be managed as required by Australian Standards;
- Establishing and maintaining a hazardous materials' register inventorying the location and quantities of hazardous substances including their storage, use and disposal; and
- Induction and training of personnel and implementation of safe work practices for minimising the risk of spillage.

2.1.2 Identification

- Contaminated soil is generally identified when workers detect a chemical or unusual odour, when unusual colour of soil is observed, or buried chemical containers are discovered;
- If suspected contaminated soil is encountered, work will be stopped in the immediate area. Access to the area will be restricted and ESH personnel informed. The safety and health of workers will be paramount and;
- An assessment will be made as to the source of the contamination; and
- Notification to EHP by GLNG as per the site permit conditions.

2.1.3 Containment

If an area of contamination is reported, the cause shall be identified and the area of contamination contained. The impact may be contained by isolating the source or implementing controls around the affected site.

2.1.4 Remediation

- If the contamination is the result of construction activities, remediation and clean up shall be per the Spill Prevention, Control and Countermeasures Plan (CEMP, Att. N 22576-100-G01-GHX-00032);
- If the contamination is identified as acid/potential acid sulphate soil then treatment shall be per the project Acid Sulphate Soils Management Plan (CEMP, Att. C 25576-100-GPP-GCE-00003);
- If the contamination is from other naturally occurring materials or a result of past land use, remediation and clean up shall be GLNG's responsibility;

- Remediation of contaminated land shall use the most appropriate available method to achieve endpoint criteria suitable for the intended land use; and
- Validation sampling of any remediated area shall be used to establish the site as "clean" as per the relevant EHP Contaminated Land and National Environment Protection Measure (NEPM) Guidelines.
- Validation sample results will be supplied to GLNG and regulatory authorities as required.

2.2 Unanticipated Discoveries

For unanticipated discoveries of soil contamination see the project's Unanticipated Discoveries Procedure (CEMP, Att. Q 25576-100-G01-GHX-00041).

2.3 Spill Prevention, Control and Countermeasures

In order to prevent the formation of contaminated soil during construction and commissioning the project's Spill Prevention, Control, and Countermeasures Plan (CEMP, Att. N 25576-100-G01-GHX-00032) shall be followed.

Spills shall be prevented by training, care in selecting locations for oil/fuel/chemical storage and refuelling/maintenance, and use of proper containers and secondary containment.

Experience has shown that even under the best circumstances equipment hydraulic lines may burst or other mechanical/human failures occur that result in oil/fuel/chemical releases. A sufficient supply of spill response materials shall be kept on-site and crews shall be trained in spill response and cleanup. All oil/fuel/chemical spills shall be immediately cleaned and contaminated soil treated or properly disposed. The site rule shall be, "If you spill it, you clean it up immediately."

In event of a major release that results in a large amount of contaminated soil GLNG and Bechtel shall consult with EHP and possibly subcontract with a specialty firm for cleanup and remediation.

3 DREDGE SPOILS

Major dredging of the Port of Gladstone and disposal of the dredge spoils has been undertaken by Gladstone Port Corporation (GPC) and is not included in this Plan.

At the Materials Offloading Facility (MOF), dredging was required near shore and conducted in accordance with a Dredge Management Plan prepared by GLNG. The dredge spoils were disposed to Fisherman's Landing as directed by GLNG.

Dredge spoils were managed according to the ASS Management Plan (CEMP, Att. C 25576-100-GPP-GCE-00003). Man-caused chemical contamination was not identified in these dredge spoils which was expected due to the pristine nature of the area. Future dredging required for maintenance will be undertaken by GPC. If these spoils exhibit any suspected man-caused chemical contamination they shall be treated per the project's Unanticipated Discoveries Procedure (CEMP, Att. Q 25576-100-G01-GHX-00041).

4 TRACKING AND REPORTING

All matters regarding discovery or handling of contaminated soil and ASS shall be documented by the Environmental Manager and reported to GLNG and regulatory agencies as required. Tracking documentation may include:

- Minor spill log recording non-reportable spills to the ground;
- Incident reports identifying reportable spills;
- Waste records documenting proper disposal of contaminated soil and/or spill cleanup materials;
- Unanticipated discovery reports; and
- ASS records including location of discoveries and treatment/disposition of soil.

Documentation may include photographs, drawings/maps, third-party accounts, or laboratory analytical data to demonstrate proper handling of contaminated soil.

GLNG

EMERGENCY PREPAREDNESS AND RESPONSE PLAN

(Attachment G of CEMP)

REV	DATE	REASON FOR REVISION	BY	CK'D	Site Mgr	APE	PM
7	25-Jan-14	Issued for Update	KL	JW	BF		PN
6	18-Dec-13	Including mutual and coordinated support		JW	BF		PN
5	17-Aug-13	Including actions and planning for CSU		JW	BF		PN
4	12-Apr-13	Issued for Annual Review and Update	CS	SMP	BF	RR	BT
3	15-Dec-11	Issued for use following review as approved from QPS & QFRS	CS	BW	BF		
2	1-Nov-11	Updated for Publication	RW	RR	BF		BT/AP
1	9-Sep-11	Issued for Use as approved by Dept of Community Safety and Queensland Police Service	DB	PH	JM		
0	29-Jun-11	Issue for Review Dept of Community Safety and Queensland Police Service	DB	PH			RB

BECHTEL OG&C INC.		JOB NO. 25576	
BECHTEL	EMERGENCY PREPAREDNESS AND RESPONSE PLAN	DOCUMENT NO.	REVISION
		100-G01-GHX-00018	7
		GLNG Doc No. 3310-BTH-3-3.3-6818	

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Acronym Key

AIIMS – Australasian Inter-service Incident Management System
APLNG – Australian Pacific Liquid Natural Gas
CCR – Central Control Room
CEMP – Construction Environmental Management Plan
CSO – Central Services Organisation
ECC – Emergency Control Centre
EMG – Emergency Management Group
EOO – Emergency Operations Officer
EPRP – Emergency Response and Preparedness Plan (This document)
ERC – Emergency Response Coordinator
GLNG – Gladstone Liquid Natural Gas (The Plant Project and supporting infrastructure for the purposes of this document)
GPA – Gladstone Port Authority
IC – Incident Controller
IMS – Incident Management System
LDMG – Local Disaster Management Group
LNG – Liquefied Natural Gas
MOF – Materials offloading facility
MSQ – Maritime Safety Queensland
P-JET – Procurement Joint Execution team
OSC – On-Scene Commander
QAS – Queensland Ambulance Service
QCLNG – Queensland Central Liquid Natural Gas
QFRS – Queensland Fire and Rescue Service
QPS – Queensland Police Service
SDS – Safety data sheets (Previously known as MSDS or Material safety data sheets.)
t - Ton
TWAF – Temporary Workers Accommodation Facility
VESDA – Very Early Smoke Detection Apparatus

1 INTRODUCTION

1.1 Purpose

This 'Plan', known as the 'Emergency Preparedness and Response Plan for Commissioning" (EPRP) establishes a process which provides a controlled and coordinated response to emergencies for work conducted on or for construction and commissioning of the GLNG Project facility.

The purpose of this Plan is to:

- To protect the health, safety and welfare of Project employees, subcontractors and visitors; and
- To protect the surrounding community and the environment.

The Project's Health, Safety and Environmental (HSE) Management Plan and the Construction Environmental Management Plan (CEMP) further support this document.

Bechtel Core Process 203 – Emergency Preparedness provides a basis for emergency preparedness and response.

1.2 Applicable Regulations and Reference Documents

Applicable Regulations

The plan is intended to meet legislative and regulatory requirements as well as operational needs. These legislative and regulatory requirements include;

- Work Health and Safety Act 2011 (QLD)
- Work Health and Safety Regulation 2011 (QLD)
- Work Health and Safety Codes of Practice (QLD)

Reference Documents

In developing this plan a number of documents were referenced. These include;

- Gladstone LNG Facility Safety Case.
- GLNG – LNG Plant Process Safety Philosophy.
- GLNG – Process Safety Design Basis.
- GLNG Plant Project – Fire and Cryogenic Hazard Analysis (FHA).
- GLNG Project – Environmental Impact Statement – Section 10 Hazard and Risk
- Emergency Management, Health and Medical Review for GLNG DSO by Crisis, Health and Risk Management services,
- GLNG Emergency Preparedness and Response Plan (Precedes this Plan).

- Bechtel Darwin LNG Project – Darwin LNG Emergency Response Plan.
- BP Process Safety Series - LNG Fire Protection and Emergency Response. 2007 Edition.
- Work Health and Safety Regulation 2011 (QLD).
- Building Fire Safety Regulation 2008 (QLD)
- Fire and Rescue Service Act 1990 (QLD)
- National Standard for the Control of Major Hazard Facilities – National Standard NOHSC:1014(2002)]
- National Code for the Control of Major Hazard Facilities - National Code of Practice [NOHSC:2016(1996)]
- Plant Operating Procedures.
- Emergency Management Australia - Emergency Management in Australia – Concepts and Principles.
- Safe Work Australia – Guide for Major Hazard Facilities – Emergency Plans.
- Occupational Health and Safety Administration (OSHA) – Principal Emergency Response and Preparedness – Requirements and Guidance.

1.3 Facility Description

The facility is a Liquefied Natural Gas production and export facility under going construction and commissioning. The GLNG facility is located at the south western end of Curtis Island at Hamilton Point West near China Bay, approximately 5 kilometres northeast of the City Of Gladstone.

Curtis Island is not physically connected to the mainland, materials and personnel access to the GLNG site during construction and commissioning is via ferry or barge transfer from mainland base facilities to the Materials Offloading Facility (MOF) situated at the southeast end of the facility site.

The project involves the construction and commissioning of a two-train configuration employing the ConocoPhillips Optimized Cascade liquefaction technology.

The site incorporates a temporary accommodation worker facility (TWAF) with a capacity of up 1700 people at any one time.

During construction there will be a workforce operating on the site 24 hours a day 7 days a week at with peak numbers operating on day shifts at about 2,500 people. This includes Fly-in-fly-out workers and locally employed who travel to site via ferry each day.

1.4 Objectives

The objectives of the EPRP are to:

- Outline processes and procedures for personnel to follow in the event of an emergency, including mainland sites, marine and the Curtis Island construction site during the commissioning phase of the project
- Identify types of emergencies that may require assistance
- Serious Medical Emergency Response
- Outline roles and responsibilities of key personnel in the event of an emergency
- Identify emergency communication protocols and phone numbers
- Identify evacuation processes
- Outline training and evacuation response exercises
- Provide communication flowcharts (see –Appendix A) detailing actions to be taken for various emergency situations

These actions, when followed, will reduce the effect of potentially dangerous situations on personnel, property and the environment.

1.5 Principles of Emergency Response Planning

Standard Approach

All incidents are managed using a standard set of management processes which are clearly known to emergency response agencies and other emergency organisations

Prevention

Refers to the regulatory and physical measures taken to ensure that emergencies are prevented or their effects mitigated (Emergency Management Australia, 2004).

Preparedness

Putting in place arrangements or plans to deal with a threat situation or a disaster, that is, the mobilisation of the disaster response structure and resources.

Response

Is the actions taken in anticipation of, during, and immediately after an emergency to ensure that its effects are minimised, and that people affected are given immediate relief and support.

Recovery

The coordinated process of supporting the emergency-affected site and associated staff in reconstruction of the physical infrastructure and restoration of emotional, social, economic and physical well-being.

Mutual Assistance

Bechtel shall also acknowledge other sources of emergency resources existing at neighbouring facilities adjacent to the GLNG construction site. This coordination is managed in conjunction with GLNG and their established agreements with the other facilities on the island.

Periodic Review

This EPRPwill be periodically reviewed and updated to address lessons learned from emergency exercises and to take into account changes in scope or work.

Plan Dissemination

Copies of this plan will be formally issued to GLNG and disseminated to all relevant Bechtel and sub-contractor personnel as required.

1.6 Scope

This Emergency Preparedness and Response Plan is applicable to the Gladstone Mainland Facilities, Curtis Island and Marine Facilities during construction and commissioning. Separate Emergency Response Plans for Home Offices (i.e., Houston, Gladstone, Brisbane and other locations), are addressed in separate emergency response plans specific to those locations.

A separate Emergency Preparedness and Response Plan will be developed for the Module Yard operation in Batangas in the Philippines, prior to the commencement of work activities.

This EPRP is to be implemented in those areas that are under the direct control of Bechtel personnel. This includes areas under construction and areas under going commissioning activities. As the project progresses areas will be officially handed over to the client (GLNG). The application of this plan is to areas that Bechtel have direct responsibility for prior to practical completion. Resourcing and response to incidents in areas that have been officially handed over to the client will be as per the GLNG Emergency Response Plan and will come under the control of the appropriate GLNG Incident Controller as per the GLNG Emergency Response Plan.

It is important to note that even though GLNG or Bechtel may be responsible for the management of emergency incidents and the provision of resources to deal with these incidents in certain areas, it is envisaged that the response will be a coordinated approach using the resources available to both organisations.

2 POTENTIAL EMERGENCY EVENTS

In developing the actions plans the design of the plant has been considered. The primary philosophy for protection of personnel and equipment on this plant is the early detection of hazardous conditions and the subsequent shutdown, isolation and de-pressuring of hydrocarbon as appropriate to the situation. As far as possible, responses to emergency situations shall be automated so as to not leave the decision responsibility to the operator.

In developing the responses to the scenarios the engineered process safety systems will provide the primary response to process emergencies. The emergency response team will

coordinate, support and supplement the designed process safety control systems in containing and dealing with the emergency.

2.1 Potential Emergencies

The EPRP is based on a set of defined emergency scenarios. Emergencies, which have the potential to occur during the course of the GLNG project, are as follows:

1. Injured Person (Including allergic reactions to insect and animal bites)
2. Fatality
3. Evacuation
4. Fire and Explosion
5. Bomb Threat
6. Bushfire
7. Criminal Act
8. Vehicle Accident
9. Severe Weather
10. Cyclone
11. Urgent Medical Transfer
12. Major Spill of Hazardous Substance on Land
13. Major Spill of Hazardous Substance on Water
14. Gas Leak
15. Contact with High Voltage Equipment
16. Tyre Fire/Explosion
17. Damage to Underground Services
18. Rescue from Height
19. Rescue from Confined Space
20. Capsize or Sinking of Vessel
21. Person Overboard
22. Earthquake
23. Tsunami
24. Offsite Emergency
25. Pandemic
26. Issue Motivated Groups (to be completed)
27. Terrorist Act (to be completed)

Additional emergencies which have the potential to arise during the commissioning and operation phases of the project are as follows:

Process events:

1. Non-ignited release of feed gas from process
2. Non-Ignited release of LNG from process or storage
3. Ignited release of feed gas from process
4. Ignited release of LNG from process or storage
5. Toxic gas release (e.g. H2S)
6. Refrigerant Fire
7. Diesel/Hot oil spill or fire
8. Switch room or substation fire
9. Central control room fire
10. Incident on berth LNGC, loading arms or transfer pipework

These incidents may occur in a number of locations throughout the plant. The list below is of potential location specific scenarios.

- Lost containment and fire at pig receiver
- Pool fire at inlet gas facility unit 11
- Fire at propane storage unit 20
- Fire at hot oil unit 34
- Fire at acid gas removal unit 12
- Fire at dehydration and mercury remover unit 13
- Fire at ethylene refrigeration unit 15
- Fire at inlet air chilling unit 37
- Fire at LNG storage tank unit 24
- Fire at boil-off gas recovery unit 24
- Fire at flare unit 19
- Gas leak and fire along gas transmission pipeline
- Fire in the warehouse
- Fire at loading jetty
- Incident involving ship within the port area

Due to the complexity of site activities being undertaken during construction and commissioning it is impracticable to identify every individual emergency scenario which may occur in each location. This however does not eliminate the need to plan for emergency events as the potential arises. To address this, a process for the development of task specific emergency actions plans will be implemented. This process will form part of the permit to work procedure. Persons seeking a permit to work will be required to complete a

Task Specific Emergency Action Plan Request form. This is attached as Appendix N. This form will be reviewed by the Emergency Response Coordinator or delegate who will review the information and based on the work being undertaken and the risks involved will determine if a Task Specific Emergency Plan is required. If it is determined one is required, the Emergency response Coordinator or their delegate will complete a Task Specific Emergency Action Plan which will accompany the permit to work application. A pro-forma copy of the plan is attached as Appendix O. A copy of the plan will be retained by the Emergency Response Coordinator and Emergency Response Teams will be briefed on the plan prior to the work commencing.

2.1.1 Hazardous Materials Inventory

As the site begins commissioning various hazardous chemicals will be introduced to the site over a period of time. Table 1 shows the types of chemicalsthat will be onsite once the plant is fully operational.

Hazardous Material	Physical Form
Natural Gas Refrigerated Liquid	Liquid
Propane	Liquid and Gas
Methane (Feed Gas)	Gas
Ethylene	Liquid and Gas
Therminol 55 (Hot Oil)	Liquid
Lube Oils	Liquid
Diesel Fuel	Liquid
aMDEA (amine)	Liquid
Hydrochloric Acid (32%)	Liquid
Sodium Hypochlorite	Liquid
Sodium Bisulfite	Solid
Sodium Hydroxide	Liquid
Ferric Chloride	Liquid
Sulfuric Acid	Liquid
Nalco 2490	Liquid
Nalco PC-191	Liquid

3 MANAGEMENT OF THE EMERGENCY RESPONSE PLAN

3.1 State of Preparedness

Preparedness for an emergency incident is achieved by:

- Reviewing and assessing foreseeable emergency situations and developing and approving the Emergency Preparedness and Response Plan to minimize loss and expedite the return to normal operations

- Training all personnel in the appropriate Emergency Response procedures for their workplace and duties.
- Training a team of competent employees who will be able to carry out emergency response to an incident until such a time as the emergency services can take control and direct all actions.
- Maintaining a Bechtel incident management team to provide expeditious management of emergency situations.
- Establishing processes to adequately warn people in the event of an emergency.
- Planning for medical evacuations.

3.2 Response

Response involves:

- The management of emergencies by designated and competent personnel from Bechtel.
- An effective command structure between Bechtel, external authorities and other stakeholders is maintained.

3.3 Emergency Response Plan Explanation

Emergency Response Plans outlines the responsibilities for:

- First line response.
- Situation assessment.
- Declaration of the emergency activation level.
- Deployment of resources.
- Activation of the Bechtel Emergency Response Team.

Recovery Plans outline the responsibility for:

- Safe clean up and rectification.
- Plant remediation, salvage and recovery.
- Waste management.

3.4 Training

The Site Incident Management Team and the Emergency Response Team will require basic competencies and appropriate training to be able to full fill their duties under the Emergency Preparedness and Response Plan. See section 12 – Education and training.

3.5 Designated Emergency Personnel

In the event of an emergency, the roles of specific project personnel will expand to include new tasks and responsibilities. Figure 1 below, lists the designees and their alternate coverage and an overview of their duties. Figure 2 and Figure 3 illustrates the organisational structure of these roles during an emergency. The person identified as the Incident Controller will change depending on whether the incident involves process operations or construction.

Figure 1 – Positions and Duties

Incident Controller (IC)	Primary:	Site Manager (Construction Incidents) Commissioning and Start-up Manager (Process Incidents)
	Alternate:	Deputy Site Manager / Deputy Start-up Manager
	Duties:	See Duty Card Appendix M
Emergency Operations Officer (EOO)	Primary:	Project HSE Manager
	Alternate:	Deputy Site HSE Manager
	Duties:	See Duty Card Appendix M
On-Scene Commander (OSC)	Primary:	Emergency Response Coordinator/Advisor
	Alternate:	Alternate Field Superintendent
	Duties:	See Duty Card Appendix M
Emergency Response Team (ERT)	Commissioning:	Emergency Response Advisors and GLNG Emergency Response Contractors, and designated site personnel (volunteers)
	Construction,:	Emergency Response Advisors and Designated site personnel (volunteers)
	Duties:	See Duty Card Appendix M
Assembly Area Warden	Primary:	Nominated and trained site employees
	Alternate:	As per delegation for each appointed person
	Duties:	Attend Assembly Area and account for and direct personnel to area of safety as required by circumstances

Log Keeper	Primary:	Lead HSE Admin Assistant
	Alternate:	HSE Admin Assistant
	Duties:	See Duty Card Appendix M
Supervisors	Duties:	Support emergency response team members in their crew by releasing them for training, turnout, and incident debriefing as required. Raise concerns regarding demands on ERT member's time with the ERC in the first instance
Site Personnel	Duties:	Participate in emergency exercises where required. In the event of an emergency, make work area safe, report to assembly area, register with assembly area warden, and wait for instructions
Subcontractor Medical Team	Duties:	As per medical protocols established for project
Evacuation Management Group (EMG)	Participants:	Project Designated Senior Managers led by Senior Project Manager
	Duties:	To determine the need, timing and process of evacuation of personnel to an off-site location in the event of a Major Emergency on Curtis Island

Figure 2 – Organisational structure of Incident Management Team during an emergency for construction areas (other than a Curtis Island Evacuation)

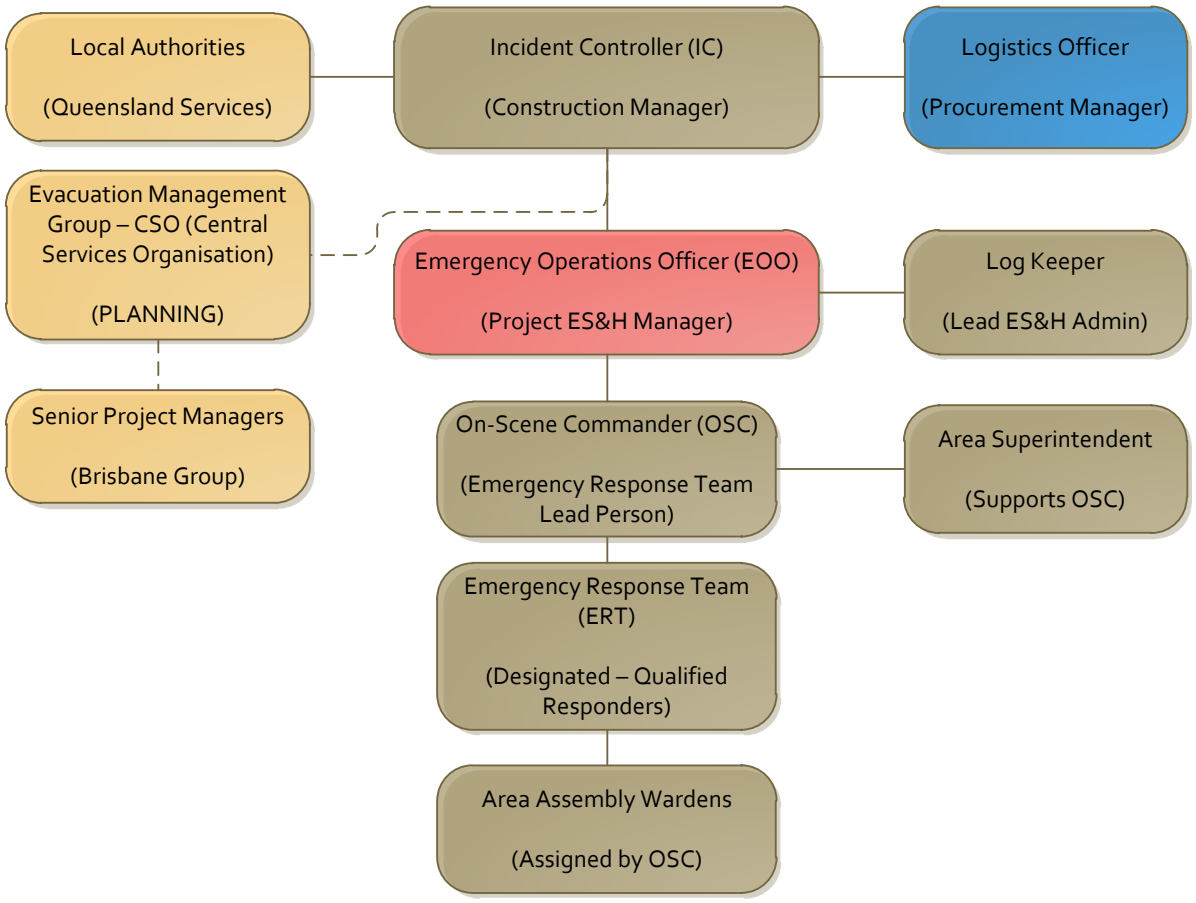


Figure 3 – Organisational structure of Incident Management Team during an emergency for commissioning areas (other than a Curtis Island Evacuation Scenario)

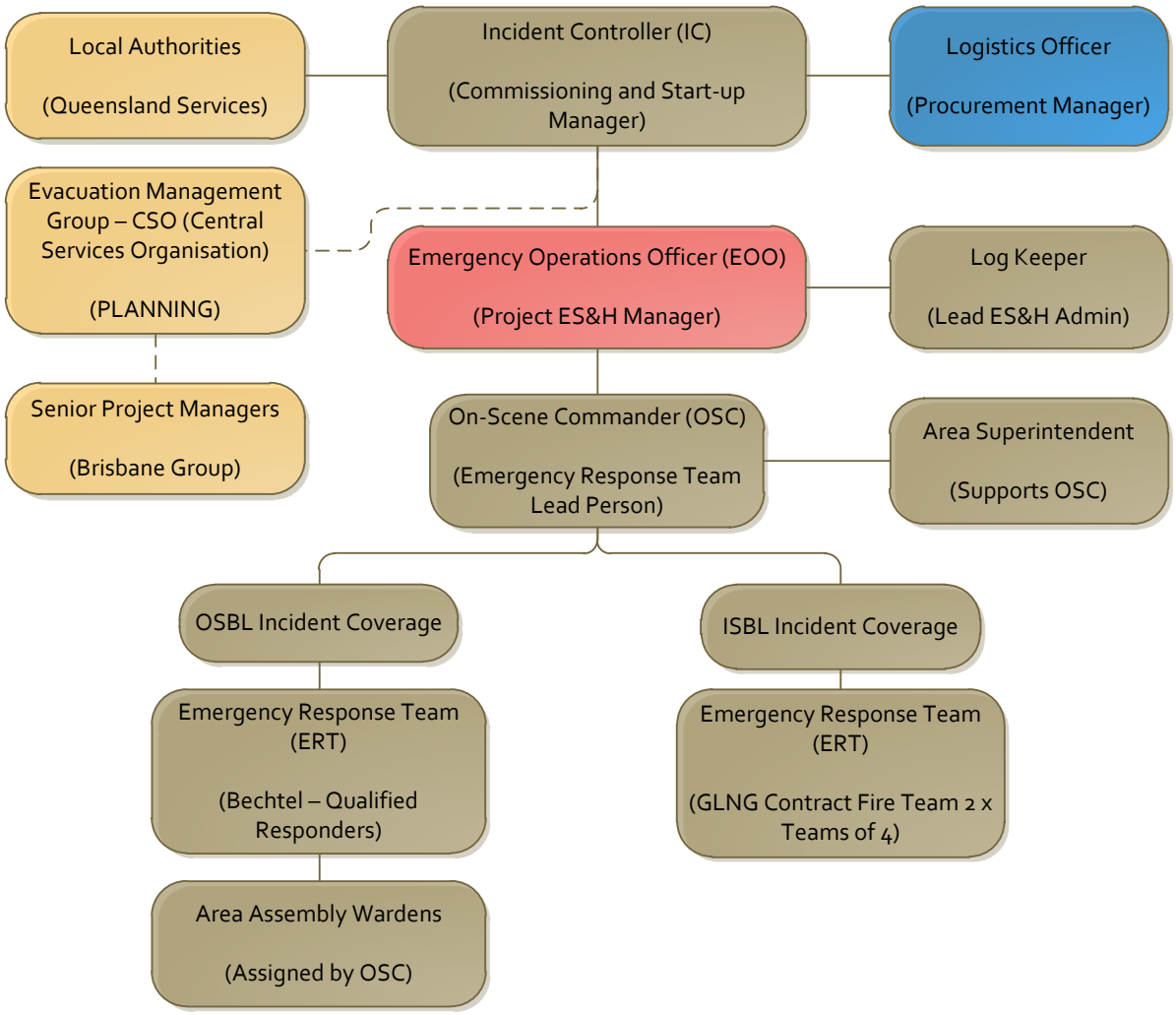
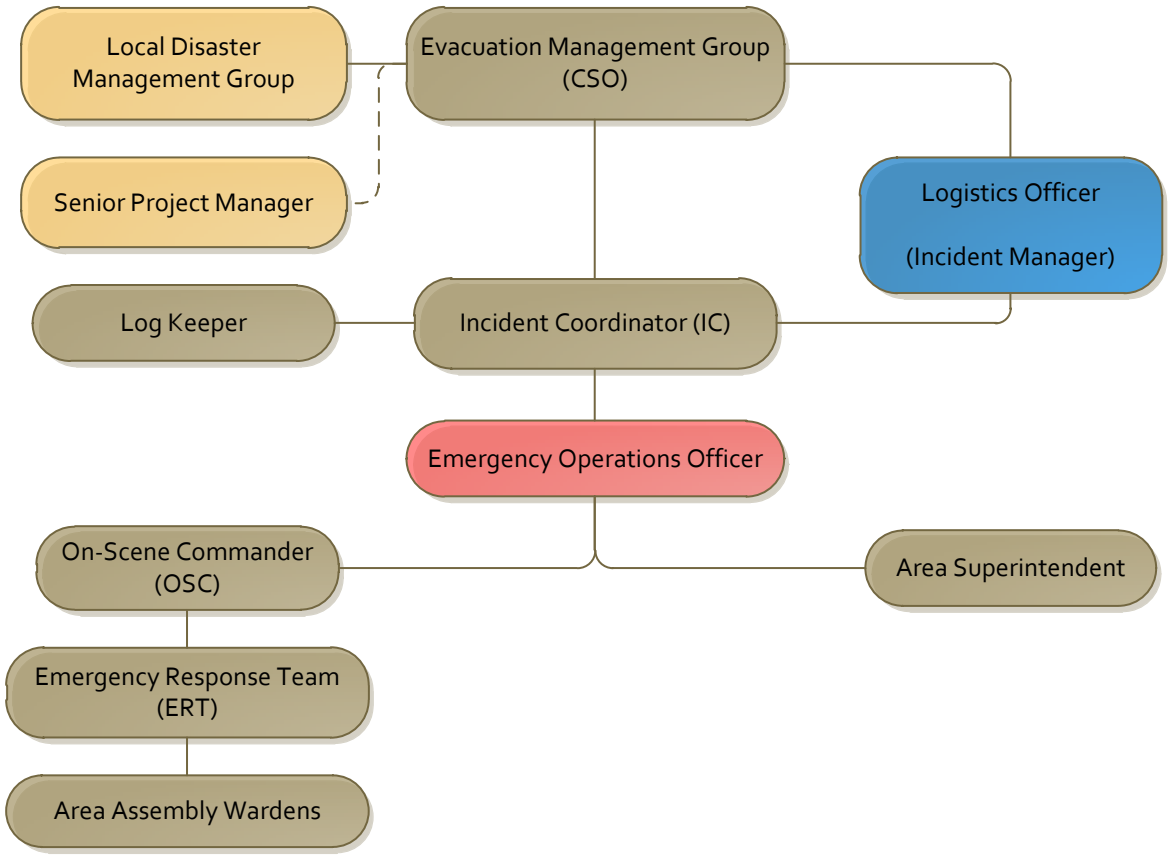


Figure 4 – Organisational structure regarding a Curtis Island Evacuation scenario.



4 Responsibilities

Emergency Response Duty Cards

Position specific Emergency Response Duty Cards are attached as Appendix M and will be distributed to emergency response personnel to provide them with an overview of their duties for each stage of emergency preparedness and response.

Additional responsibilities for emergency response personnel are listed below:

4.1 Incident Controller (IC)

The IC is responsible for overseeing the implementation of planning and response to emergencies or other threats to life and property on the Project. Other responsibilities include:

- Providing sufficient resources, trained personnel and facilities to prepare for and address emergency requirements, should they arise
- Reviewing the Project's EPRP for adequacy and functionality
- Directing and coordinating personnel/operations from the Emergency Operations Centre (EOC) as Required
- Providing permissions for use of project equipment and resources
- Participating in Evacuation Management Group
- Providing permission for offsite responses
- Communicating, coordinating and liaising with external authorities
- Reporting to and liaising with Client on status of emergency and related information

Note: See Appendix M – Duty Cards for a list of duties for Incident Controller.

4.2 Emergency Operations Officer (EOO)

The Emergency Operations Officer is responsible for:

- Directing and coordinating personnel/operations from the Emergency Operations Centre (EOC) as Required
- Implementing emergency procedures and response to threats
- Providing Coordination for the Project in the event of an emergency
- Implementing appropriate training for emergency team members
- The planning and scheduling of emergency and evacuation exercises and drills
- Periodically reviewing procedures in conjunction with construction and commissioning management and subcontractors' site personnel
- Organising for team members to act as Wardens for each area of operation and office buildings

- Issuing nominated Wardens with a mobile radios with access to a dedicated emergency radio channel
- Providing Warden training covering emergency procedures
- Ensuring the project maintains a current list of all site personnel for assembly area and evacuation purposes
- Ensuring emergency equipment inspections are undertaken as scheduled
- Auditing emergency response process
- Arranging briefing at the completion of each emergency and emergency exercise

Note: See Appendix M – Duty Cards for a list of duties for Emergency Operations Officer.

4.3 Log Keeper

The Log Keeper is responsible for:

- Monitoring Radios and Telephones and maintaining a record log (see Appendix E) and timeline of all emergency response activities
- Ensuring that the Emergency Operations Centre is equipped with all required materials to record emergency information
- Participating in debriefs of emergency events

Note: See Appendix M – Duty Cards for a list of duties for Log Keeper.

4.4 On-Scene Commander (OSC)

The Bechtel Emergency Response Team will provide 24/7 coverage with a full time Emergency Response Advisor. The Emergency Response Coordinator or Emergency Response Advisor will assume the role of the OSCat the scene of an incident. This person is responsible for:

- Managing the Emergency Response Team and emergency scene safety as a priority
- Directing first aiders to attend to injured personnel
- Securing the emergency scene to enable the health and safety of all persons
- Initiating evacuation if required
- Providing an escort to meet the emergency response team
- Securing, as far as practicable, incident location from disturbance or interference until cleared by EOO or incident investigation is complete
- Providing direction, assistance and support to persons at the scene
- Maintaining communication with IC & EOO
- Seconding labour, equipment and machinery from immediate resources to assist to control the emergency

Note: See Appendix M – Duty Cards for a list of duties for On-Scene Commander

4.5 Emergency Response Team (ERT)

As part of emergency response organisation the emergency response team consists of a core of fulltime emergency advisors supported by on-site personnel. The Bechtel emergency response team will be additionally supported by fulltime emergency responders employed directly by GLNG. The GLNG emergency responders will come under the direction of the OSC for all incidents on the site. The emergency response team will provide 24/7 coverage of the site.

Emergency Response Team members are responsible for:

- Attending Emergency Response Team training and meetings where relevant
- Acting upon hearing the Emergency Alarm, reporting to area of concern or Emergency Operations Centre depending on nature of emergency – taking directions from ECC
- Assisting the ERC to stabilise and make safe the area around any incident to the best of their ability while awaiting the arrival of the appropriate team, e.g., Medical, Fire, Rescue, or external emergency services, etc.
- Co-ordinating personnel at assembly areas, evacuating them to safety if necessary
- On instructions from ERC, safely conducting activities, searches or any other tasks deemed necessary

Note: See Appendix M – Duty Cards for a list of duties for Emergency Response Team Members.

4.6 Wardens

Wardens are project personnel whom either volunteer or are assigned by the EOO to oversee a specified assembly area. During an emergency, the Warden is responsible for:

- Reporting, as soon as possible, to their designated assembly area
- Coordinating the accounting of team members and visitors within their control
- Reporting personnel and visitors present and absent to the Emergency Coordinator
- Coordinating and managing directions received from the ICor Emergency Response Coordinator
- Advising personnel of an emergency in their specific area
- Directing people evacuating an area to the appropriate assembly area
- Reporting status of area and roll call to the EOO
- Restricting entry into affected areas to emergency personnel only
- Providing cardiac pulmonary resuscitation (CPR), application of automated external defibrillator (AED) and initial first aid coverage as required.

Note: See Appendix M – Duty Cards for a list of duties for Wardens.

4.7 Security Officer

- Controlling entry of traffic onto the site and within car parks
- Directing traffic around the incident scene and escorting emergency vehicles
- Attending the site access points to prevent traffic entering or leaving the site during an emergency or as directed by the IC
- Assisting the IC as directed

4.8 Evacuation Management Group (EMG)

Team consisting of senior project management who will make final decision on site evacuation (Stay or Go) once in receipt of all facts and information to allow an informed decision to be made.

4.9 Employees, Subcontractors and Visitors

Employees, subcontractors and visitors are responsible for:

- Obeying all instructions given by Wardens and emergency response teams, including directions to provide assistance at the scene
- Shutting down any necessary equipment so that areas are left in a safe condition
- Reporting to the Warden at the assembly area for roll call
- Remaining at the assembly area until instructed by the Warden
- Returning to work when the all clear is given
- Participate in making workplace safe in preparation for storm/cyclone
- Evacuate site as directed by IC

4.10 First Aiders

First Aiders are responsible for:

- Providing the initial response to injured personnel
- Continuing to provide first aid under the direction of the site medical staff
- Providing cardiac pulmonary resuscitation (CPR) and application of automated external defibrillator (AED) in an emergency.

4.11 Supervisors

Supervisors are responsible for:

- Communicating emergency procedures to team members prior to the commencement of work

- Assembling personnel under their supervision to appropriate assembly area during an emergency
- Being able to account for personnel under their direction

4.12 Project Medical Services Provider

A subcontracted medical services provider will employ a doctor, paramedics and nurses who will provide emergency medical coverage for the project on a 24/7 basis. These staff will also undertake training for ERT members in first aid and medical assistance requirements.

Site medical staff will also participate in preparing emergency medical protocols and participating in emergency exercises.

For incidents involving multiple casualties the medical services provider will coordinate with Careflight and Capricorn Rescue for the evacuation of casualties from site to an appropriate medical facility on the mainland. Casualties may then be transferred on to specialist treatment by an appropriate transport method as determined by medical facility (Hospital) staff on the mainland. The specialist treatment will be given at a hospital appropriately resourced to handle the specific types of injury.

A mass casualty kit is also stored on site at the fire station for immediate transport by the emergency response team at the request of the medical team. The kit incorporates medical supplies for an incident involving multiple injuries including trauma and burn injuries.

4.13 External Emergency Response Personnel

Where required, government emergency services will be requested to provide emergency assistance (Ambulance, Fire and Rescue, Police, Gladstone Ports Corporation) to mainland sites and the Curtis Island Site. External emergency response will be requested when:

- Emergency warrants immediate external control/assistance
- Contacted by EOC requesting assistance
- Incident takes place on mainland
- Incident requires additional or specialised emergency road or marine transport assistance and/or equipment
- Helicopter required for medivac from Curtis Island, marine or mainland location

In this event the EOC will contact 000 and initiate the request for resources.

The EOC will then contact, the Bechtel Project Joint Procurement Execution Team, PJET. They will coordinate the transport of resources to Curtis Island in accordance with their procedure.

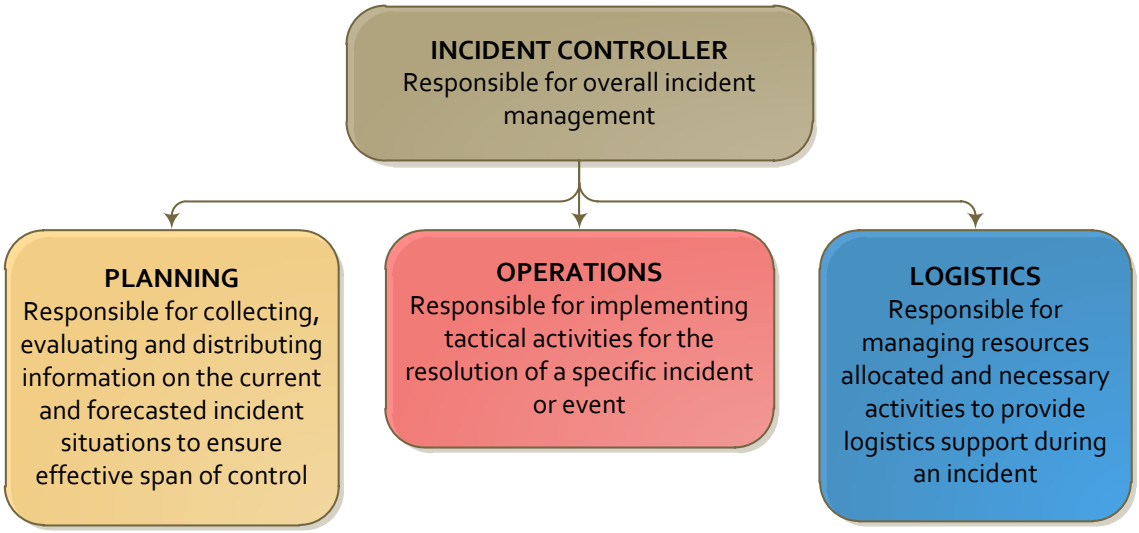
Should a ‘000’ emergency call be placed to the local emergency services by project personnel outside of the EOC, the reporting individual shall contact the IC/EOO as soon as

possible (radio or telephone) to report the incident. Thereafter, any further communication to the local emergency services will be made through the EOC or PJET's coordinator in accordance with the established protocol.

5 General Procedures

This Incident management system (IMS) is based on Australasian Inter-service Incident Management System (AIIMS) and is designed to develop and expand from the ground up ensuring that the appropriate level of management is applied at each level of incident response.

Incident Management Systems Relationships



5.1 Command, Control and Coordination

Command

Command is the direction of members and resources within an agency or department in the performance of that organisations role and tasks associated with the incident. Authority to command is established in legislation or by agreement within an organisation.

Control

Control is the management of other support agencies. Control is the overall direction of response activities in an emergency situation. Authority for control is established in legislation or in the emergency response plan

Coordination

Coordination involves the bringing together of agencies and elements to ensure effective response to emergencies. It is primarily concerned with the systematic acquisition and

application of resources (agency, manpower and equipment) in accordance with the requirements imposed by the incident.

The ERC (i.e., the most qualified team member on the scene of an emergency) will initially take control and coordinate the first response to the emergency. This person will assume the role of OSC once the Incident management team is established.

5.2 Communications

Emergency communications will be generated via a two-way radio system. A radio channel will be assigned as the dedicated emergency channel, which if activated will override all other communication channels. Mobile telephones assigned to emergency response personnel may also be used for communication purposes. During commissioning mobiles will not be able to be used in the plant operating areas. Emergency telephones will also be available in the Emergency Operations Centre on site for external calls.

Due to possible communication black spot on the island the Bechtel Emergency Response Appliance will be fitted with a Satellite phone along with detailed instructions on its use and an up to date phone contact list carried in the Appliance. A secondary satellite phone will be provided to the Incident Control Team in the EOC should the normal communications system fail.

The following dedicated radio channels will be used in the event of an emergency:

- Radio Communication UHF Construction 1 and Emergency Channel 1. Dedicated channels may be established for commissioning phase to ensure uninterrupted communication at certain stages.
- Channel 2 for emergency incident operations. This will be a restricted channel for emergency response personal and selected Bechtel Management as outlined in this plan.

All personnel communicating via radios are to be aware of privacy breaches, particularly sensitive information that may be overheard by third parties. Names of missing team members or discussion of injuries are NOT to be broadcast over the radio. Sensitive information communicated to the ECC will be conveyed via mobile phones or face-to-face.

Emergency communication equipment is to be considered as part of the planning phase of each task and recorded on the *Job Hazard Analysis/Work Method Statement.* This will be communicated to each team member before work commences.

In the event of an emergency, the EOC, in consultation with local emergency services, will direct the response strategy to place emergency service personnel on the Island or to evacuate any injured personnel from the Island to medical treatment facilities on the mainland.

In emergencies, a call will be made to **000**. This call will be directed to the appropriate Queensland Emergency Services Co-ordination Centre (Ambulance, Fire and Rescue, or Police).

The caller will clearly identify the project by using the following wording to avoid confusion with the other projects.

"This is (**GLNG PROJECT CURTIS ISLAND, I repeat, GLNG PROJECT CURTIS ISLAND**) calling"

Other potential locations where emergency calls may originate include mainland project locations (RG Tanna and Port Central) or from a vessel in the Port of Gladstone.

In the case of injury or entrapment, a comprehensive description of the type of emergency will be given to the Queensland Ambulance Service (QAS) Co-ordinator.

Should an external emergency organisation be requested to attend an incident on the Curtis Island site, the responding agency's Officer In Charge (OIC) with be provided on arrival to site, a portable hand held two way radio pre-set on channel 2. This will allow the external Emergency Team to communicate directly with the site ERC.

For further details, refer to **Appendix G** – Reporting an Emergency.

5.3 Emergency Response Exercises

Emergency response exercises will be conducted throughout the year to test the efficiency of the Project's emergency response system and to additionally reinforce emergency procedures and processes to Project personnel. Emergency exercises will include, but are not limited to:

- Medical Emergencies
- Fire Emergencies, including bushfires
- Vehicle incident
- Hazardous spills / leaks
- Rescue from height, confined space, etc.
- High voltage equipment contact
- Marine emergencies

Bechtel will conduct a programme of regular emergency response exercise and reviews of the EPRP consisting of activities set out in Table 1.

Table 1 – Schedule of Exercises and Reviews

Activity	Schedule
(1) Site emergency drills/simulations	Quarterly for the Incident Command and Coordination Team and Emergency response team (ERT) members. Exercises may be of individual or joint nature to test and verify command and communication systems.
(2) Desktop exercises	Monthly desktop exercises with process and commissioning team's review of EPRP elements on a more frequent basis.
(3) EPRP exercise with emergency services involvement	At least Annually, with more frequent active engagement of emergency services in site and systems familiarisation.
(4) EPRP review and revision in light of exercises, incidents, discussions with the EPRP Coordination group, new knowledge and changes to the facility or its environment	As directed by the EPRP Coordination group.
(5) EP periodic review	At least every 3 years

The total workforce shall be trained in the correct response to any emergency arising and a successful emergency response trial shall be carried out prior to the introduction hydrocarbons into the facility including the receiver station and Train 1. This will include response to identified emergencies and will include both personnel working within the "live" areas and those in adjoining areas. Scheduled emergency response exercises shall be carried out in accordance with Table 1 – Schedule of Emergency Exercises and Reviews. An initial exercise prior to introduction of hydrocarbons to the Train 2 Site and at semi-annual intervals (every 6 months) thereafter, unless the turnover of personnel requires an increased frequency as agreed between the parties.

Emergency exercises will also be held for Mainland facilities, including offices, etc.

The ERC will prepare a written overview of the planned exercise and will facilitate the drill.

Drills may incorporate a full site emergency assembly and will include a specific emergency, e.g., fire, medical emergency, etc.

Where practicable, external emergency services personnel may be requested to participate in these emergency exercises to ensure communications and joint actions are assessed and addressed where lacking.

A timeline of the emergency exercise will be maintained and used in the debriefing along with photographs or videos of the event.

A debrief will occur at the completion of each emergency drill and all personnel involved shall participate and provide input.

A report will be prepared following each emergency drill providing an overview of the drill and making recommendations for improvements.

NB: Emergencies exercises will be conducted in a manner so as not to place personnel or equipment at risk.

5.4 Emergency Desktop Exercises

For extremely large and complex exercise scenarios i.e. (complete evacuation of Curtis Island), a separate exercise (table-top with the Local Disaster Management Group) should be conducted annually.
Emergency desktop exercises will be conducted to assess the level of preparedness of emergency response personnel and the system. The IC, in liaison with the EOO, will prepare a written emergency scenario. The emergency response team and associated groups will then respond to the emergency scenario as if it were a real emergency.

A review will be held at the conclusion of each desktop exercise to assess the group's responses and to determine the level of preparedness of the organisation.

These exercises will be able to assess the effects of severe weather, low tides, etc., on potential emergency scenarios, without placing personnel or equipment at risk.

Where required, this EPRP will be modified to address any deficiencies determined from these exercises.

5.5 Arrangements for Assisting Emergency Services and Neighbouring Facilities

In providing assistance to emergency services and neighbouring facilities the aim is to provide an integrated approach for emergency coordination and emergency response resource sharing. The goal is to provide a coordinated response to any emergency situation that arises on Curtis Island while recognising commercial and other interests of stakeholders.

GLNG emergency response crews may be called upon by other facilities or emergency services on Curtis Island to provide assistance in dealing with an emergency situation. This may involve a request for personnel, resources or both to assist in dealing with an emergency situation which is beyond the immediate capabilities of the responding agency or business.

Approval to provide assistance to an emergency offsite from the GLNG facility must be approved by the Site Manager or the most senior Bechtel representative on site and will take into account the nature and seriousness of the emergency, the current GLNG site

requirements, or agreements and work activities at the time and the nature of the request and the potential implications to the GLNG site.

Resources and personnel may be conveyed by ferry or barge to neighbouring facilities and/or Curtis Island access roads and right of ways may be utilised to assist other areas on Curtis Island such as request from the Curtis Island Rural Fire Brigade.

6 INCIDENT CLASSIFICATION AND REPORTING

In consultation with the OSC, the IC will classify the incident in accordance with the matrix in Table 2. It can be expected that in the event of an emergency involving construction activities, equipment or personnel, assistance will be required from the Bechtel Project Management Team to adequately classify the incident. Depending on the classification of the incident, a local construction site evacuation may be required and the emergency siren sounded.
A Level 3, 4 & 5 Emergency will require the involvement of the Project Management Team and a Level 5 Emergency will require the involvement of OG&C's Crisis Management Team in Houston.
GLNG's Nominated Site Representative will be advised verbally of all Level 2, 3, 4, & 5 Emergencies, immediately after they occur, and in writing within two hours, where practicable.
IC will notify relevant Regulatory Authorities in line with statutory requirements and jointly agreed reporting protocols of any emergency event that warrants such reporting.

An incident may escalate up the classification depending on a number of issues or events. Triggers for escalating an incident include:

- The issue becomes larger and more complex,
- Additional resources are required,
- There is a greater impact on the construction site or surrounding community,
- The incident is not contained within four hours,
- There is greater public and political interest or concern.

Pre-determined triggers include:

- Weather warnings,
- Health warnings,
- Directives from the regulatory authority,
- Directives from corporate office.

Table 2 – Incident Assessment Matrix

Bechtel Reponses	Bechtel GLNG Incident Assessment Matrix				
	Severity Category	**Health and Safety**	**Natural Environment**	**Reputation (Government, Media, Community)**	**Local Site Evacuation Requirement**
CMT / Incident Control Team / Emergency Response Team	**Level 5**	Fatality Major Site or Accommodation Fire Major Chemical Spill or Gas Leak (Also From Nearby Plant)	Destruction of sensitive environmental features. Regulatory & high-level Government intervention/action	Critical impact on business reputation National level media exposure	Yes. Personnel to report to their assembly areas
	Level 4	Permanent disabling injury and/or long term off work with high potential to become life threatening Bomb Threat	Long-term impact of regional significance on sensitive environmental features. Regulatory intervention/action.	Significant impact on business reputation State level media exposure	Yes. Personnel to report to their assembly areas
	Level 3	Multiple Injuries requiring medical treatment, time off work rehabilitation with the potential to escalate	Short-term impact on sensitive environmental features. Triggers regulatory investigation	Moderate to small impact on business reputation State level media exposure	No
	Level 2	Injury requiring medical treatment, time off work and rehabilitation	Impact on fauna, flora and/or habitat but no negative effects on ecosystem. Requires immediate regulator notification	Some impact on business reputation Adverse news in local media	No
	Level 1	Minor injury – first aid treatment	Negligible impact. On flora/fauna, habitat, aquatic ecosystem or water resources. Incident reporting according to routine protocols	Minor impact to reputation	No

7 EMERGENCY DECONTAMINATION PROCEDURES

Decontamination is a physical / chemical process to prevent, reduce and control contamination of people and the environment that have been exposed to potentially harmful substances. It includes persons and property exposed to hazmat incident and is conducted before leaving the hazard area. It involves a deliberate process in a designated area and can include physical (diluting, brushing, vacuuming) and/or chemical (neutralisation/disinfecting) decontamination.

In the event of an incident requiring decontamination or people or equipment the emergency response team will set up an emergency decontamination area. See Appendix P for an example decontamination plan.

8 EMERGENCY MANAGEMENT

The Emergency Operations Officer is immediately notified of any emergency occurring or as soon as is practicably possible. The EOO, reporting to the IC will initiate communications and coordination with internal emergency response team and external emergency services i.e., Ambulance, Fire or Police, unless the IC or OSC have already initiated contact. In the absence of the IC or EOO at the EOC, the most qualified Supervisor will undertake the role until either the IC or EOO takes charge.

The EOO will manage all communications with assistance from other members of the Emergency Response Team. The IC and EOO are the only persons who may direct the OSC and are responsible for liaising with outside organisations and emergency services. In addition, the OSC shall keep the EOO informed of events and the status of the emergency.

All parties are to obey the directives of the EOO during the emergency.

8.1 Emergency Operations Centre (EOC)

The EOC will act as a site-specific central point of contact during an emergency situation. In the event that an emergency or threat affects the command centre, an alternative location will be determined at the time of need.

Primary Emergency Operating Centre (EOC):

- GLNG – Bechtel on-site Office Main Conference Room
- Control Centre Room Meeting Room (After first Gas)

The ERC shall maintain a Contact List (see **Appendix F**) of contact numbers of ERT members, Wardens and relevant members of Bechtel and Client management and subcontractor companies and external emergency support organisations.

This list will also be maintained at the EOC and the Central Control Room (CCR).

In the event of an emergency, the following personnel shall assemble at the EOC, unless otherwise directed by the IC:

- Incident Controller
- Emergency Operations Officer
- Logistics Manager
- Centralised Servicers Manager
- Security Manager
- Employee Relations Manager
- Evacuation Management Group (Where Required)
- Log Keeper
- Personnel as designated by IC
- Client Representative

In certain instances, the IC may instruct members of the ERT and/or Security Manager to report directly to the incident scene.

When requested by the Site Manager/CSU Manager an EOC will be established in the main construction office on Curtis Island or at 231 Alf O'Rourke Drive – main conference room – back building. The Evacuation Management Group (EMG/CSO) will provide coordination with local services and Curtis Island LNG Projects in the event personnel on Curtis Island have to evacuate or require additional support.

A media relations location will be established at the 231 Alf O'Rourke Drive front conference room in the recruitment centre.

9 EVACUATION

Emergency Evacuation Assembly Areas

The position of muster areas will be defined as the Project develops. Assembly areas on site will normally be located outside of construction and office areas, unless the IC or EOO nominate other locations at the time of the incident. Such changes may be based on prevailing conditions or other mitigating factors.

Further, as the construction site is developed, signage shall be provided to direct personnel to Assembly Areas. Should any Assembly Area be rendered inappropriate or unsafe, due to incidents occurring at the facility and due to wind direction, or construction and commissioning activities, then alternative location(s) shall be designated.

The ES&H group will be responsible for updating assembly area locations as well as signage, once-a-month, with respect to moving work fronts. Similarly, evacuation or emergency vehicle routes will be updated on a weekly basis with respect to construction activity taking place throughout the site. Assembly areas and evacuation routes shall be

regularly communicated (notices, toolbox talks, etc.) to project personnel through the use of maps and charts.

Camp assembly areas will also be assessed and changes made to suit accordingly.

9.1 Site Evacuation

Should a site evacuation (not off the Island) be necessary, Wardens will be responsible for directing personnel to their assembly areas or other safe locations to await instructions from IC or EOO. Potential sites for a site-wide assembly area include:

- Camp
- Warehouses
- Laydown areas
- Sport fields
- Materials Offloading Facility (MOF)

9.2 Curtis Island Evacuation

Key Buildings on Curtis Island, including the Temporary Workers Accommodation Facility (TWAF), will be designed in accordance with the Building Code of Australia for a Category C Cyclone Region for resident protection. Wherever possible, it will be the intent to maintain the TWAF residents on site during severe weather. However, Bechtel may be required to evacuate project personnel as appropriate should wind strengths and weather specialists determine this necessary.

Decisions regarding the evacuation of Curtis Island will be made after consulting with; Proponents, Project Management, the Gladstone Local Disaster Management Group (LDMG) and Maritime Safety Queensland (MSQ).

If a severe weather event is expected to occur, EMG/CSO will consult with the LNG projects and P-JET and decisions relevant to Appendix J will be made regarding the following stages:

Gathering information Stage (Severe Weather Alert - Cyclone)

- A meeting/phone call is convened/facilitated by the CSO as soon as such information is known. (Severe weather and other information will be obtained by the CSO from the Bureau of Meteorology, LDMG and MSQ.)
- Those to be included on the call are the three LNG Site Managers, the three LNG site Workforce Services Managers, PJET Site Manager, CSO General Manager and CSO's Workforce Services Manager (or in each instance, appropriate designee's).
- The three LNG Site Managers will contact their customer counterparts to share/gather consensus regarding the collective decisions being made.

72 Hour Preparation Stage

- CSO will establish a command centre for the EMG, and their Proponents to convene (231 Alf O'Rourke Drive).
- If work in general is to be called off, each project and PJET will disclose what work will proceed.
- It's important for those on the call to know what that work is, and to maintain consistency to the extent possible. The same is true for decisions associated with shelter in place and evacuation.
- CSO will gather all projects information (including P-JET)
- The EMG and Proponents will make a joint decision regarding options.

Decision Made and Directed from EMG/CSO regarding Evacuation Option as per CSO Emergency Preparedness and Response Plan.

- Information will be transmitted back to and known by the three LNG Site Managers.
- The three LNG site Workforce Services Managers will facilitate transmitting the notification of our path forward to all subcontractors and ascertain their plans.
- The three Site Managers will contact their customer counterparts and confirm for them, the actions taken/path forward.
- CSO will contact the LDMG and MSQ to inform them of Bechtel's plans regarding the LNG Projects and P-JET.
- Each project and the CSO will document relevant information for record.

Wherever possible, Bechtel will return its local staff to the mainland in order that they can be with their families during winds of sufficient strength.

In the event of an island evacuation, personnel will be alerted to the need for evacuation and Wardens will direct personnel to their assembly location. The IC and EOO will coordinate the evacuation from Curtis Island and verify with the Wardens that all personnel have been accounted for.

When necessary, passenger vessels and plant transport vessels will be made available for Curtis Island evacuations with the IC and Traffic and Logistics Manager organising transport and ensuring coordination at embarking and disembarking points, respectively. All marine transportation will comply with relevant legislation and the requirements and directions of the Regional Harbour Master.

9.3 Employee Accountability

To ensure appropriate employee accountability, a swipe card system will be used by all personnel travelling to and from the Curtis Island projects by marine ferry, as well as for entering or leaving the Curtis Island TWAF locations. Each person (including visitors) will be

issued a site security badge and will be required to swipe their card at each of these locations:

1. At the Ferry Terminals on the island.
2. For access to and from all Curtis Island Construction TWAFs.

Human Resources and Workforce Services aided by Site Security personnel shall be responsible for preparing, issuing and upon completion of assignment, retrieving identification badges for each person granted access to the Curtis Island project sites.

During any major emergency, there is a possibility for persons to be unaccounted for. To address the possibility of missing persons, the project will adopt the following practices:

- Personnel leaving the mainland will be required to electronically register their departure so a record of their status is maintained and accessible.
- Personnel entering and leaving the GLNG project site on Curtis Island will be required to electronically register their ingress and egress to the island at the ferry terminal so a record of their status is maintained and accessible.
- Personnel residing at the Curtis Island Temporary Workers Accommodation Facilities will be required to register their entry and exit to the accommodation area so a record of their status is maintained and accessible.

Note: Where it is determined that a person(s) is missing, the EOO will notify the OSC and a search will be initiated.

9.4 On-Shore Response

In the event of an injury/illness onshore, project First Aiders will provide the primary response until the site medical team arrive at the location. The medical team, i.e., paramedic, doctor, will determine the extent of the injury/illness and decide whether QAS will be required to either attend and/or transport the person from Curtis Island or from mainland marine landing point to a regional hospital. The primary responder will continue to provide care until medical personnel arrive on the scene.

In the event of a serious injury, illness requiring medical treatment, or person(s) requiring rescue, one of the following options will be initiated:

- The person will be transported by site ambulance to **MOF** ferry terminal and evacuated to the mainland by marine vessel to **Port Central GLNG Ferry Terminal**, and upon arrival, be transported by QAS ambulance to an appropriate medical treatment facility.

Or

- QAS Paramedics and/or Queensland Fire and Rescue personnel will be transported to Curtis Island by marine vessel or Helicopter, met by an escort vehicle at **MOF**, or the **GLNG Helipad**, and taken to the incident scene to treat, stabilize, rescue and

transport a patient by rescue helicopter or the above mentioned means to an appropriate medical treatment facility.

9.5 Emergency Response

In the event of an emergency, the local emergency services will direct the response strategy to place emergency services personnel on the Island or to evacuate any injured or trapped personnel from the Island to medical treatment facilities on the mainland. These responses will differ for various phases of the construction work and various operations.

In an emergency situation, a call will be made by IC to **000** and to the (EMG/CSO) requiring their status to go to "stand-by" status.

This call will be directed to the appropriate Emergency Services Co-ordination Centre (Ambulance, Fire and Rescue or Police).

The caller will clearly identify the project by using the following wording to avoid confusion with the other projects.

"This is (**GLNG PROJECT CURTIS ISLAND, I repeat, GLNG PROJECT CURTIS ISLAND**) calling"

In the case of severe injury or entrapment, a comprehensive description of the type of emergency situation and casualty's vital signs will be provided to the Queensland Ambulance Service (QAS) Co-ordinator.

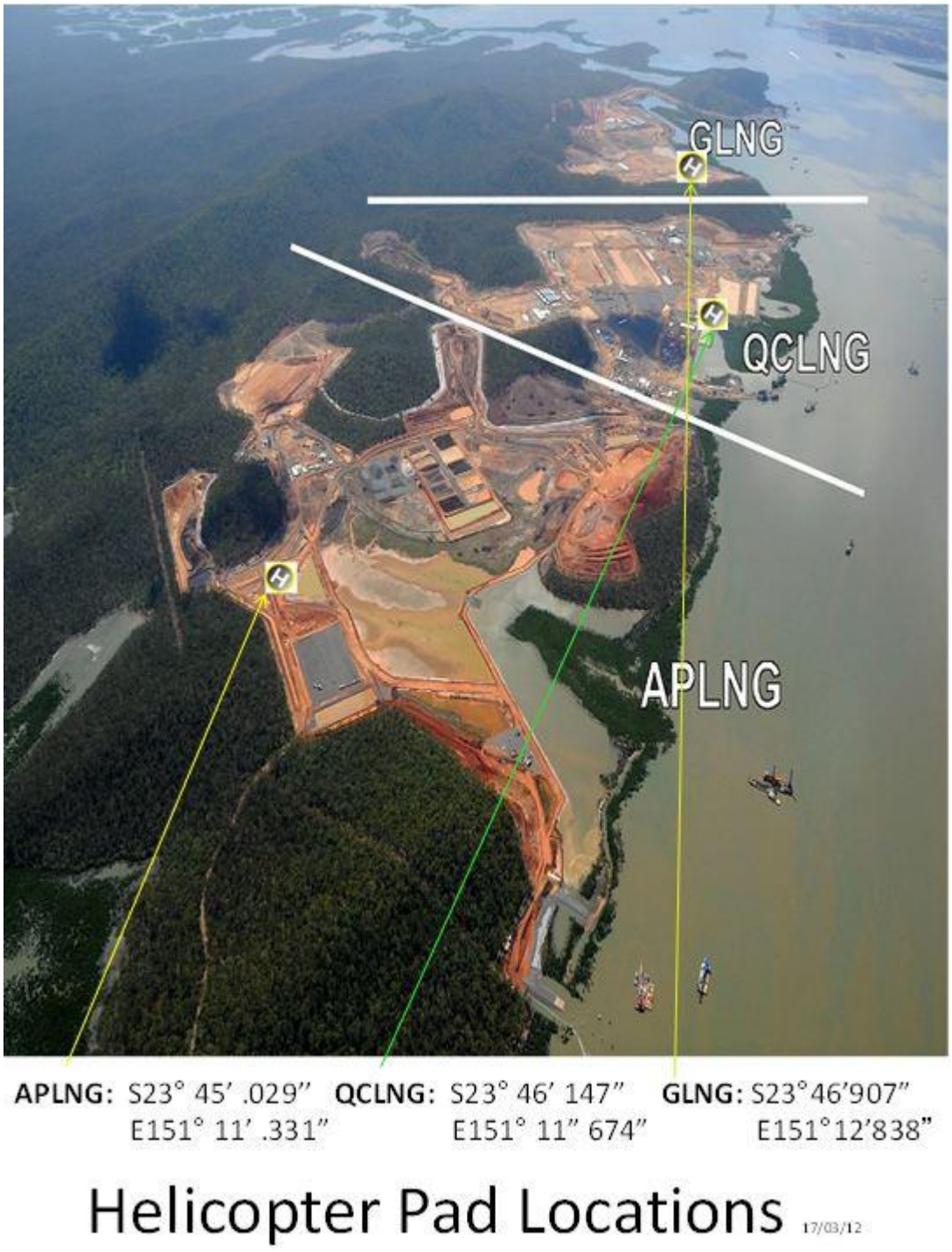
QAS, acting as Primary External Emergency Response provider, will then determine whether:

- The injured person is to be treated and stabilized on Curtis Island and transported to Gladstone Marina, or
- QAS will mobilize to the Island, by water or air, treat and stabilize the patient(s) and transport the patient(s) by vessel to Gladstone Marina from where they will be transported by ambulance to a nominated hospital or where a rescue helicopter is deployed the patient(s) will be directly transported to a nominated hospital, or
- Queensland Fire and Rescue Service are required to rescue or release a trapped person, or
- Careflight or Capricorn Rescue Helicopter is required to airlift the person from an offshore work platforms or Curtis Island, or
- Other vessels are required to mobilise to rescue persons in case of vessel collision, fire, sinking or grounding

Personnel will most likely require emergency response treatment and evacuation for:

- Injuries associated with falls from height, use of plant, equipment, vehicles, vessels, chemical exposure, fire and explosion or entrapment
- Envenomation/allergic reactions from snakes, spiders, insects, ticks, marine creatures
- Dehydration, heat exhaustion, pre-existing medical conditions, cardiac arrest.

Map 1: Location of Curtis Island LNG Project Sites and their Helicopter Pad Locations



9.6 Offshore Locations

In the event of an injury/illness offshore (barges, tender vessels, tugs or transport vessels), project First Aiders will be the primary response until the site medical team arrive at the location. The medical team, i.e., paramedic, doctor, will determine the extent of the injury/illness and whether QAS will be required to either attend and/or transport the injured/ill person(s) to a mainland facility. They will also determine whether a medivac by rotary wing aircraft with hoist fitted is required. The primary responder will continue to provide medical care until medical personnel arrive on the scene.

In the event an injured or ill person(s) requires rescue or medical treatment, one of the following options will be initiated:

- The person will be transported by marine vessel to nominated mainland marine landing place and then transported by QAS ambulance to nominated medical facility, or
- QAS Paramedics and/or Queensland Fire and Rescue will be transported to the offshore locality by marine vessel, or RACQ Helicopter, taken to the incident scene, and carry out rescue, treatment, stabilization of injured/ill person(s) and effect transport of injured/ill person(s) by marine vessel to nominated mainland marine landing place for transfer to QAS ambulance or by rescue helicopter directly to an appropriate medical treatment facility, or
- In the event of a vessel, grounding, catching fire, colliding or sinking, an emergency call will be made via VHF radio on Channel 13 or 16 to Harbour Control MSQ (Maritime Safety Queensland). MSQ will be responsible for directing emergency responses in relation to vessels, and notify QAS and VMR (Volunteer Marine Rescue) to respond in relation to injuries or rescue as required.
- The vessel will at this time give location co-ordinates as per MSQ Gladstone Port Procedures.
- The Gladstone Water Police should be notified and placed on standby

NOTE: *An offshore work barge may be located in an intertidal zone and may be inaccessible via land or water, dependant on the stage of the tide. In this case, evacuation by rescue helicopter via winching may be the only option. Capricorn's Helicopters are fitted with night landing capability and also a rescue hoist.*

9.7 Barge/Jack-up Barge Specific Actions

In the event that a person is injured on a jack-up barge and needs evacuation, the following will occur:

- When calling an injury from a jack-up barge, the Latitude and Longitude will be given to QAS Communication Centre along with required weather conditions and wind speed, etc., which may potentially decide the method of rescue.
- The Gladstone Water Police should be notified and placed on standby
- The barge may be required to be jacked down to water level to facilitate access/egress

- The barge crane will be made ready for use if directed by Emergency Services personnel
- If a rescue helicopter is required, a personnel/stretcher landing area will be cleared on the barge deck and any flammable or combustible substances completely removed from this area
- All loose items of equipment shall be removed from the deck area or solidly fastened down
- Barge personnel will not attempt to touch or contact any suspended lines or rescue slings from the helicopter so as to avoid static discharge incidents
- Barge personnel will take directions from Emergency Services personnel during any rescue operation.

9.8 Emergency Communications and Rendezvous Points

Emergency communications are primarily by mobile phone to **"000"**. There are some "dead spots" for both phone and radios on Curtis Island.

Note:- Due to possible communication black spot on the island the Bechtel Emergency Response Appliance will be fitted with a satellite phone along with detailed instructions on its use and an up to date phone contact list carried in the appliance. A secondary satellite phone will be provided to the Incident Control Team in the Emergency Operations Centre.

The emergency channel during the phase of the construction will be Channel 1 UHF. The project will have a VHF radio on Curtis Island that may be used to contact MSQ Harbour Control on **VHF Channel 13** only if:

- All mobile phone communications are lost, and
- There is a life threatening emergency.

In order to facilitate a co-ordinated emergency response, certain rendezvous points shall be located and agreed upon with marine services, QAS and the project. These points are located on Curtis Island the Gladstone Marina, and Port Central

9.8.1 MOF Rendezvous Point

This landing site is located at the South end of China Bay where marine vessels drop off and pick up passengers and where the project's vehicles maybe parked.

QAS personnel will be met here and driven to the incident location. An injured person will be transported in the company ambulance to the Pioneer MOF for water evacuations or the Helipad for aerial evacuation.

9.8.2 Curtis Island Pioneer Helipad Rendezvous Point

A 40mX40m pioneer Helipad has been designated on Curtis Island for the GLNG Project and is located beside the haul road. There is a high visibility "H" marking on the ground and a wind sock for helicopter pilots to gauge wind speed and direction. QAS and other emergency response personnel will be met at the helipad and if required will be transported to the incident scene.

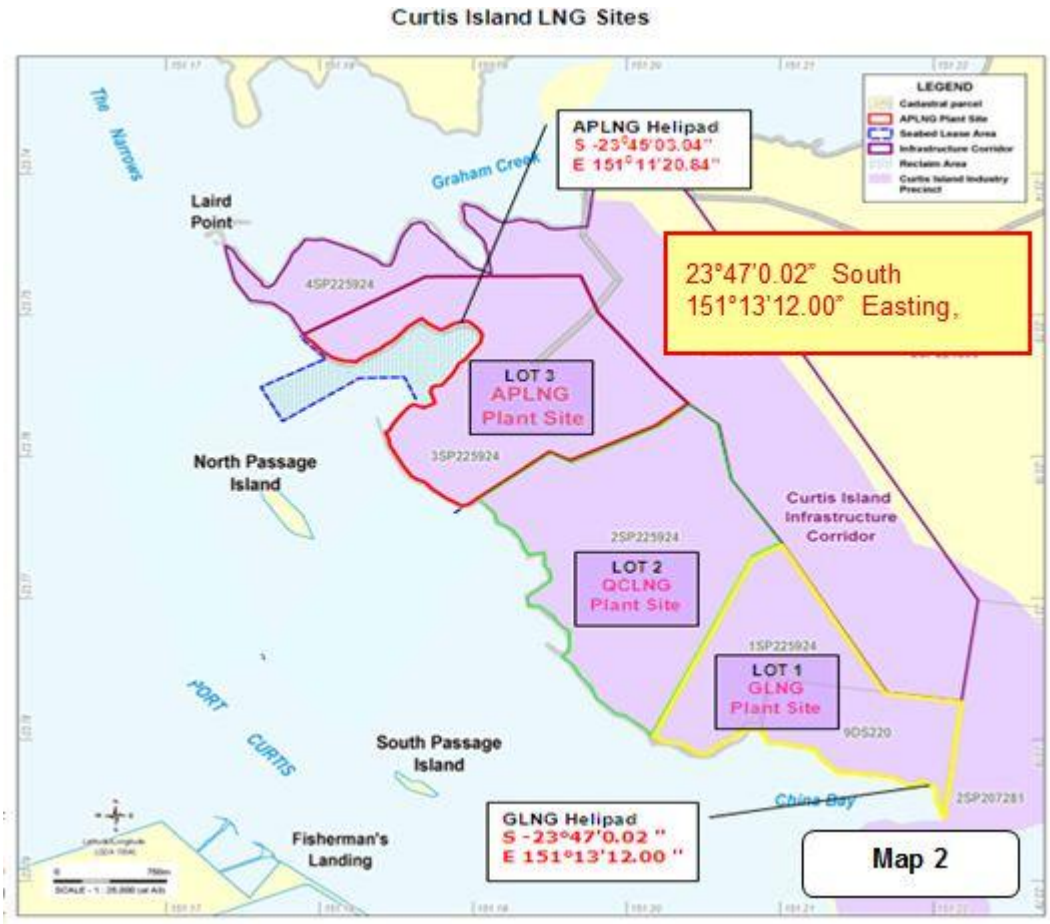
Note:- If the helipad is unusable for any reason, a section of Haul Road with be closed off and an emergency landing pad will be established Appendix L – Helicopter Support Guidelines provides information required for a helicopter response to the workplace on Curtis Island.

The project personnel will not enter within 40m radius of rotating wing aircraft, unless directed to do so by the pilot.

The co-ordinates of the helipad are as follows;

- **23°46'0.907" South**
- **151°12'12.838" Easting,**

See Map 2 for Location of GLNG Temporary Helipad on Curtis Island.



9.8.3 Port Central (Auckland Point) Landing Place

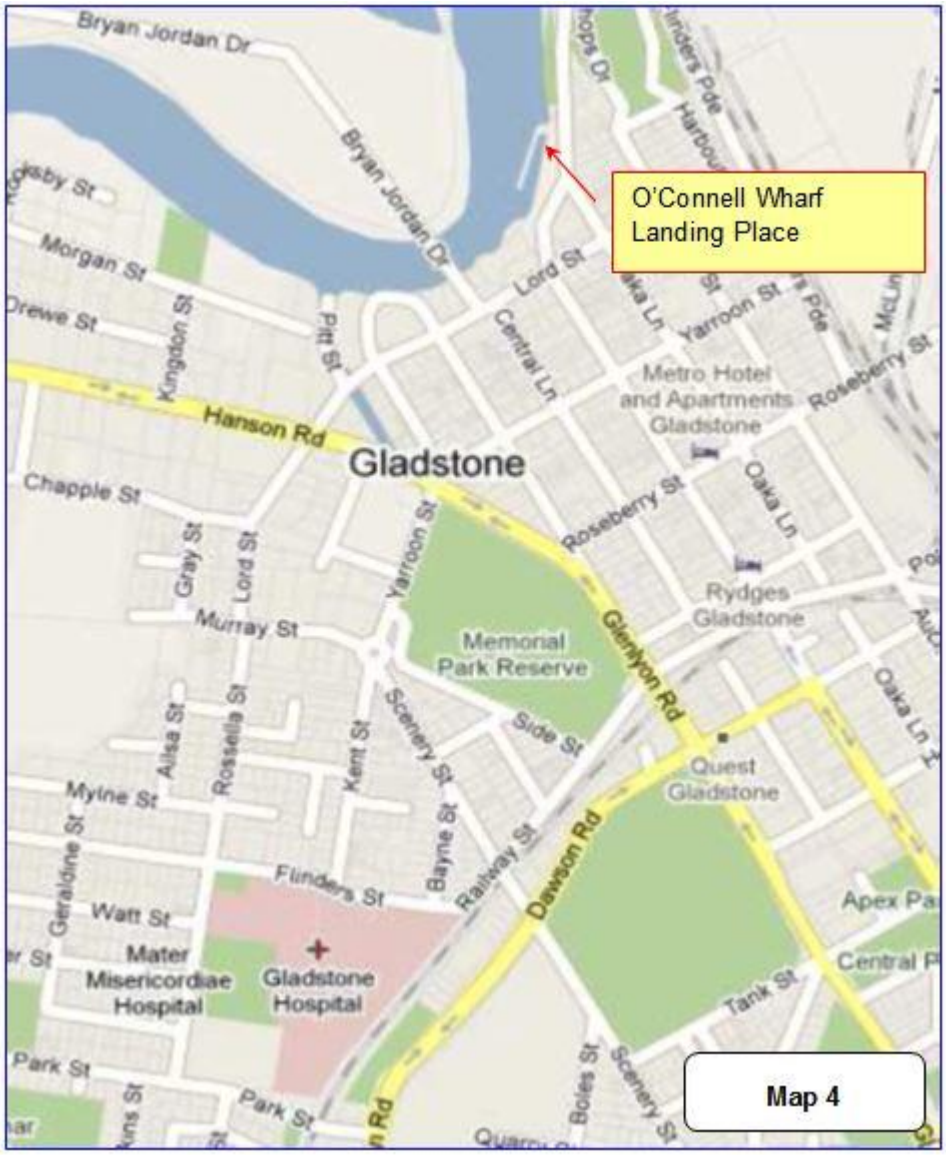
Port Central will be the main marine terminal for the GLNG project and is designed to address tidal changes and be compatible with project transportation vessels. This centre

will be the principal receiving point for marine medivacs and for the transportation of medical and emergency teams and equipment to Curtis Island.

See Map 3 for location of Port Central.

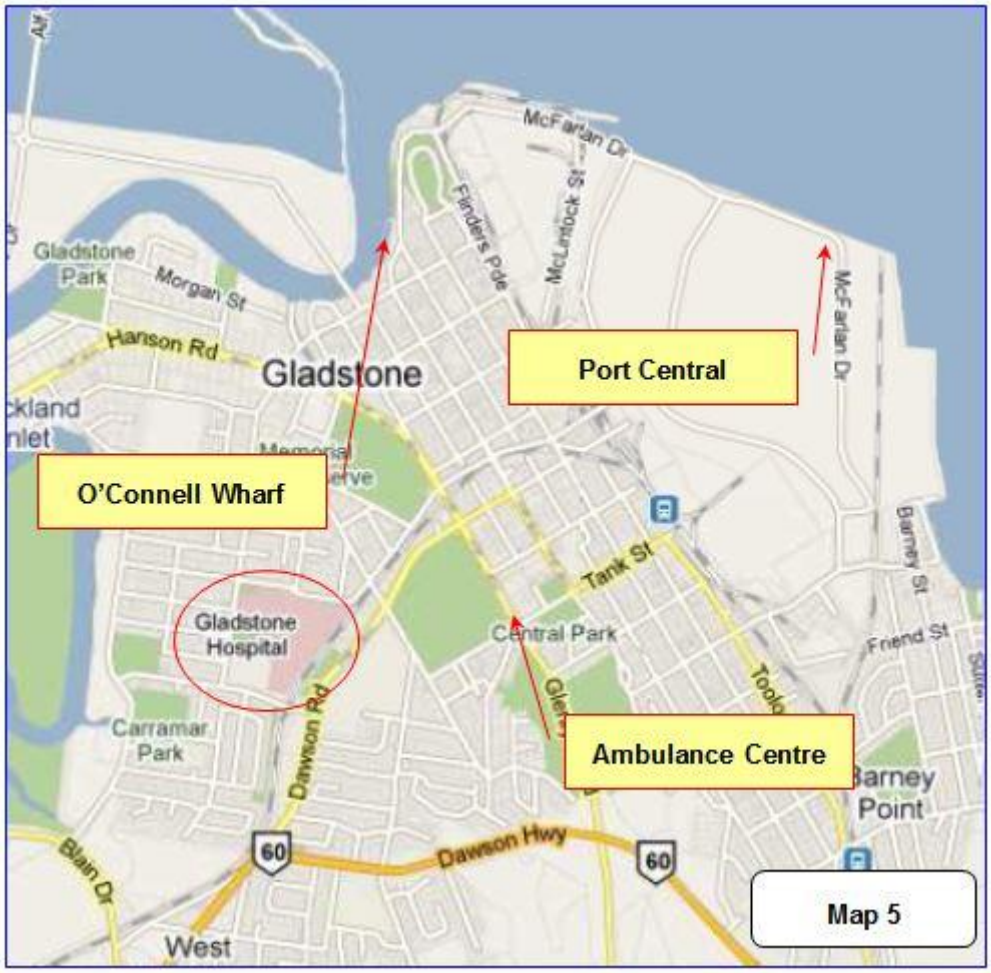
9.8.4 Alternative Rendezvous Point

If the Primary Rendezvous Point is unsuitable for any reason, the O'Connell Wharf may be used. It is located at Flinders Parade, Gladstone Queensland 4680, Australia (07) 4976 1398. O'Connell Wharf is approximately 2 km from the Gladstone Hospital and Ambulance Centre shown on map 4.



9.8.5 Mainland Helipad Locations, Gladstone Hospital and Ambulance Station

Map 5 illustrates where the two preliminary and permanent marine landing places are for emergency events in relationship to Gladstone Ambulance and Hospital locations.



9.9 Queensland Fire and Rescue Service (QFRS) Response

If a situation develops that requires rescue (i.e., entrapment/entanglement) the Gladstone Queensland Fire and Rescue Service may be requested to respond. All rescue equipment is contained in a 4WD appliance and trailer. Bechtel will arrange marine transport for QFRS to Curtis Island from a nominated mainland facility.

9.10 Gladstone Port Authority

If an incident occurs that requires the Gladstone Port Authority to be notified wether for regulatory compliance or for assistance this will be coordinated by the IC or EOO.

10 Emergency Alarms

A manually activated emergency siren will be situated at one or more locations to allow full coverage of the project and shall be loud enough to be distinguishable above construction noise. The siren is activated to alert personnel of fire or other site related emergencies, and consists of a continuous series of 'whooping' tones. Upon hearing the siren, all personnel must stop work and switch off running equipment and go directly to the closest assembly area and remain there until the "All Clear" is sounded or wardens or members of the ERT instruct employees otherwise.

A separate camp siren will be establish to alert personnel that an emergency has occurred in the camp and that personnel are required to proceed to their designated assembly areas.

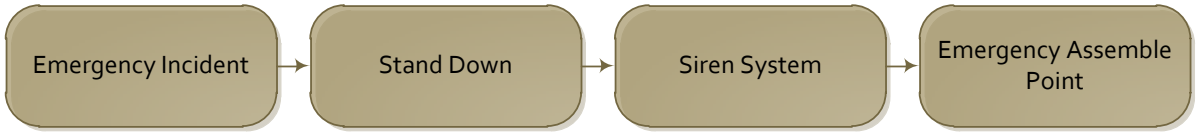
Sub-Contractors must verify that their employees are aware of the correct procedures to be followed in the event of an emergency evacuation situation. Employees will be informed of the requirements below at their ES&H orientation and by bulletins and toolbox meetings.

10.1 Emergency Incident

An Emergency Incident is a situation on site whereby the site ERT responds and deals with an incident. The types of incident could include but are not limited to; injured person, fire, rescue, chemical leak, etc. The call will be transmitted over the emergency channels 1 advising all work areas to stand down and all vehicles to pull up and park in a safe area allowing clear access to responding emergency response vehicles. The site siren system **will not** be activated for an emergency incident.

10.2 Area Evacuation

An area evacuation may be required if the emergency incident escalates and an area needs to be cleared. On hearing the siren in your work area, all workers must immediately report to the nearest Emergency Assemble Point for a roll call. An evacuation is required only when the site siren system is activated. The all clear will again be given over the emergency channels 1 by the site ERC/ Advisor.



On hearing the emergency alarm, project personnel shall:

- Stop all work immediately
- Shutdown and isolate all sources of ignition, if safe to do so
- Crane drivers are to make safe their loads, if safe to do so

- Proceed to designated assembly areas, via safest route

Drivers must park vehicles in a safe location, ensuring that emergency vehicle access is not blocked, and switch off engines, leave keys in ignition and proceed to designated assembly area on foot.

A check of the site by the ERT will take place to ensure that employees have stopped work and evacuated their areas.

All “work permits” are automatically suspended in the event of a “General Emergency / Emergency Evacuation” and will be re-issued once it is deemed safe to do so.

As the project develops, periodic emergency drills shall take place to familiarise employees with the emergency process. Emergency sirens will be tested at scheduled times to be determined by the EOO.

10.3 Flammable Gas Detection Alarms

As part of the process safety installations the operating plant will be fitted with a variety of devices to detect the presence of flammable gases in the air. During the period of time when “live” areas will border construction areas such as the boundary between Train 1 and Train 2 a system of temporary multipoint portable gas detectors will be set up to establish a boundary between the two. The purpose of this is to provide an audible and visual warning of hydrocarbon/ flammable gas at the boundary to allow for the immediate shutdown of equipment and work activities in the affected areas.

At any time a person becomes aware of the activation of the fixed installation system or a portable system they are to immediately cease work activities and raise the alarm. All equipment must be shut-down, work activities to cease, fuel-driven construction equipment to be manually shut down immediately and all personnel move to a safe area

10.4 Alarm Associated with Emergency at Neighbouring Plant

In the event that a neighbouring project experiences a gas or toxic chemical release that has potential to impact the GLNG project site, the Site Manager or ERC upon being notified of the situation by telephone from the affected site, will:

- Liaise with the Incident Management Team to determine the appropriate actions to be taken.
- The site warning system may be activated indicating that all site personnel and visitors are required to report to the closest assembly areas and wait further information form the IC.
- EOC personnel will monitor the situation by maintaining contact with the project in question.

All “work permits” shall be automatically suspended in the event of an emergency from a neighbouring plant that could impact the site. Permits will be re-issued once it is deemed safe to do so.

Note: Windsocks will be stationed at predetermined locations to provide wind direction in the event of a chemical/gas leak from GLNG or neighbouring site.

10.5 Clear Signal

The “All Clear” signal is relayed to Wardens by way of an “All Clear” radio call.

On hearing the “All Clear” Wardens shall notify personnel that it is safe to return to their place of work.

Note: Personnel who have been working under a Permit to Work, e.g., hot work, confined space, excavation permit, etc., may not return to work until the Work Permit has been revalidated by the Permit Authority.

11 DEBREIF

A debrief meeting will take place as soon as practicable after an exercise or an incident has been brought under control. The ERC will chair this meeting.

Personnel involved in the emergency shall attend, or at least be provided with comprehensive feedback on the details of the emergency and all relevant outcomes. The debriefing will detail the emergency step-by-step so that it can be documented as accurately as possible. The debriefing will also identify lessons learned (if any) and the need for procedure modification or training requirements. During emergency exercises, video and photographs shall be taken to assist with feedback and reporting.

12 EDUCATION AND TRAINING

12.1 All Personnel and Visitors

All visitors and personnel entering the site shall receive instruction in the form of a site orientation which includes what action to take in the event of a site emergency. Key subject areas are:

- Overview of emergency plan and procedures.
- Threats from neighbouring plants, where applicable.
- Potential emergency threats on GLNG project.
- Action to take in the event of an emergency.
- Emergency siren tones and associated responses.

All personnel will receive training in relevant aspects of this Plan through site orientation and training and via pre-start and/or toolbox talks from time to time, as required. Information on emergency response and/or evacuation will be provided approximately once per month through one of the following: Toolbox Talk; HSE Bulletin; Daily Information Sheet; or an emergency exercise.

The Project's emergency response system will change as the Project grows and risks and resources change. Where changes are introduced, revised processes and procedures shall be communicated through formal training sessions including re-inductions which include new site hazards, procedures and work methods and emergency procedures.

All site personnel will undertake formal training sessions in regards to any new work methods, including but not limited to permit to work systems, hot work procedures, lock-out tag out procedures, hazardous substance management relevant to the site which introduces new risks. This training will be conducted prior to the introduction of new hazards on to the site. The training should include hazardous substance identification, properties of substances, PPE requirements and procedures designed to minimise the risks associated with working in and around the hazardous substances.

As the project develops training will provided to all relevant personnel to ensure compliance with regulatory requirements including the Building Fire Safety Regulation 2008. This training will documented as required by the regulations in the site Fire Safety Management Schedule. All records will be maintained onsite in hard copy and a back-up maintained electronically and be available for inspection at the request of an Authorised Fire Officer or other authorised regulatory person.

12.2 Supervisors

Supervisors and above will receive additional training through the Supervisors ES&H Orientation.

12.3 Incident Management Team

Emergency Response Duty Cards (see Appendix M) will be used for training and educational purposes. Laminated prompt sheets will also be provided in key locations for ready reference of what actions need to be taken in the event of an emergency.

Personnel, designated to fulfil an emergency role (e.g., Wardens, ERT) will be trained in the duties required of the role. In addition, a training program will be developed to provide ongoing emergency response training for ERT members.

12.4 Emergency Response Team

The emergency response team members will receive advanced training in dealing with emergency scenarios identified as part of this plan. As a minimum emergency response team members will hold or are working towards a Certificate III in Mine Emergency Response and Rescue.

Emergency Response Team members will also have training in specific hazards prior to the introduction of those hazards to the GLNG facility which include specialised techniques in:

1. Response to LNG spills and fires,
2. Response to hydrocarbon fires and spills,

3. Response to Cryogenic incidents.
4. Shipboard firefighting (Awareness)

13 EXTERNAL COMMUNICATIONS

13.1 Media Communication

If any person under Bechtel's direction (i.e. employees and subcontractor personnel) receives an enquiry from the media, they will do the following:

- State that they are not the right person to comment, and give the name and phone number of Bechtel Media and Communications Manager.
- Be polite and firm, not getting drawn into answering questions.
- Never offer an opinion about the situation, the project, or any company associated with the project (customer, Bechtel, subcontractors, etc.).
- Inform their Supervisor and Bechtel Media and Communications Manager.

In the event that media representatives arrive on site in response to an emergency:

- Security will inform them that they are not authorized to enter the site per project procedures, and give them the name and phone number of the Media and Communications Manager.
- Security will inform Media and Communications Manager and Site Manager of the media presence.
- If necessary, Security will call the Media and Communications Manager to talk to the media representatives.
- No external media releases related to any incident are to be released by Bechtel employees. All media releases related to emergency incidents which are as a result of activities performed under the GLNG project will be through the GLNG Project Director.

13.2 Regulatory Notifications

Both Bechtel and GLNG have requirements for the notification of various regulatory bodies following an emergency incident occurring on the site. Each organisation is responsible for ensuring that following an emergency incident occurring the necessary regulatory bodies are notified within the required timeframes and with sufficient detail as requested by the regulator.

14 HOME OFFICE

The Bechtel Office, Fire and Evacuation Plan shall be implemented for the project offices in Gladstone. Office response plans for Houston and Brisbane will be in accordance with existing Office Safety System procedures.

15 EMERGENCY FACILITIES AND EQUIPMENT

The following emergency facilities and equipment shall be provided to ensure that all potential emergency requirements are adequately addressed.

15.1 Fixed Emergency Installations

Fixed firefighting installations that will be available for use in the event of an emergency include:

- 2 x Fire water tanks with a capacity of 4,400 m3 each.
- 3 x fire pumps each with a capacity of 550 m3 per hour (Additional jockey pumps and associated equipment are also incorporated.)
- Pillar fire hydrants
- Water sprinkler deluge systems
- Gaseous suppression systems – CO2, FM200
- Fire hose reels
- Fixed monitors with a flow rate of 2000 litres per minute
- Oscillating monitors with a flow rate of 2000 litres per minute (Loading Jetty monitors will deliver 3000 litres per minute.)
- Helipad for medical evacuations
- Jetty firewater connection points for Gladstone Ports Corporation firefighting tug attachment. (Booster point to mainland system).

15.2 Portable Emergency Equipment

Portable firefighting and emergency equipment that will be available for use in an emergency situation include:

- Hand held portable fire extinguishers in varying sizes up to 9kg including dry chemical powder, foam and carbon dioxide.
- Wheeled fire extinguishers.
- First aid kits
- Automatic defibrillators
- Portable Multi-point gas monitoring system.

15.3 Fixed Alarm and Detection Systems

The site will have installed a variety of alarm and detection systems designed to provide early warning of an unplanned event or emergency situation. These include:

- Main Fire indicator panel and sub-fire indicator panels.

- VESDA detection alarms
- Low temperature detectors
- Infra-red multiple flame detectors
- Optical line of sight gas detectors
- Infra-red fixed gas detectors
- Ultrasonic gas detectors
- Fusible loops
- Manual-call points

During the period of time when "live" areas will border construction areas such as the boundary between Train 1 and Train 2 a system of temporary multipoint portable gas detectors will be set up to establish a boundary between the two. The purpose of this is to provide an audible and visual warning of hydrocarbon/ flammable gas at the boundary to allow for the immediate shutdown of equipment and work activities.

All fire safety installations on site will be installed and maintained in accordance with the relevant Australian Standard and such installation and maintenance will be carried out to ensure compliance with relevant Building Codes of Australia, Fire and Rescue Service Act 1990 and the Building Fire Safety Regulation 2008. The records of the fire safety installations will be maintained in the Fire Safety Management Schedule. All records will be maintained onsite in hard copy and a back-up maintained electronically and be available for inspection at the request of an Authorised Fire Officer or other authorised regulatory person.

15.4 Emergency Response Resources

The emergency response team will be equipped with the necessary equipment to respond to any potential incidents on the site during the construction and commissioning phases of the project as highlighted in this EPRP. These resources will include:

- An emergency response fire appliance which incorporates:
    - A fire pump with a Minimum flow rate of 6000 litres/min.
    - 4 lay-flat hose connections (Queensland Round thread)
    - Lay-flat hoses with sizes varying from 38mm, 45mm, 64mm, and 125mm with (Queensland round thread couplings)
    - 1 appliance mounted monitor.
    - On board foam supply. (Low expansion foam).
- An emergency response, type 2 fire appliances with a medium pressure pump and rescue capabilities. Pump capacity of 2000 litres per minute.
- A foam trailer with a capacity of 2000 litres of low expansion foam.

- A water tender with a capacity of 3000 litres minimum incorporating a ¾ inch hose reel with a flow rate of 200 litres/min, and outlets capable of connection using layflat hose to the main emergency response fire appliance.
- Portable high expansion foam generation equipment and foam supplies. (Suitable for response to LNG spills and fires).
- Personal protective equipment which includes:
    - Level 2 firefighting protection – Bunker/turnout clothing including fire helmets, flash hoods.
    - Proximity Fire suits
    - Nomax coveralls
    - Level 3A Chemical splash suits
    - Level 3B fully encapsulated chemical suits
    - Compressed air self-contained breathing apparatus
    - Cryogenic aprons, gloves and hoods.
    - Intrinsically safe radio or alternative means of communication.
- Portable gas detectors – Multi-gas relevant to identified risks.

15.5 Main Gate Entrance Security Guardhouse

The main site entrance security guardhouse shall be furnished with the following items of emergency related equipment:

- Visitors log book
- Copy of the EPRP
- Portable radios
- Charger for portable radios
- Telephone with external line for making outside calls
- IT line for communications
- Laminated cards containing emergency numbers
- Clock
- Plan of where major chemical and waste chemicals are stored
- Site plot plans
- Writing materials and log book

15.6 Emergency Operations Centre (EOC) on Curtis Island

A dedicated Emergency Control Centre (ECC) will be established in the main construction office conference room on Curtis Island to provide a facility for the management and coordination of emergency response requirements. This centre will contain:

- Copy of the EPRP
- Portable radios
- Two IT lines for communications
- Camera with spare batteries
- Clock
- Charger for portable radios
- Two telephones with external lines for making outside calls
- Access to Chemwatch system
- White board and pens for listing emergency information
- Emergency response log and writing material
- Laminated cards containing emergency numbers and contact personnel
- Site plot plan
- Writing materials
- Cyclone tracking map
- Eight designated emergency personnel vests

15.7 Gladstone Town Office

The Gladstone town office will be furnished with the following items of emergency related equipment to provide a redundancy capability in the event the Curtis Island EOC is not able to function:

- Copy of the EPRP
- Two IT lines for communications
- Camera with spare batteries
- Clock
- Charger for portable radios
- Two telephones with external lines for making outside calls
- Access to Chemwatch system
- White board and pens for listing emergency information
- Emergency response log and writing material
- Laminated cards containing emergency numbers and contact personnel

- Site plot plans
- Writing materials
- Cyclone tracking map
- Four designated emergency personnel vests

15.8 Curtis Island Medical Centre

The site medical centre will be furnished with the following items of emergency related equipment:

- All equipment and services as specified in the contractual arrangements for the supply of medical services to the site.
- Copy of the EPRP
- Two Portable radios
- Two IT lines for communications
- Camera with spare batteries
- Charger for portable radios
- Two telephones with external lines for making outside calls
- Emergency medical equipment in line with a Level III medical facility
- Laminated cards containing emergency numbers of contact personnel
- Site plot plan
- Access to Safety Data Sheets (SDSs) and Chemwatch database.

Note: All radios used during commissioning and operations must be intrinsically safe.

16 EMERGENCY MEDICAL PROVISIONS

16.1 Potential Medical Events

The potential medical events that may require assessment, initial treatment, stabilisation and referral if required are include but are not limited to:

- Routine medical emergencies, e.g. angina, myocardial infarction
- Singular medical emergencies that may occur due to geographical nature, e.g. snake and spider bites
- Multiple casualties that occur due to a combination of geographical location and natural event, e.g. cyclone or bushfire
- Singular medical emergencies that may occur as a result of an industrial accident, e.g. slips, trips, falls from heights

- Multiple casualties that may occur due to industrial event, e.g., fire and explosion, structural collapse.
- Single or multiple casualties that may occur as a result of transport accident, e.g. motor vehicle or ferry accident.
- Single or multiple casualties that may occur as a result of public health issue, e.g. influenza.

16.2 Medical Facilities

16.2.1 Onsite Facilities

The GLNG on site medical facilities consist of the Main Construction Site Medical Centre and the Construction Camp Medical Centre. The medical services provide trained and licensed medical personnel for medical services to a mixed-gender construction workforce 24 hours/day 7 days/week. The main Construction medical centre is staffed 6am – 6pm with a Doctor, clinical nurse, paramedic and physiotherapist. The centre has three designated treatment beds. The Construction Camp Medical Centre is staffed 24 hours by a clinical nurse. Between the hours of 6pm-6am the paramedic is also based out of this centre. The Doctor and other off duty medical personnel are available on an on-call basis if required. The Construction Camp Medical Centre has 1 designated treatment bed.

The onsite medical services include emergency care and response for industrial/construction accident or emergency medical conditions including triage, first response and patient stabilization and transport to local and regional hospital facilities (including care during transport) if requested.

16.2.2 Current Hospital Infrastructure

The area is serviced by two local hospitals based at nearby Gladstone and Rockhampton. Gladstone is an L2 rural district facility with 58 beds. Gladstone has no facilities for long term ventilation, burns or trauma management other than to stabilise patients pre-transport to definitive care. Gladstone hospital does have a helipad but does not have CASA requirements therefore is not designated as a helipad. Rockhampton is a L5 regional hospital with 6 ICU beds. The emergency department has 17 holding beds and 3 resuscitation bays, with an emergency specialist. Rockhampton hospital has a designated helicopter landing pad. Outside the local region, patients would be transported primarily to the Royal Brisbane and Women's Hospital (RBWH) in Brisbane. This is an L6 hospital that would provide tertiary care for major trauma, burns and spinal patients. RBWH works with Queensland Emergency Medical System Co-ordination Centres (QCC) and regularly receives patients via their helipad from aero-medical services.

16.2.3 Medical Evacuation Provisions

There are currently in place medical evacuation procedures of patients from Curtis Island GLNG facility by both ferry and helicopter to medical facilities. The nature of the evacuation

method is determined by the onsite Physician in consultation with off-site medical facilities and aero medical providers and is based on the patient's condition. Critical injuries would be transported to the most appropriate facility which can provide appropriate definitive care. This would be determined by the Queensland Health Plans. It is important to note that in local Gladstone emergencies Queensland Health may activate a state response, when other agencies can manage with a local response, because of the lack of critical care facilities. In the event of a mass casualty incident Queensland Health may activate the Queensland Health Mass Casualty Sub Plan where the requirement for coordination of retrieval services is required, or the coordination of specialist beds is required such as burns or spinal injuries. The allocation of definitive care for patients such as an incident involving multiple burn casualties is coordinated through these Queensland health support services.

17 TRACKING OF PERSONNEL TRAVELLING TO AND ENTERING THE PROJECT SITE

A swipe card system will be used to enable the tracking of all personnel traveling to the project site by marine vessel and entering the project site and camp location. Each person will be issued with a site security badge and required to swipe into the site and camp through entrance turnstiles or similar.

The card system will be capable of printing out "Real-time" emergency assembly sheets detailing those persons allocated to a vessel or required location.

Human Resources aided by Site Security personnel shall be responsible for preparing, issuing and retrieving identification badges for each person entering and leaving the project site.

18 EMERGENCY ACTION PLANS

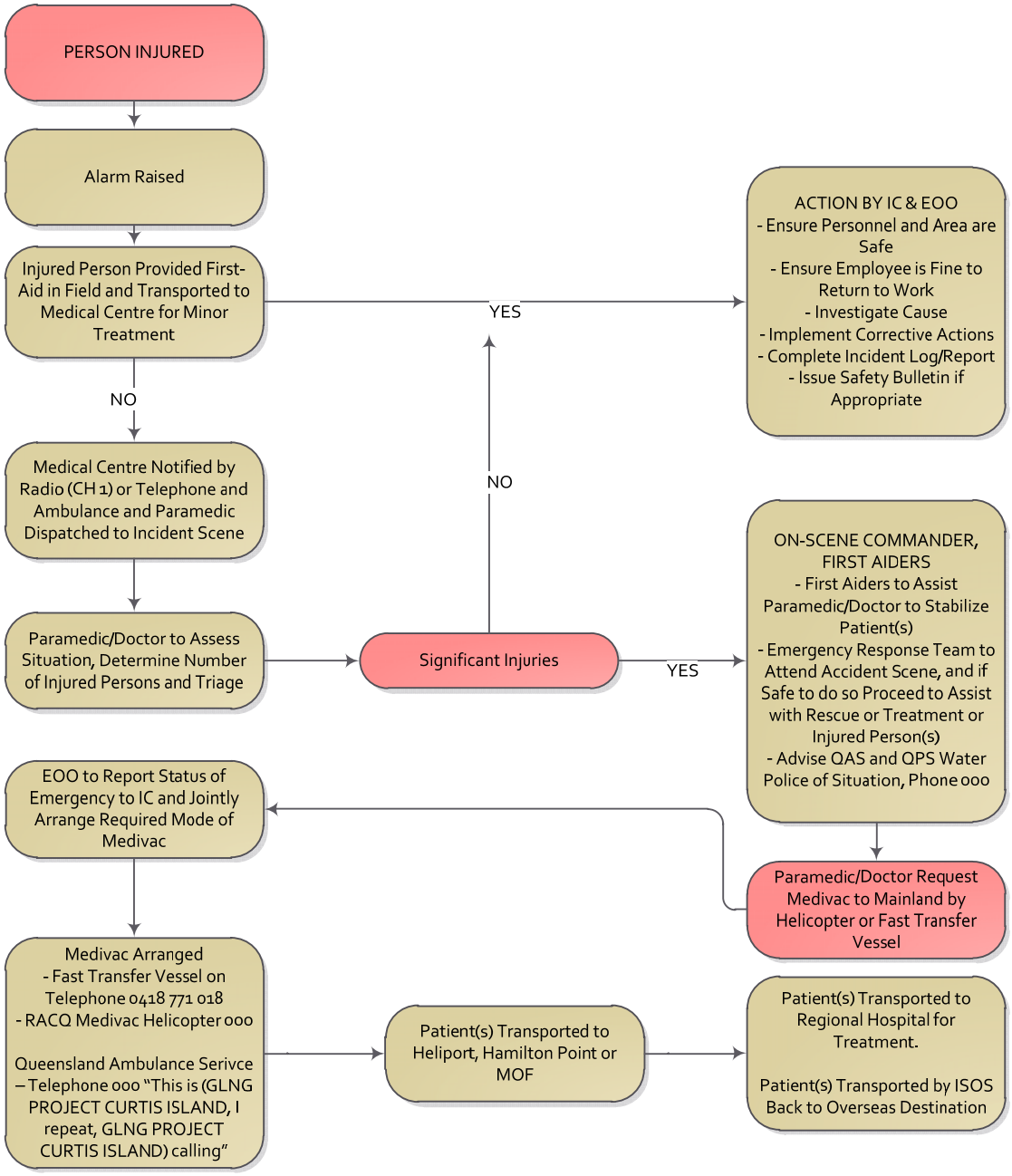
For each of the potential emergency responses that the project could experience, and shall be prepared for, this plan has established a set of response sheets Appendix A detailing the actions required by emergency response personnel.

As well as the above listed Action plans and specific incident scenario plans (Appendix C) process systems introduce additional hazards. The initial response to these incidents will be similar to the action plans and incident scenario plans, however additional requirements of first responders, the ERT and the IC may be required. See Appendix B for aide memoires that provide additional information that will need to be considered.

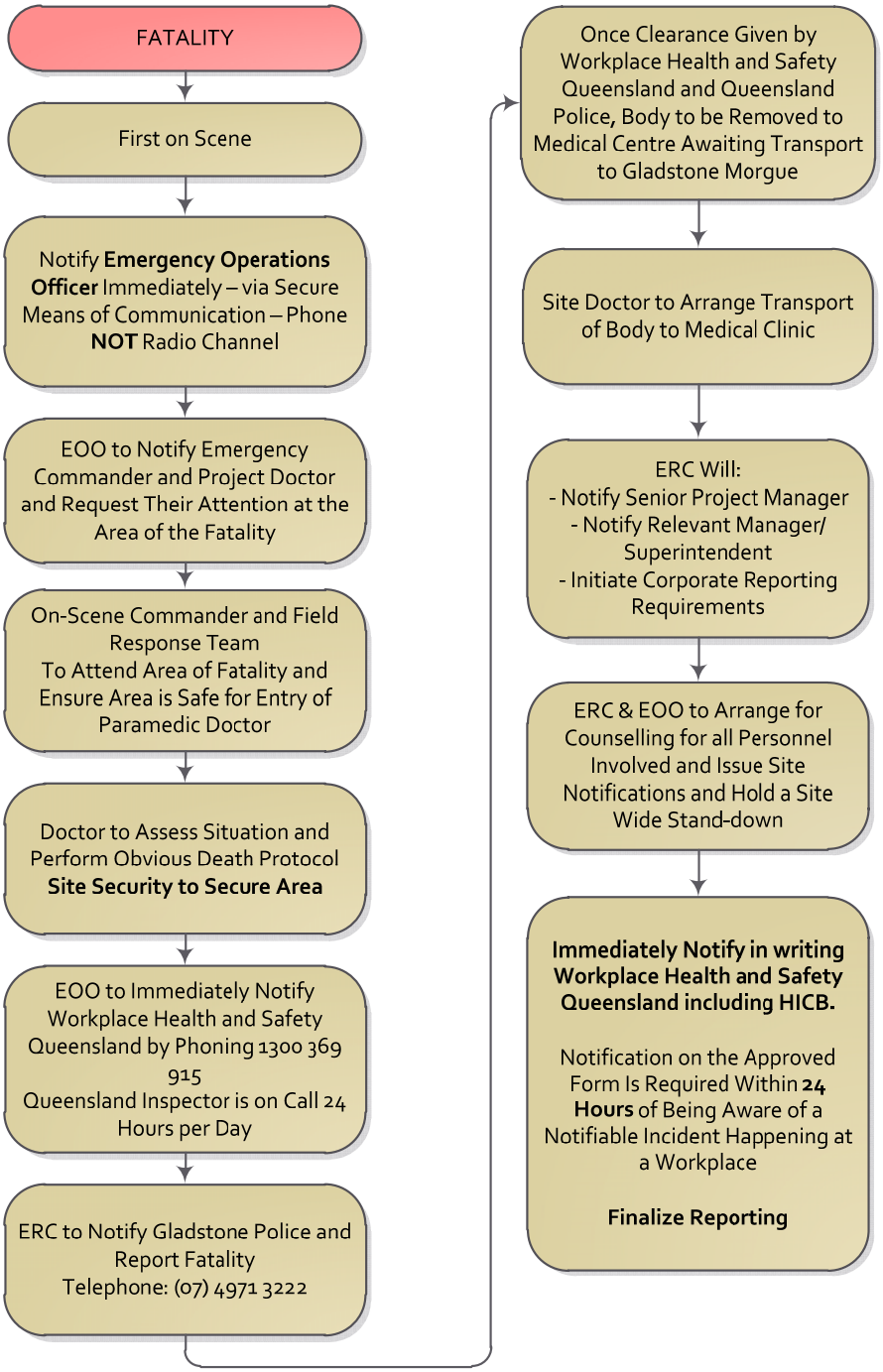
LIST OF APPENDICES	
Appendix A	Emergency Actions Plans
Appendix B	Aide Memoirs of Process Events
Appendix C	Incident Scenario Action Plans
Appendix D	Incident Controllers Checklist
Appendix E	Emergency Log
Appendix F	Emergency Contact Information
Appendix G	Reporting and Emergency Template
Appendix H	Bomb Threat Form
Appendix I	Suspicious Parcels
Appendix J	Cyclone Response Guide
Appendix K	Pandemic Overview Guide
Appendix L	Helicopter Support Guidelines
Appendix M	Duty Cards
Appendix N	Task Specific Emergency Action Plan Request Form
Appendix O	Task Specific Emergency Action Plan Template
Appendix P	Example Decontamination Plan

19 APPENDICES

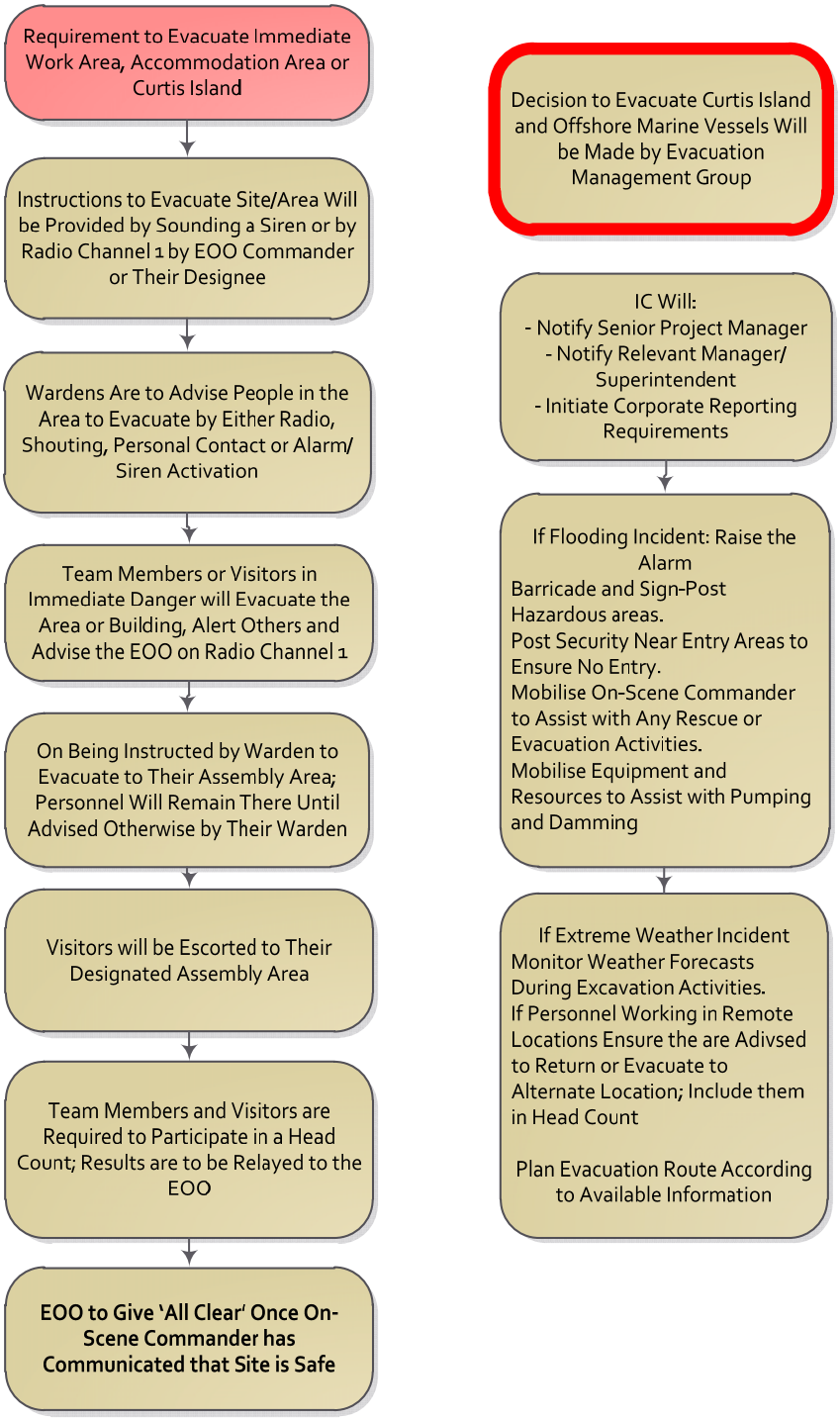
Attachment 1.0 – Injured Person



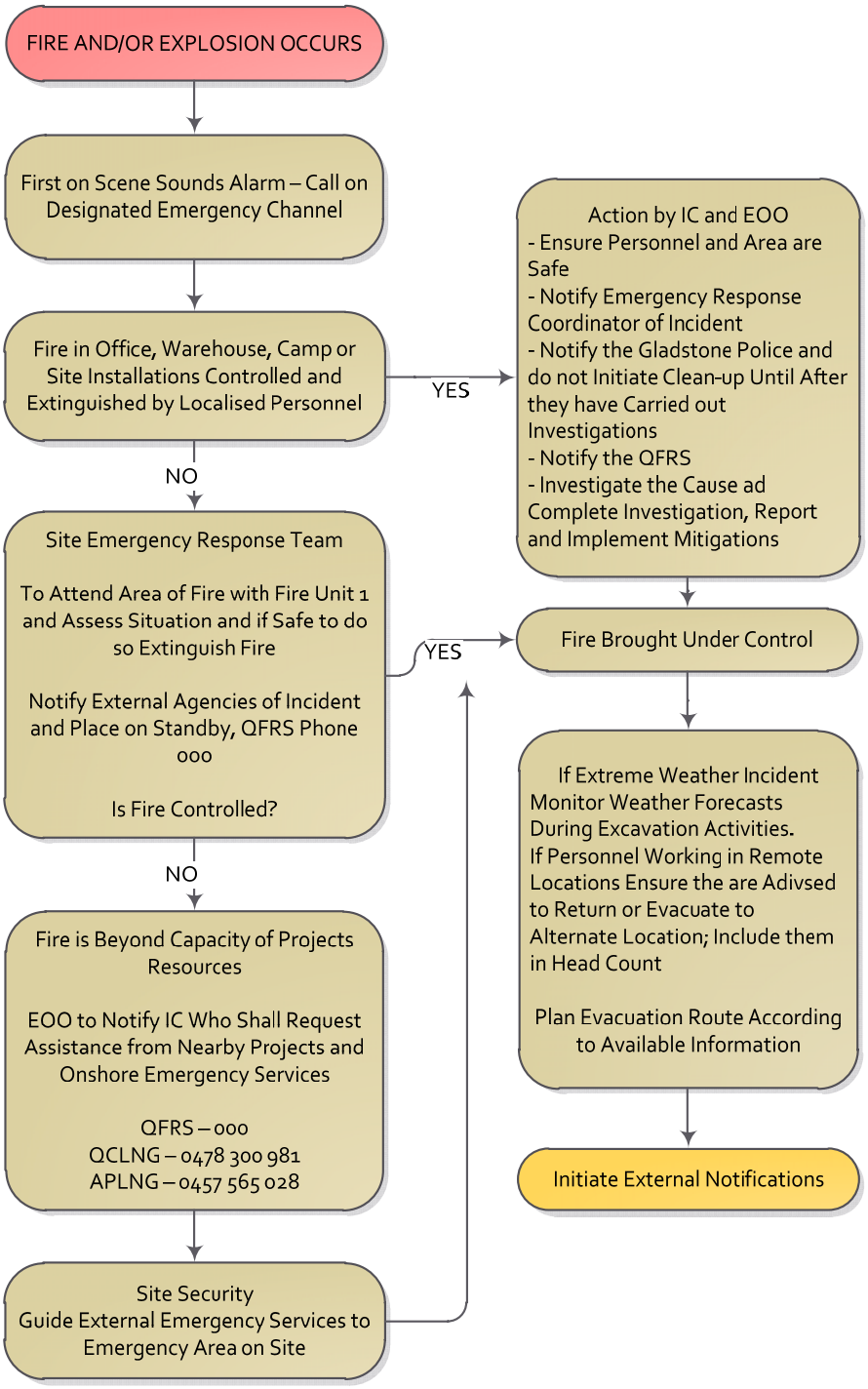
Attachment 2.0 – Facility



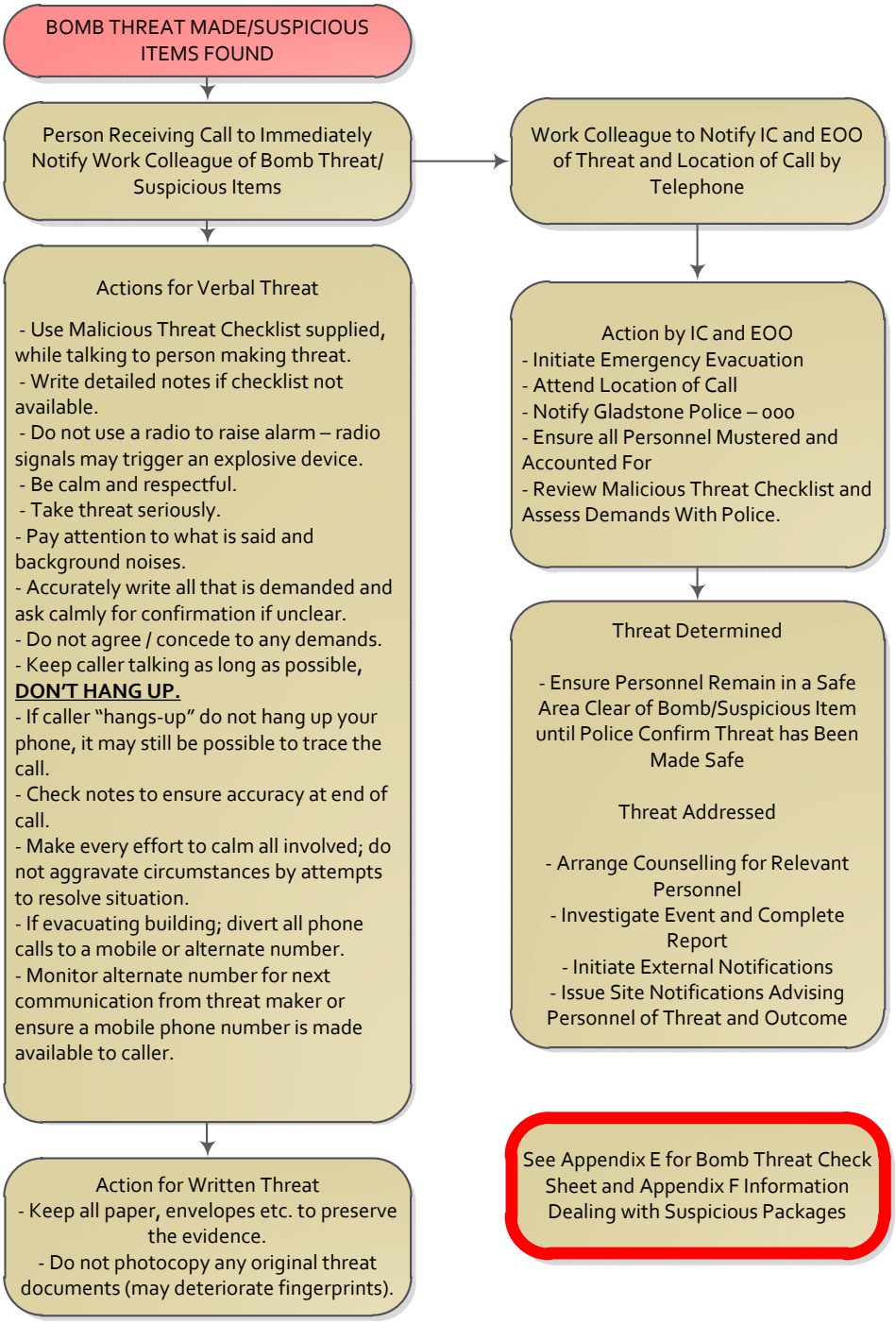
Attachment 3.0 – Evacuation



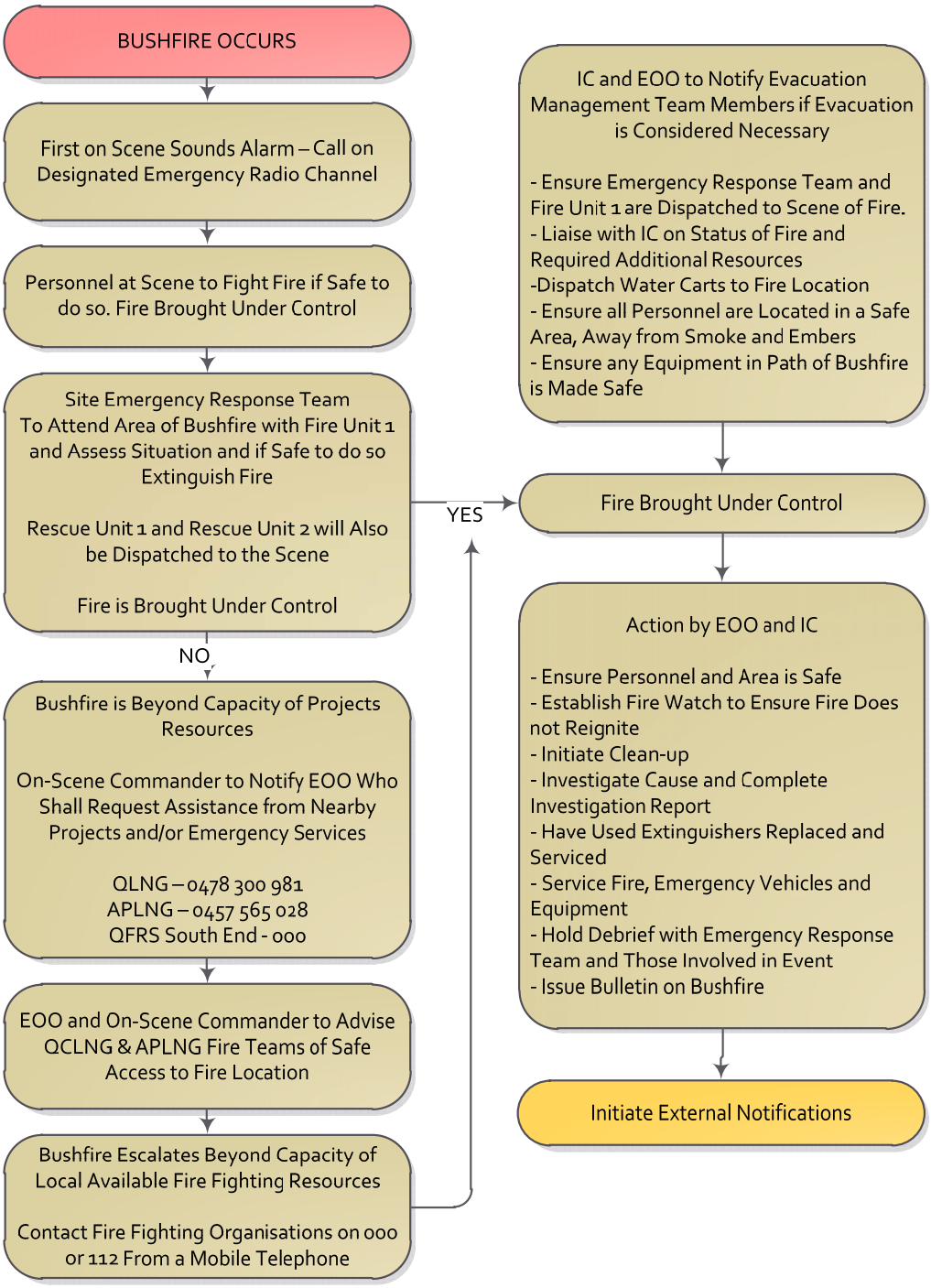
Attachment 4.0 – Fire and Explosion



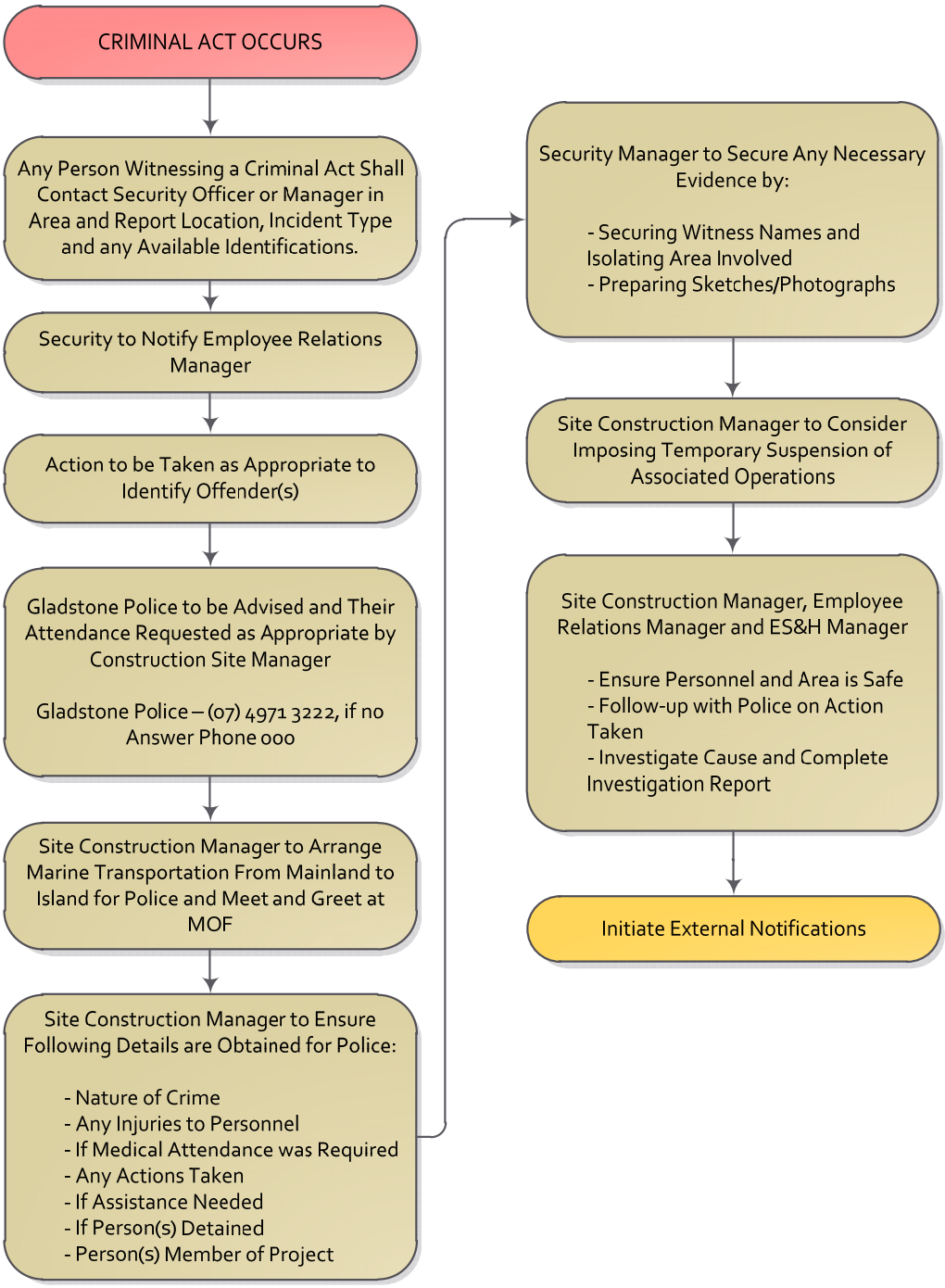
Attachment 5.0 – Bomb Threat/Suspicious Items



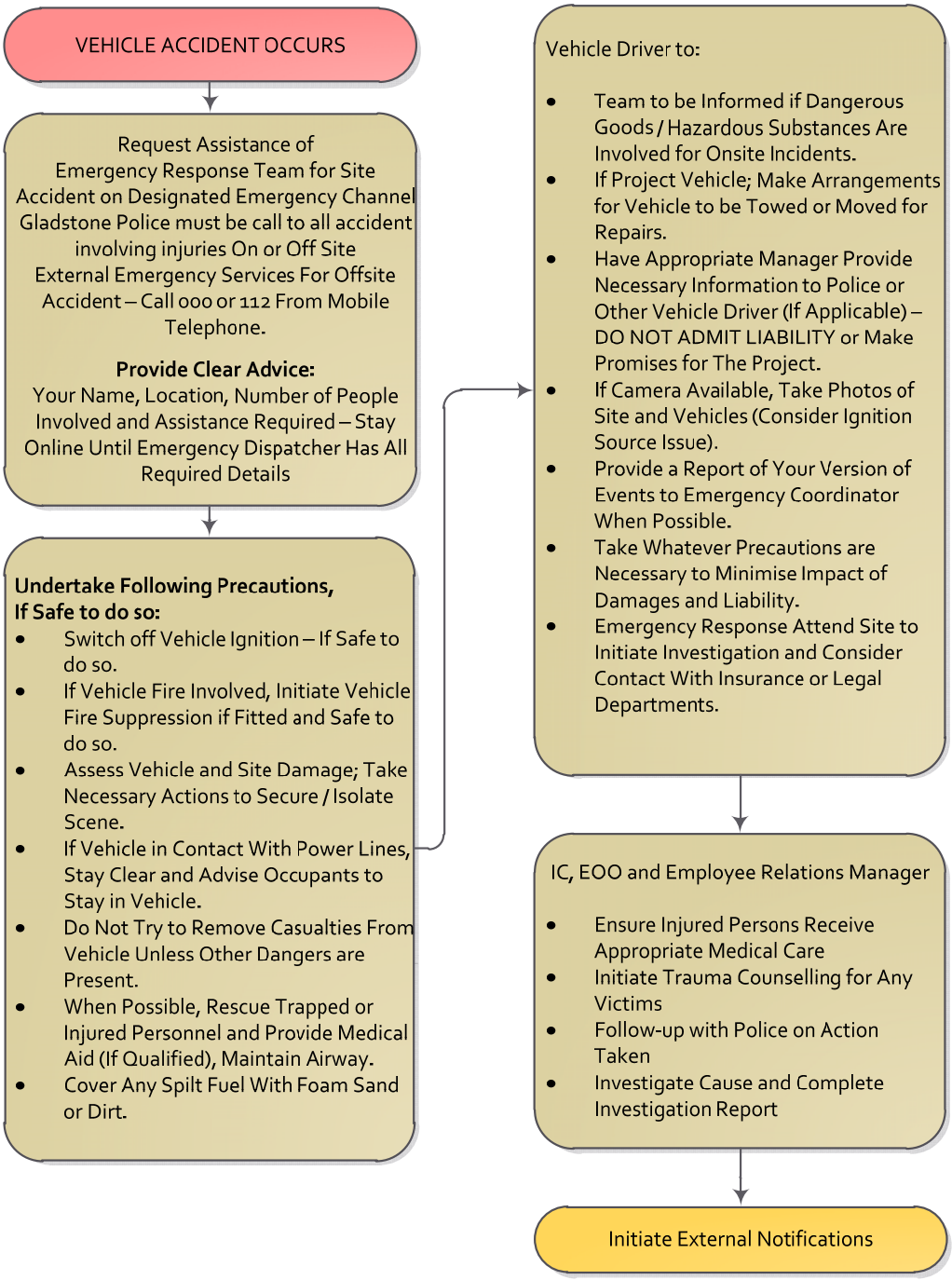
Attachment 6.0 – Bushfire



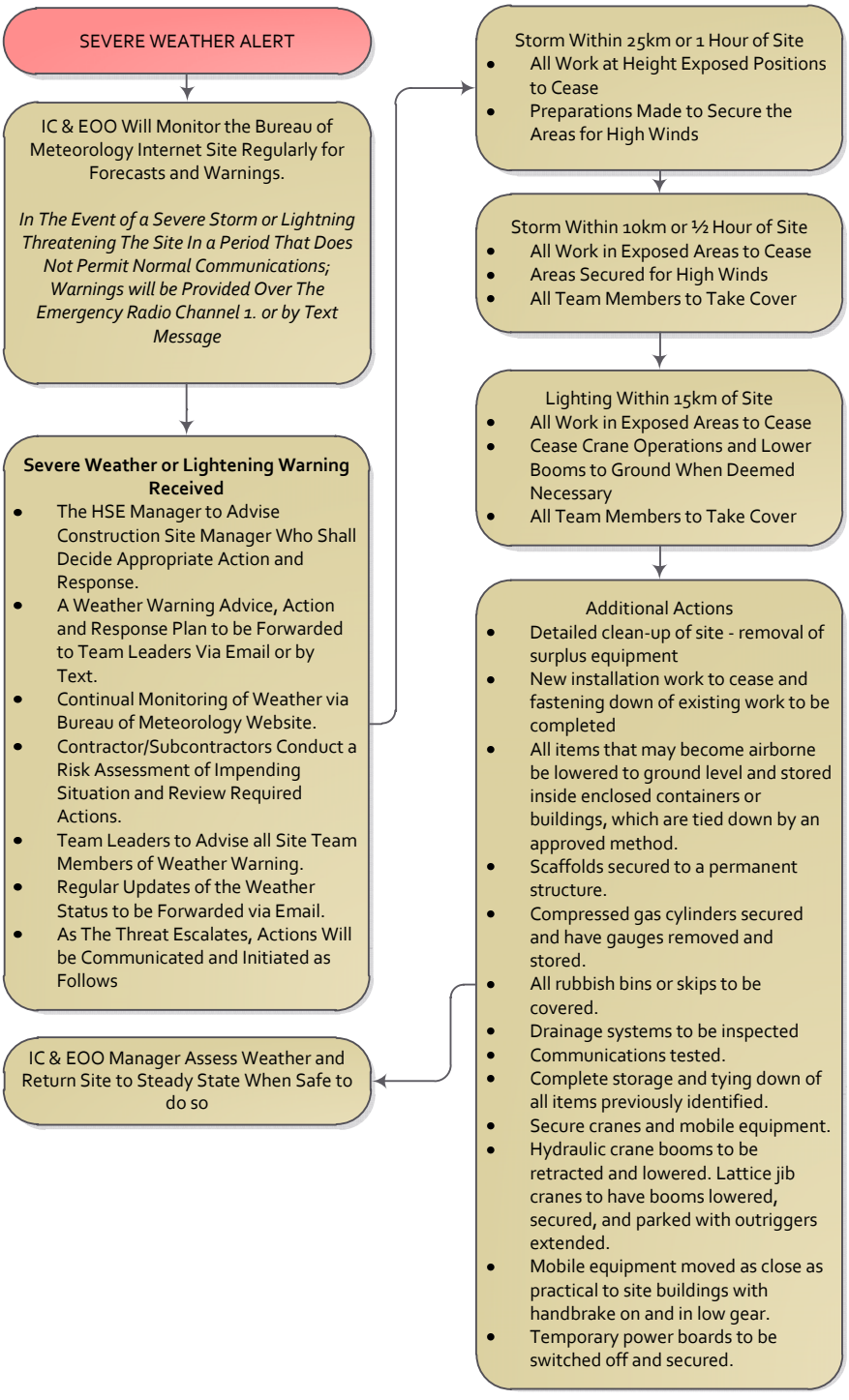
Attachment 7.0 – Criminal Act



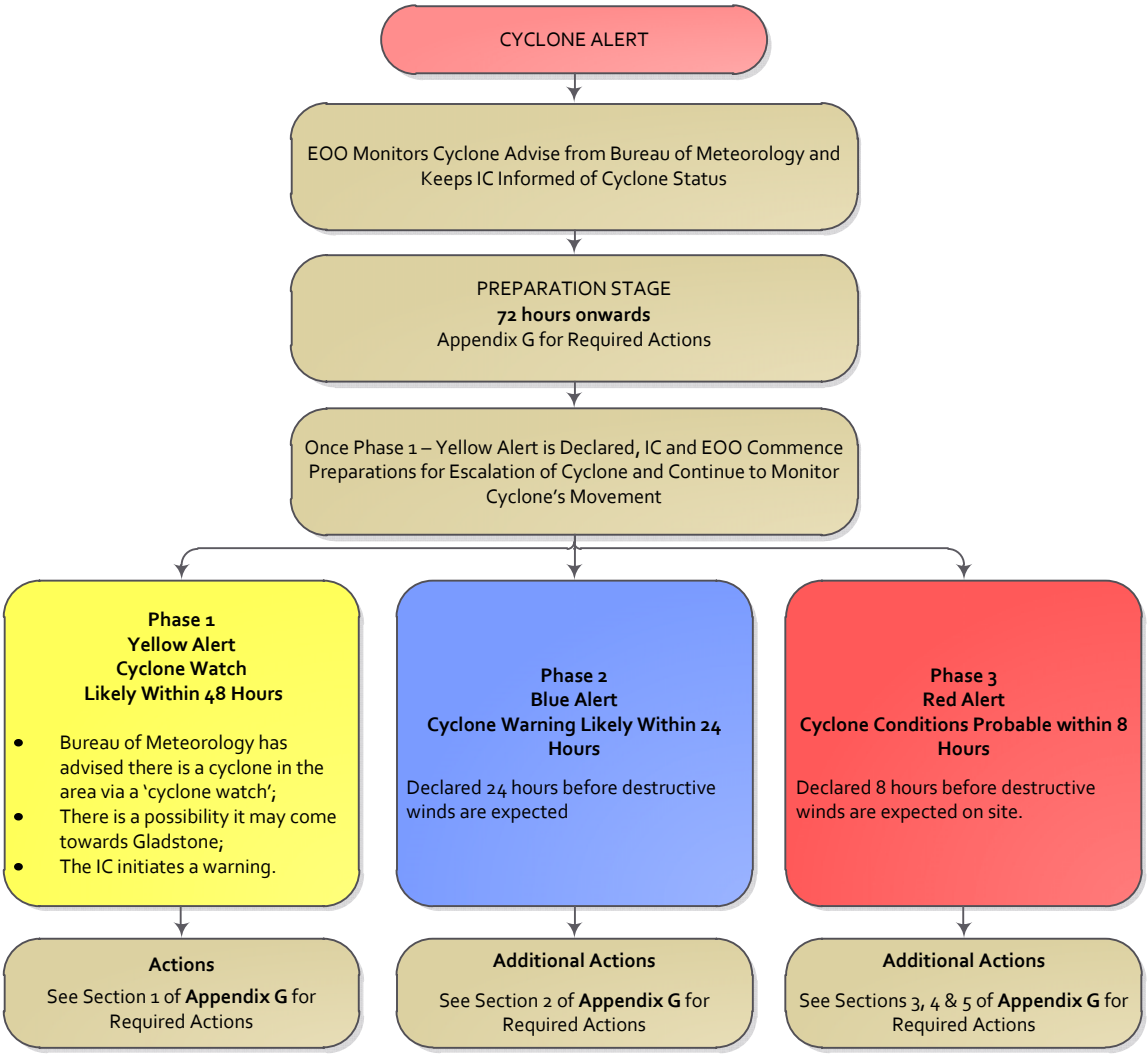
Attachment 8.0 – Vehicle Accident



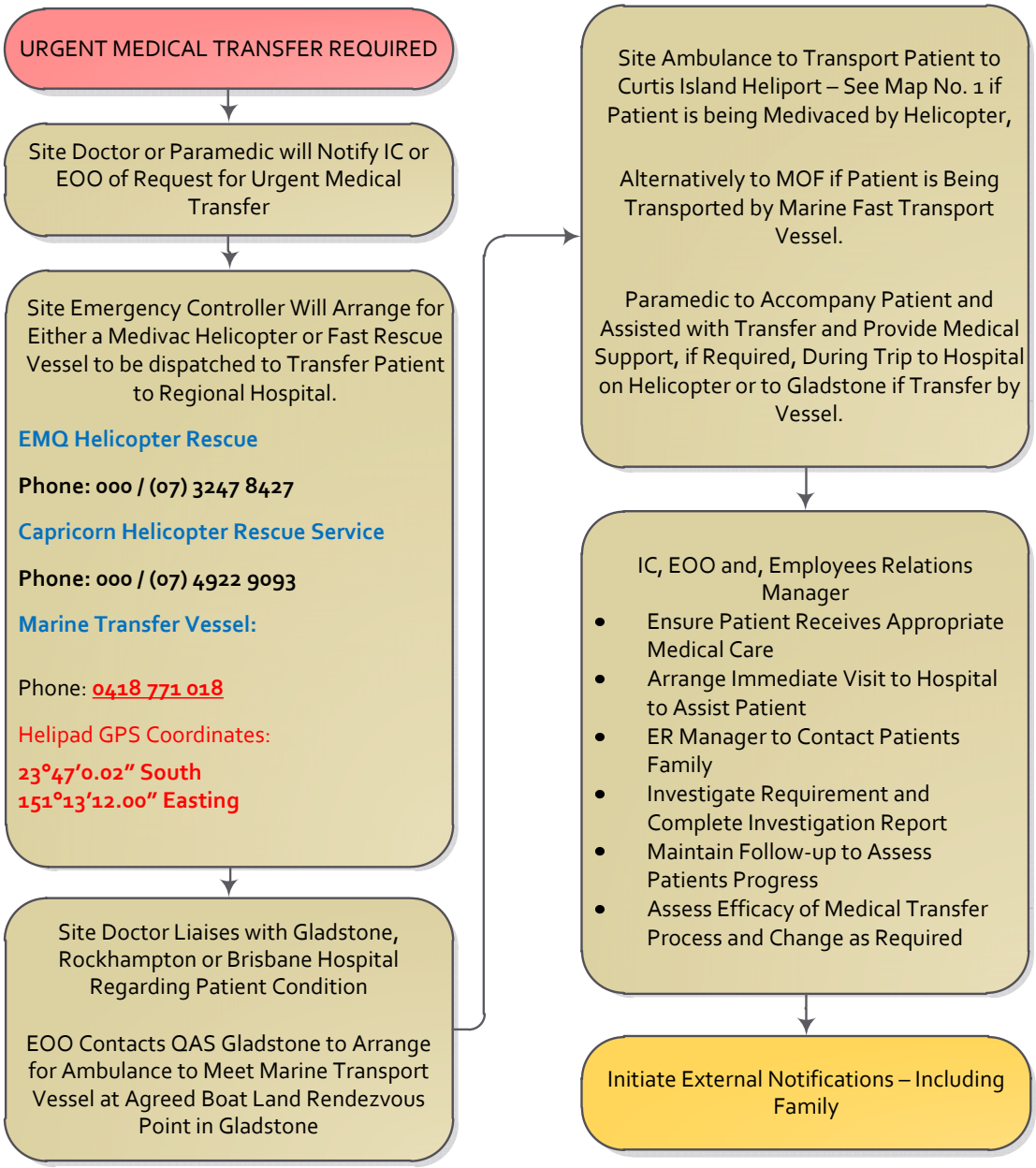
Attachment 9.0 – Severe Weather



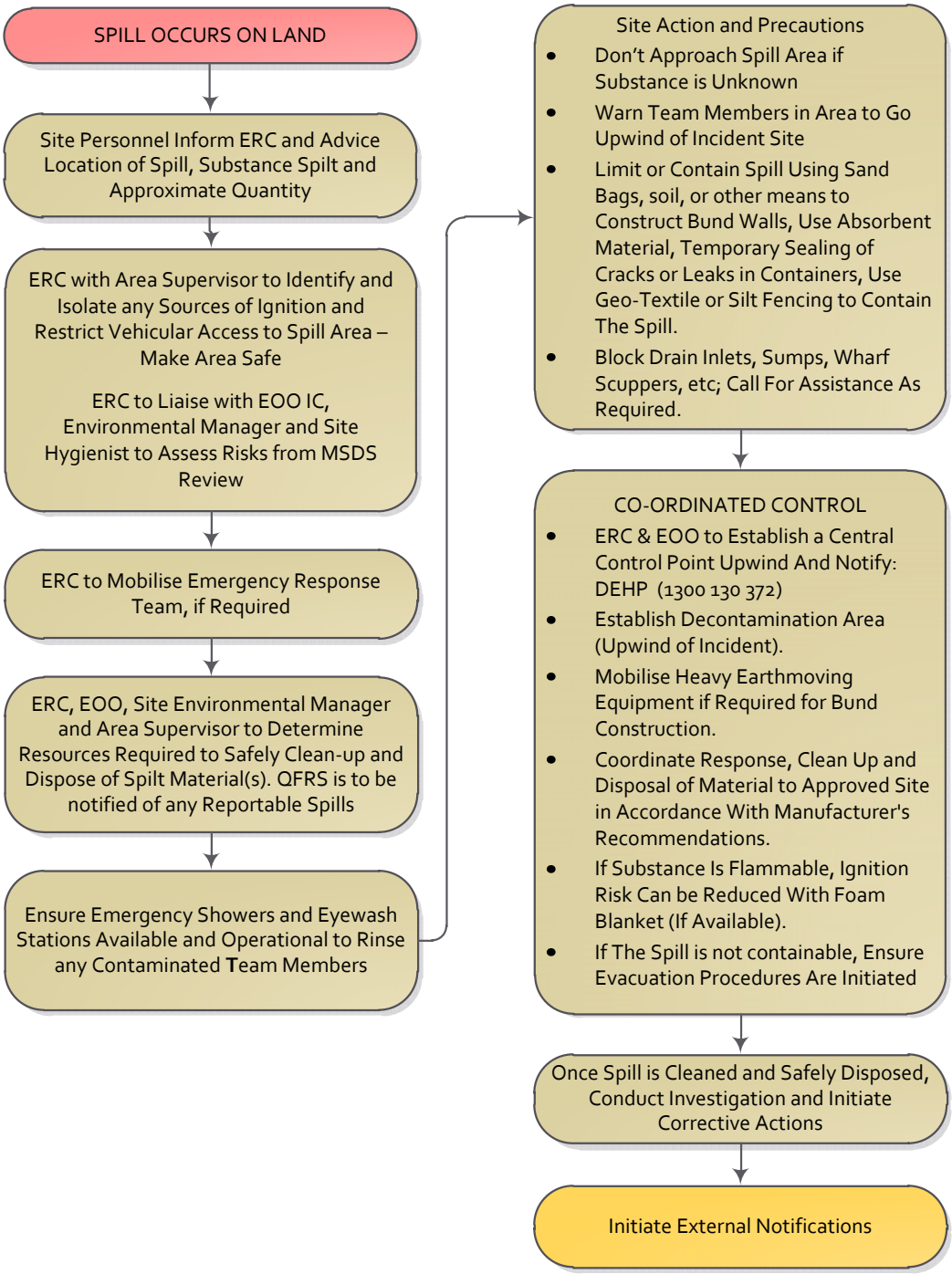
Attachment 10.0 – Cyclone Alert



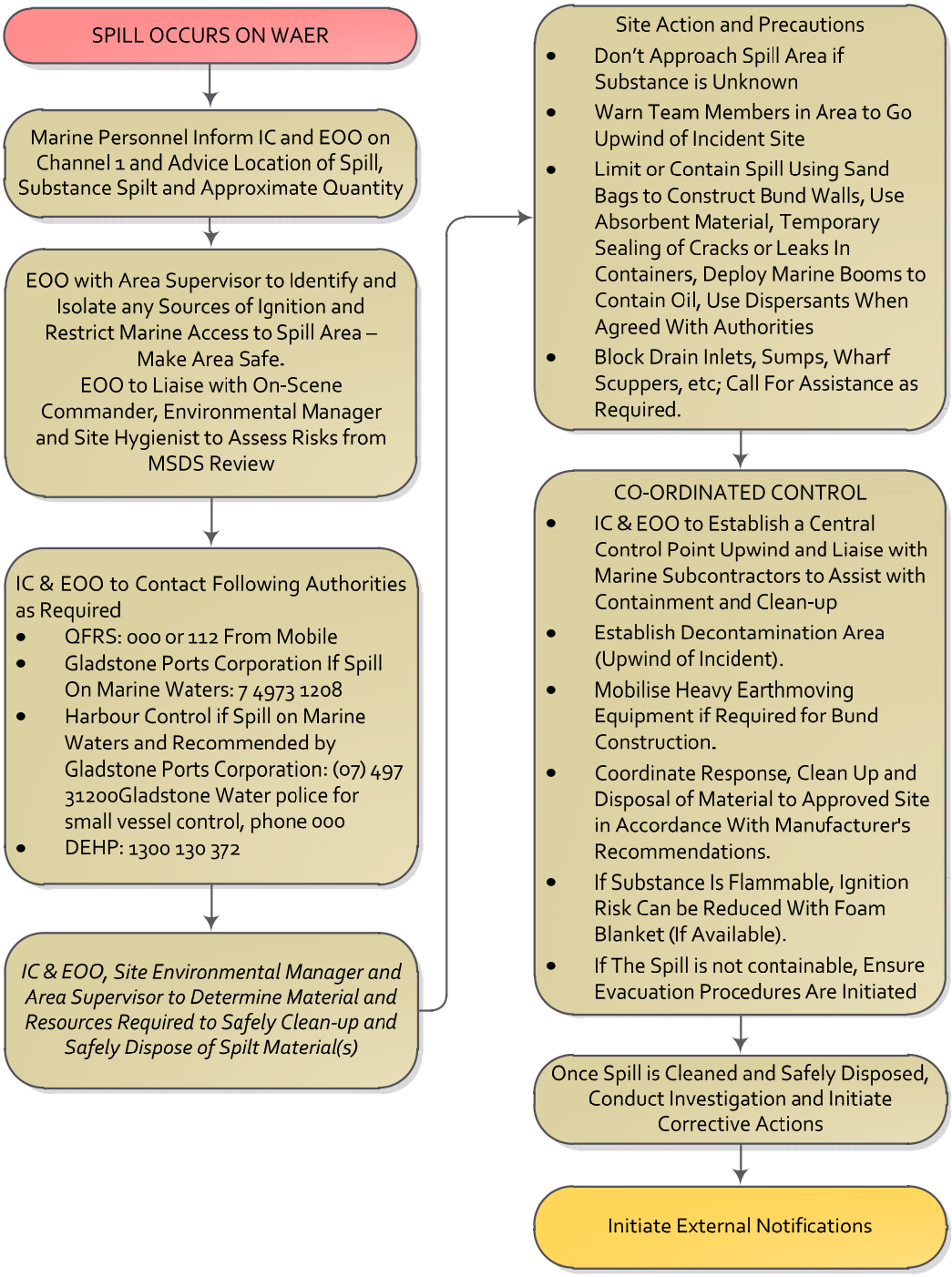
Attachment 11.0 – Urgent Medical Transfer



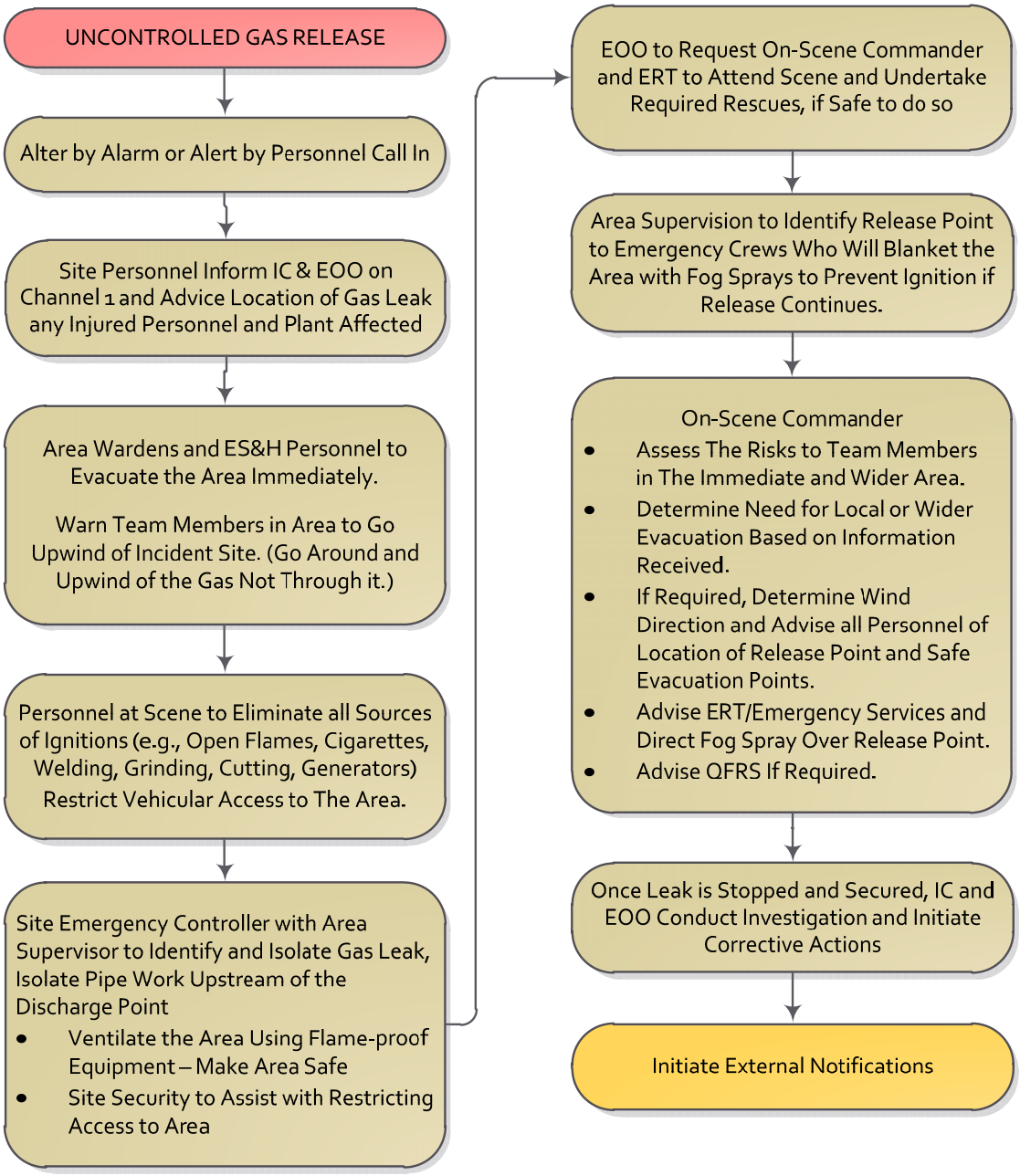
Attachment 12.0 – Major Spill of Hazardous Substance – On Land



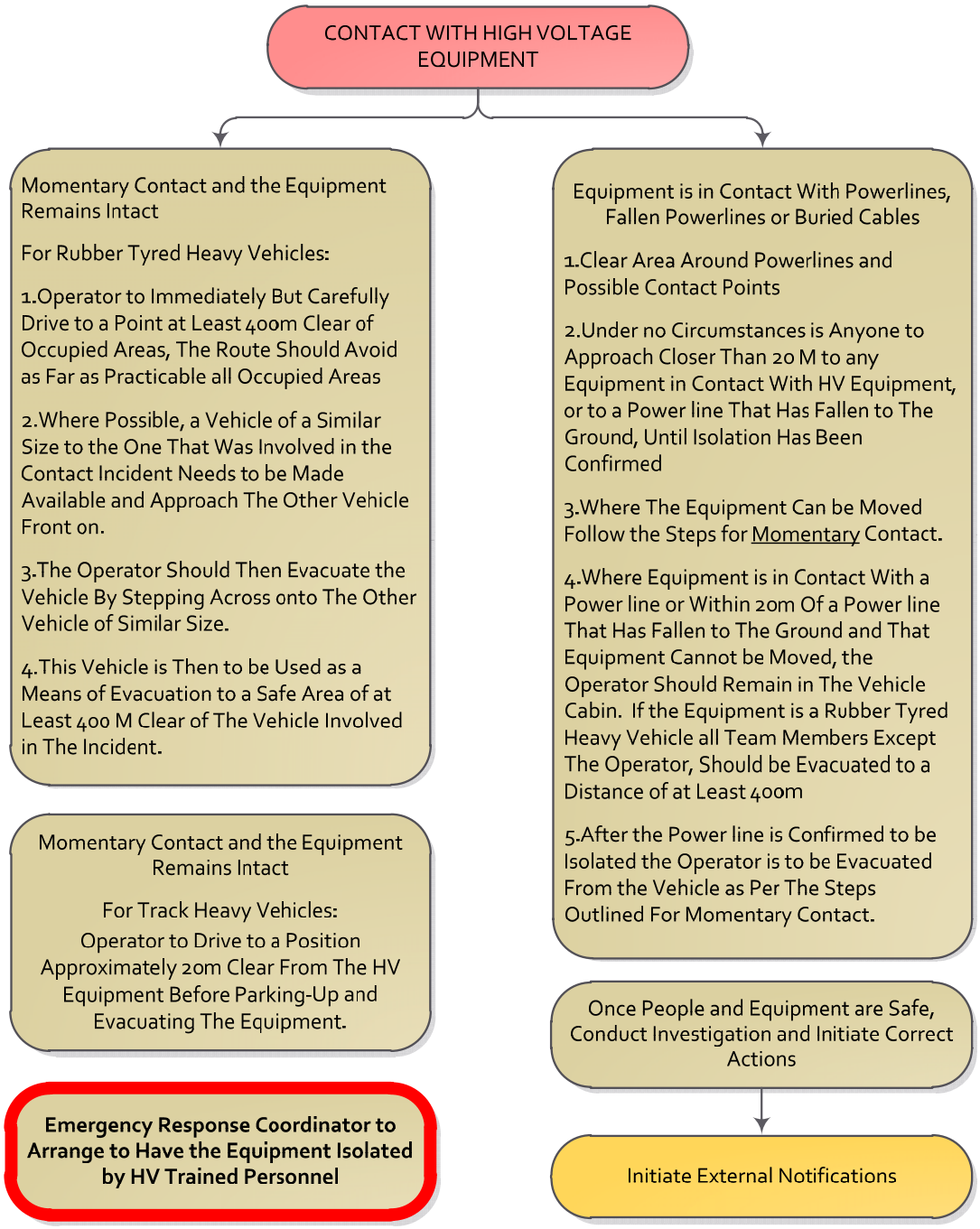
Attachment 13.0 – Major Spill of Hazardous Substance – On Water



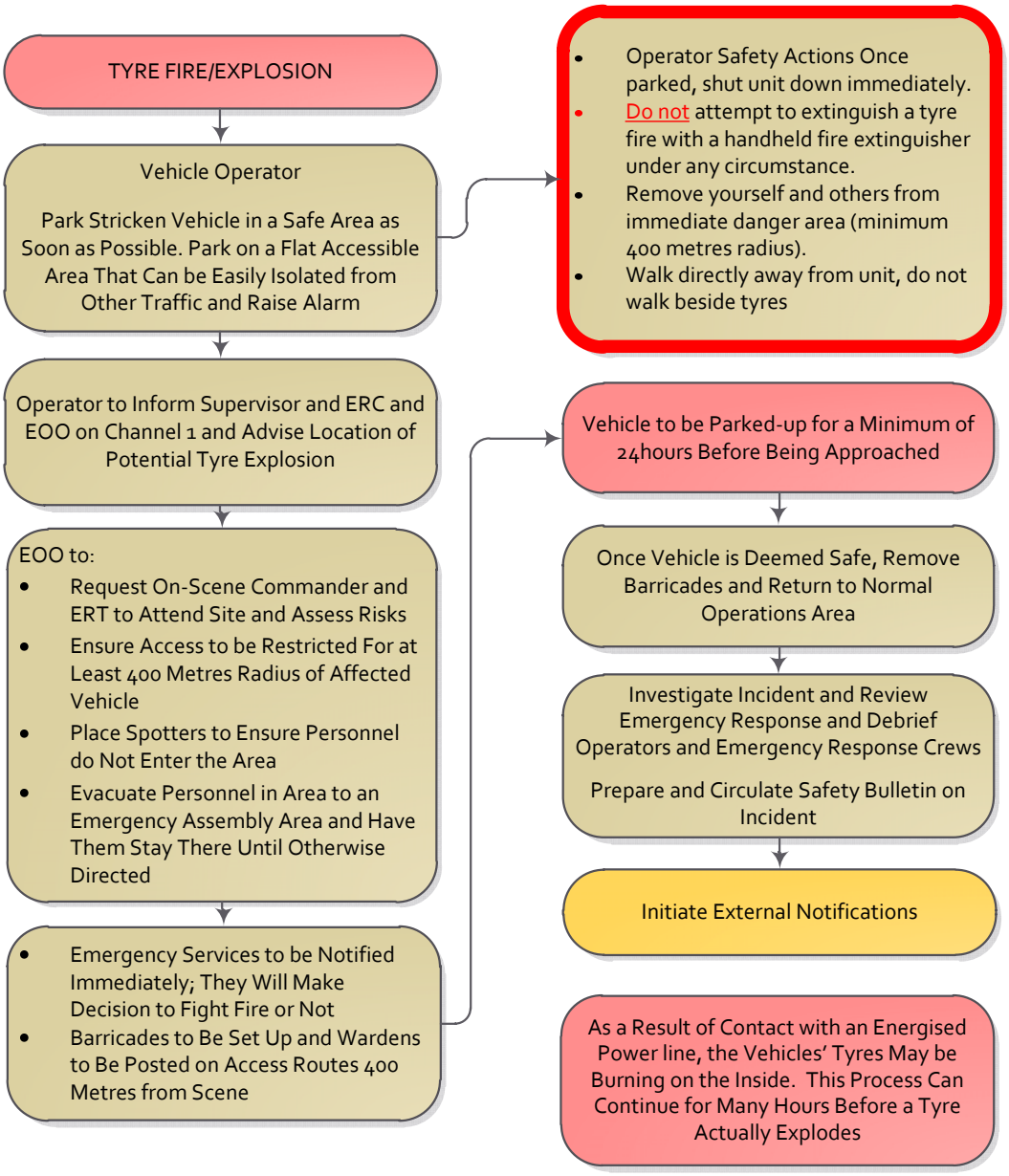
Attachment 14.0 – Uncontrolled Gas Release



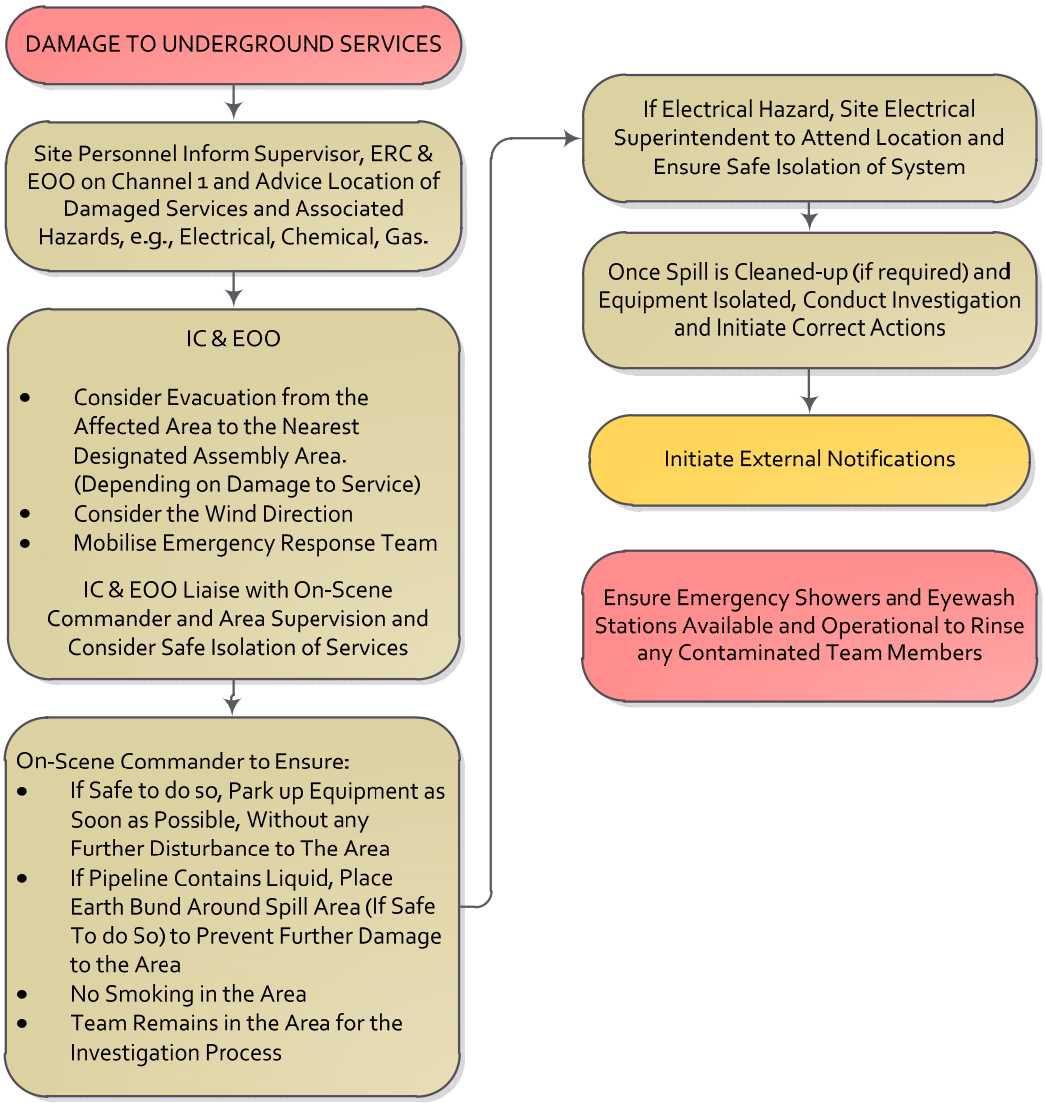
Attachment 15.0 – Equipment Contact with High Voltage Equipment or Power Lines



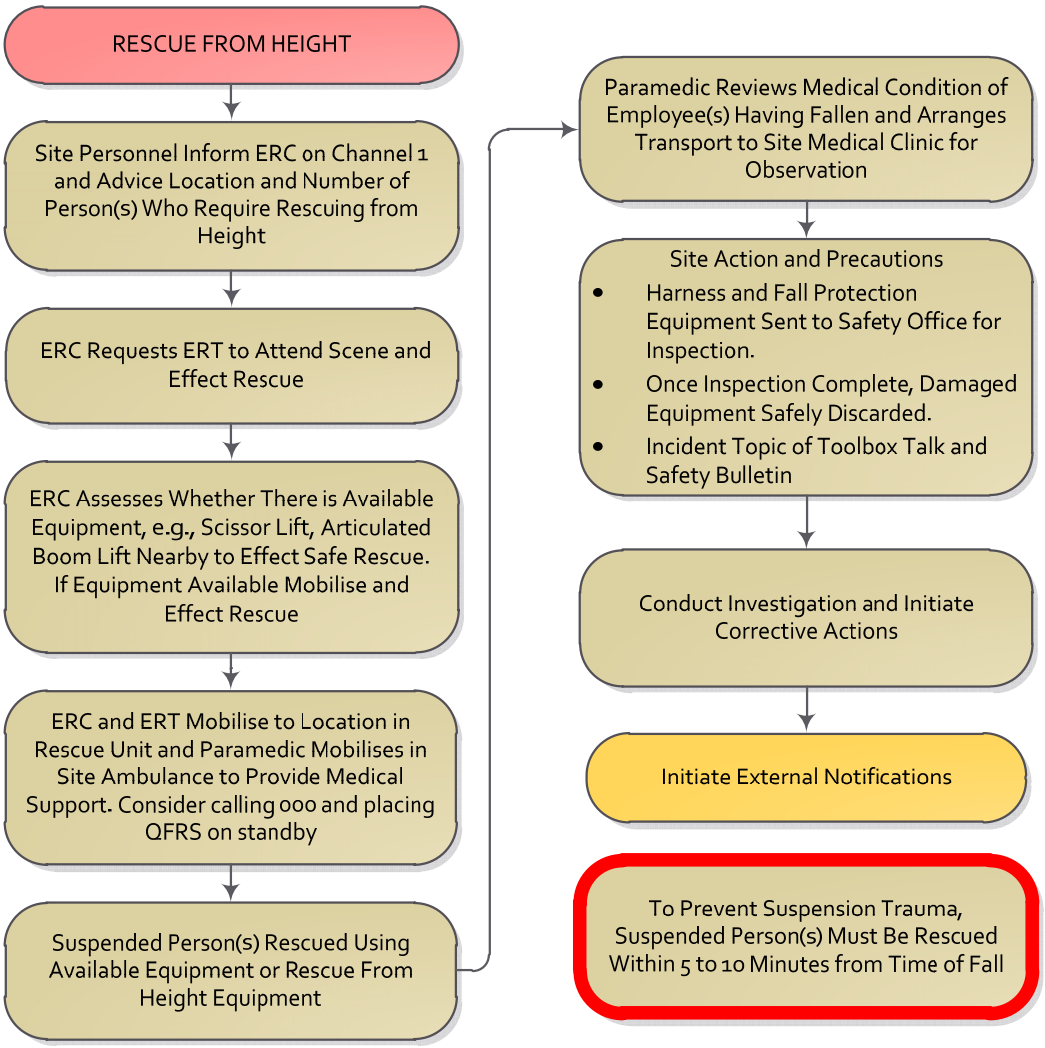
Attachment 16.0 – Tyre Fire/Explosion



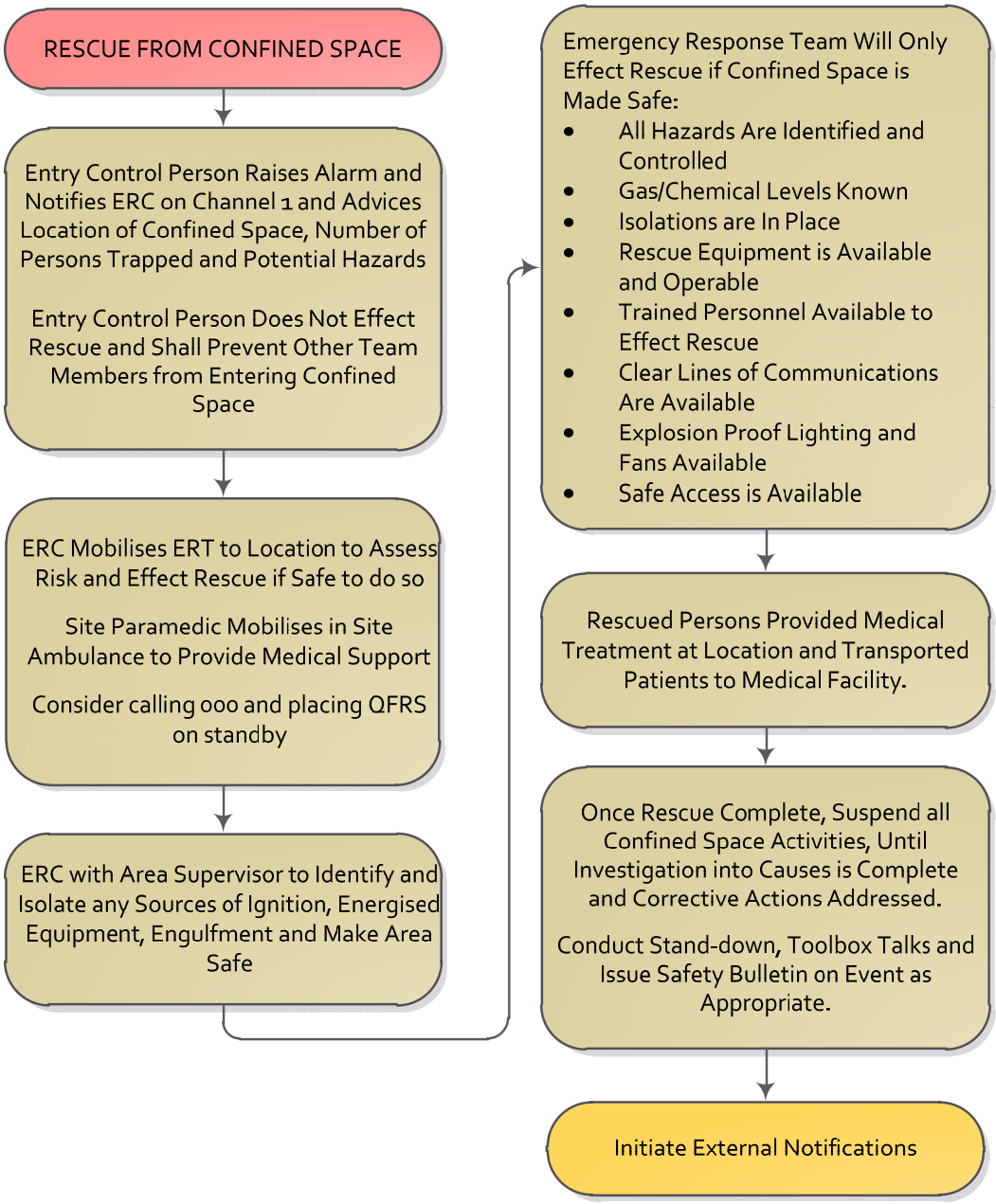
Attachment 17.0 – Damage to Underground Services



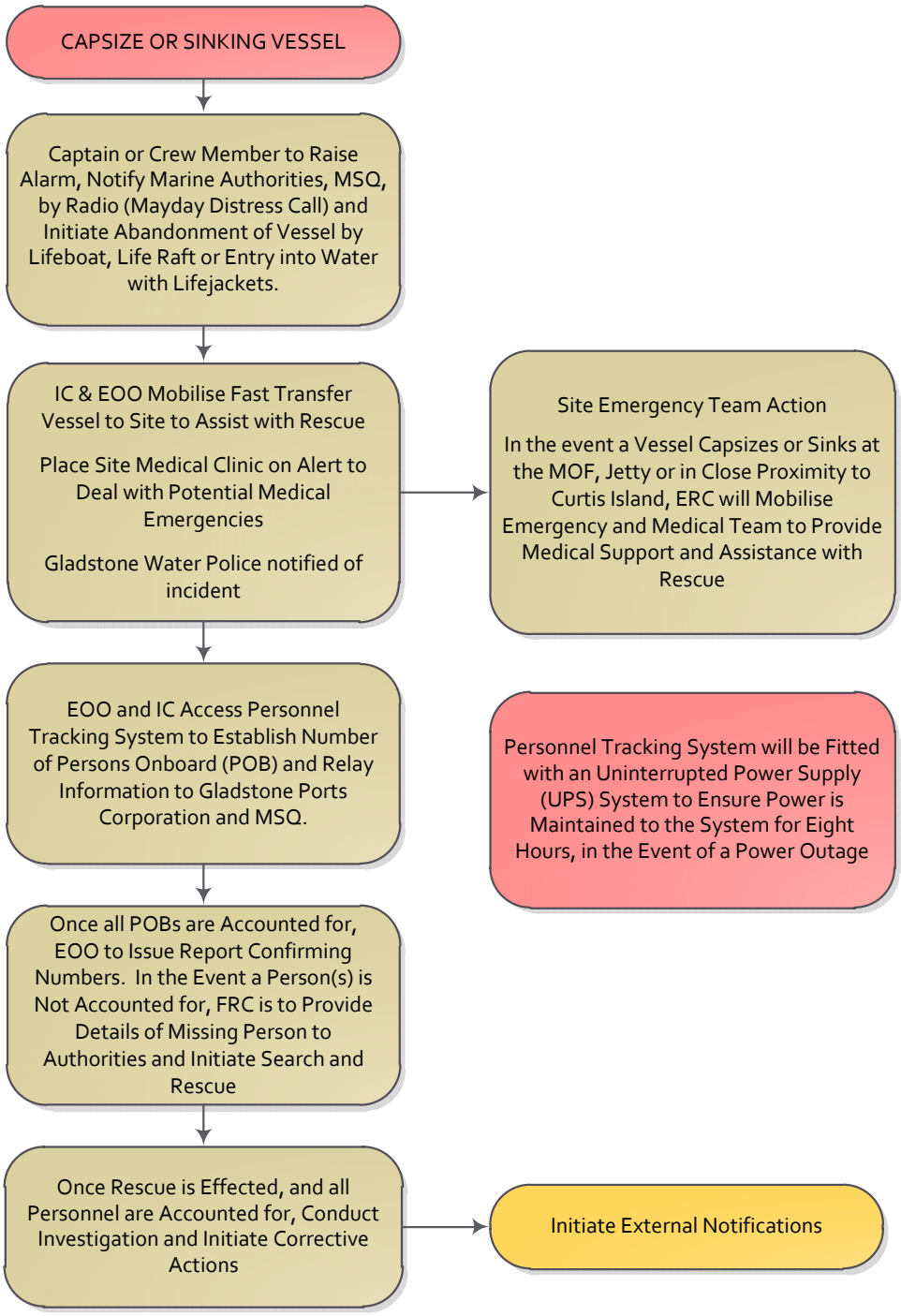
Attachment 18.0 – Rescue from Height



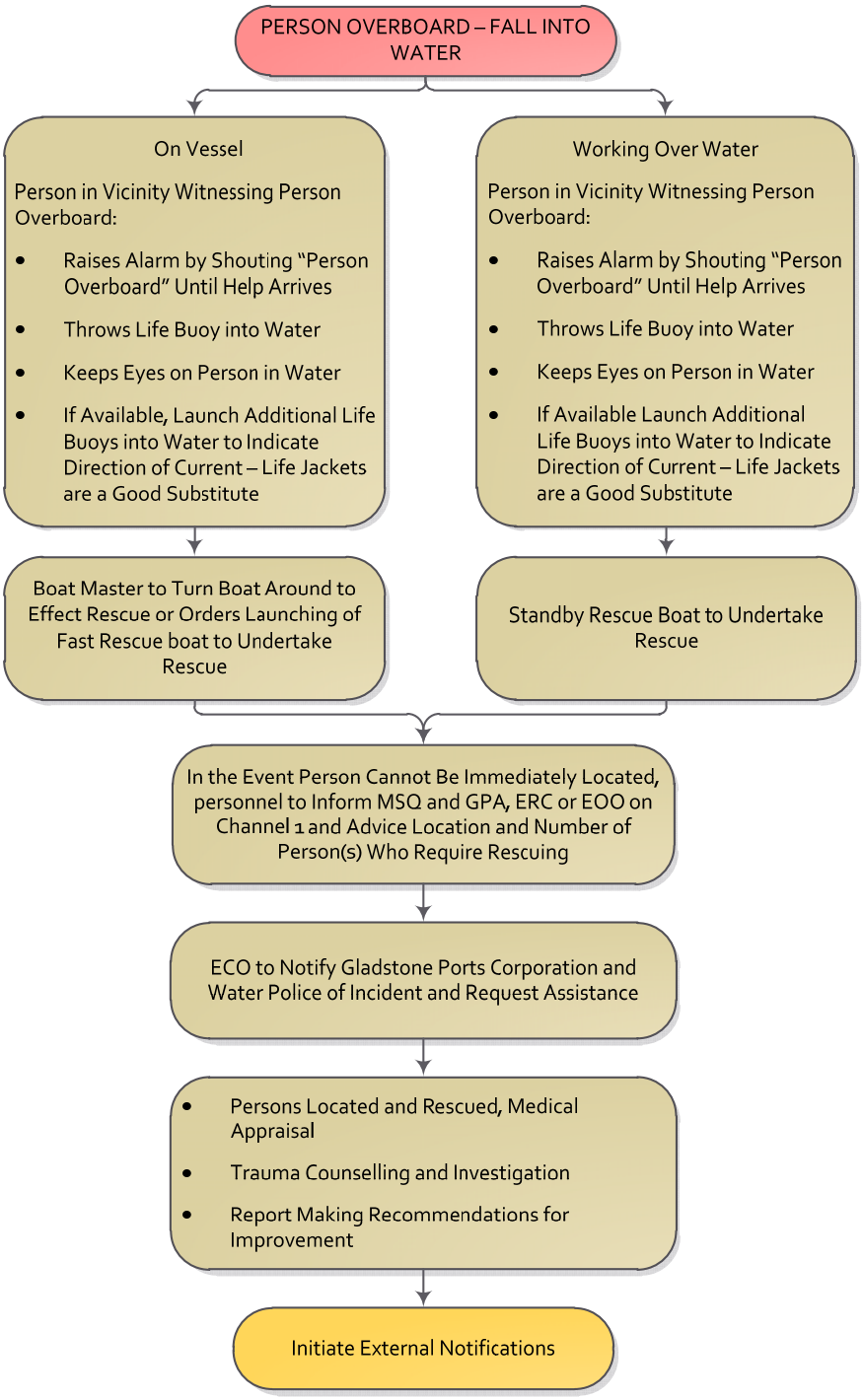
Attachment 19.0 – Rescue from Confined Space



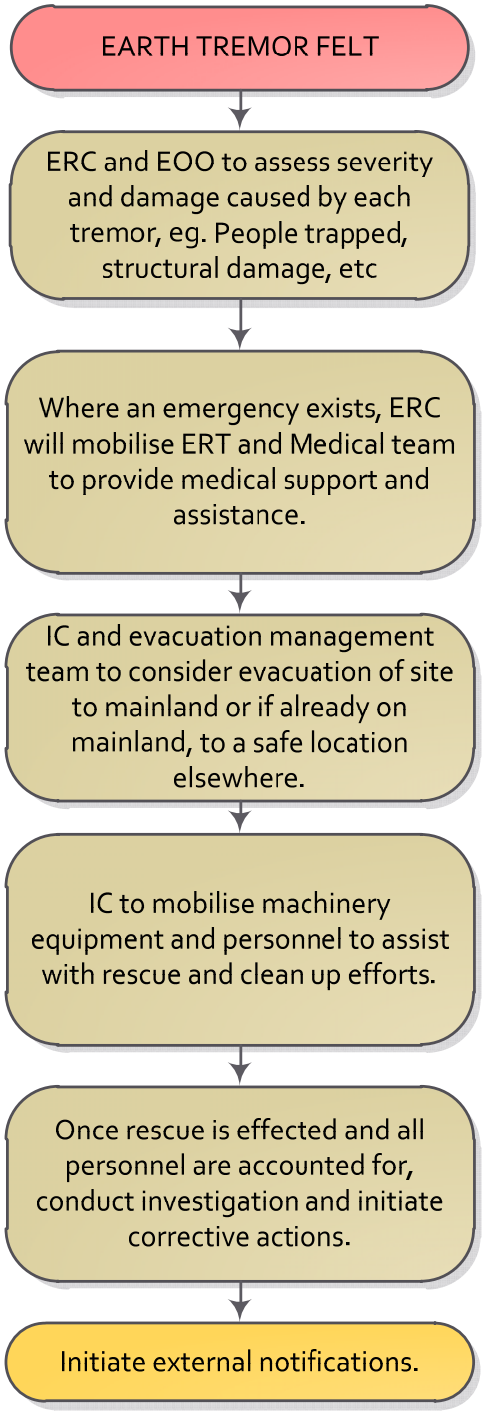
Attachment 20.0 – Capsize or Sinking Vessel



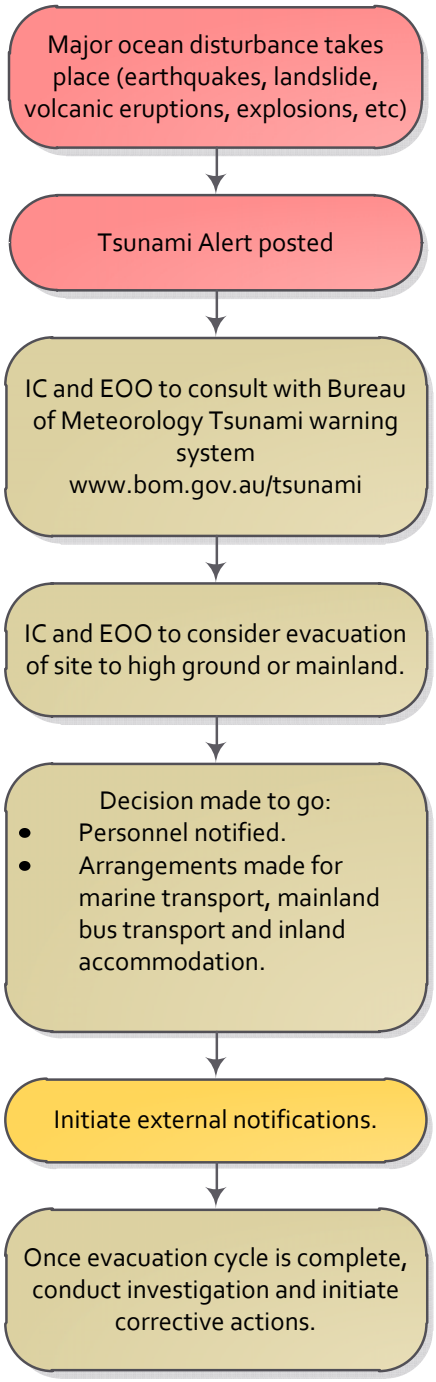
Attachment 21.0 – Person Overboard



Attachment 22.0 – Earthquake Emergency



Attachment 23.0 – Tsunami Emergency

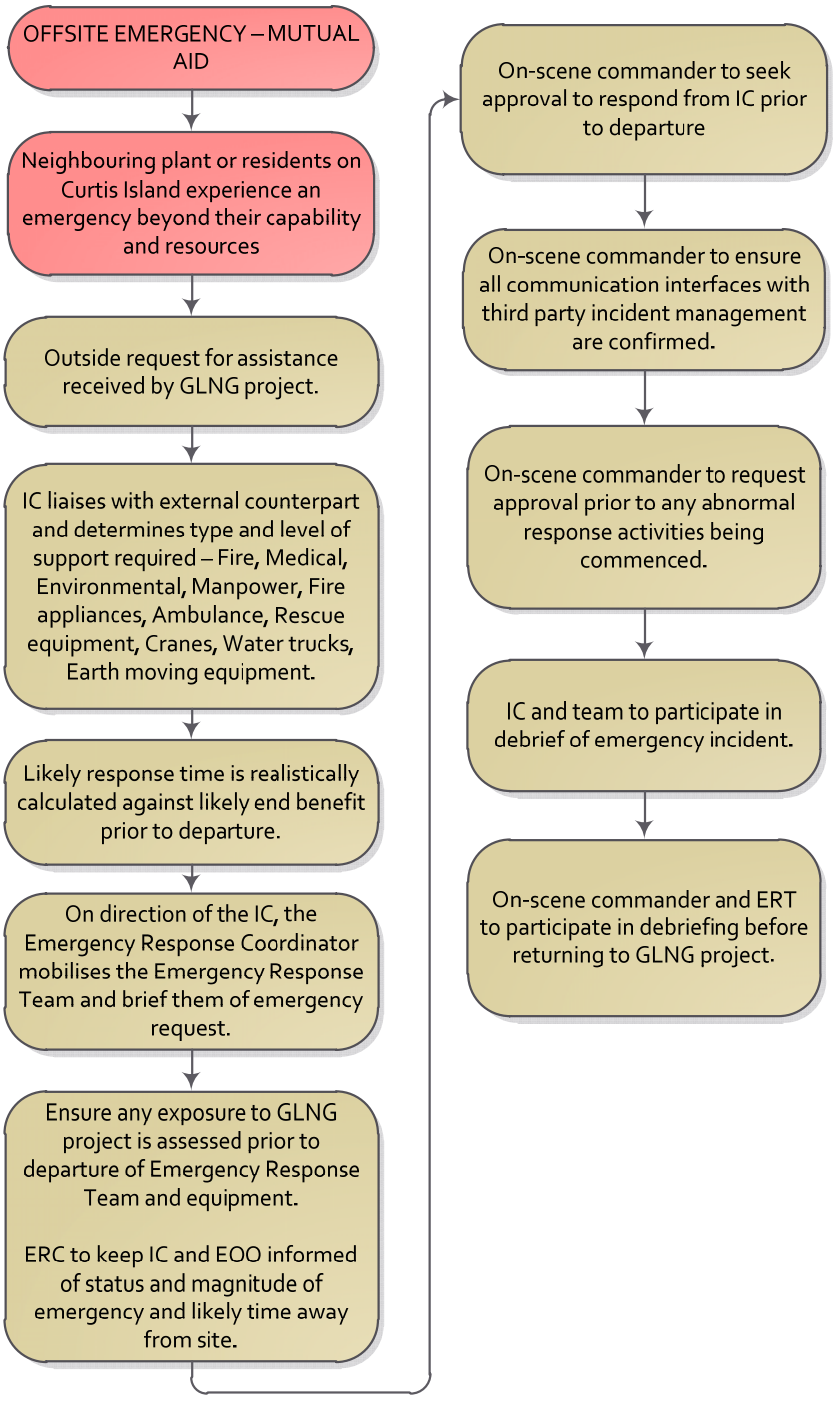


Evacuation decision considerations – Evacuation Management Team

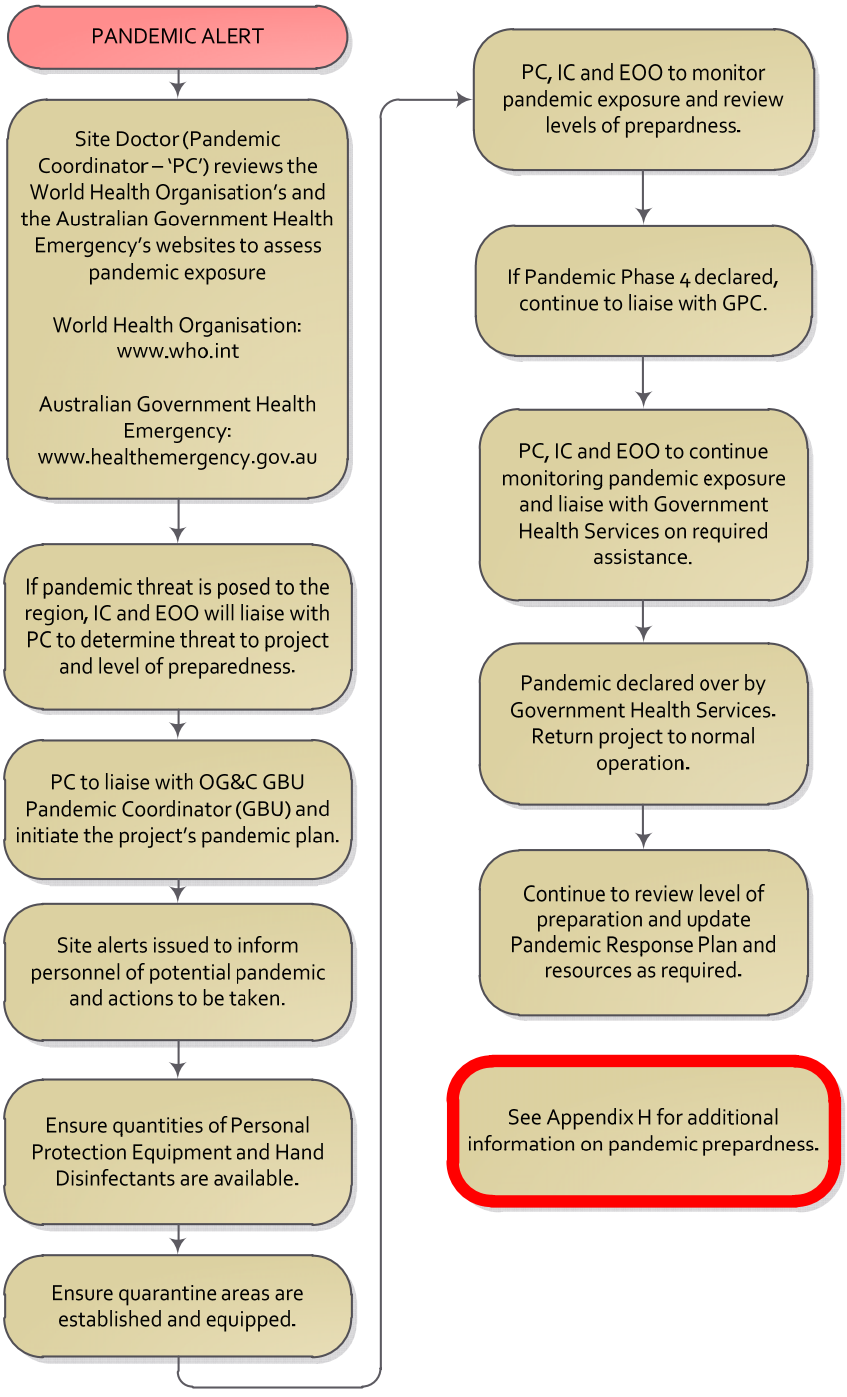
- Is there time to effect evacuation? – Tsunamis can occur close to area there might not be sufficient to arrange and execute sage evacuation.
- Consider implications of staying or going.
- Determine probable path and timeline of tsunami.
- Determine alternative safe areas on Curtis Island and mainland.
- Consider type and availability of transportation vehicles.
- Method of conveying alarm without causing panic. If time permits, call toolbox talks and consider radio use.
- Employ personnel tracking system to account for all persons evacuating.
- Consider return to site issues in the event tsunami strikes site:
  - Flooding of site and excavations.
  - Damage to scaffolds, equipment, etc.
  - Structural damage to camp and offices.
  - Impact on medical facilities.
  - Electrical hazards.
  - Drainage issues.
  - Wildlife hazards.

Consider all of the above issues before occupying site.

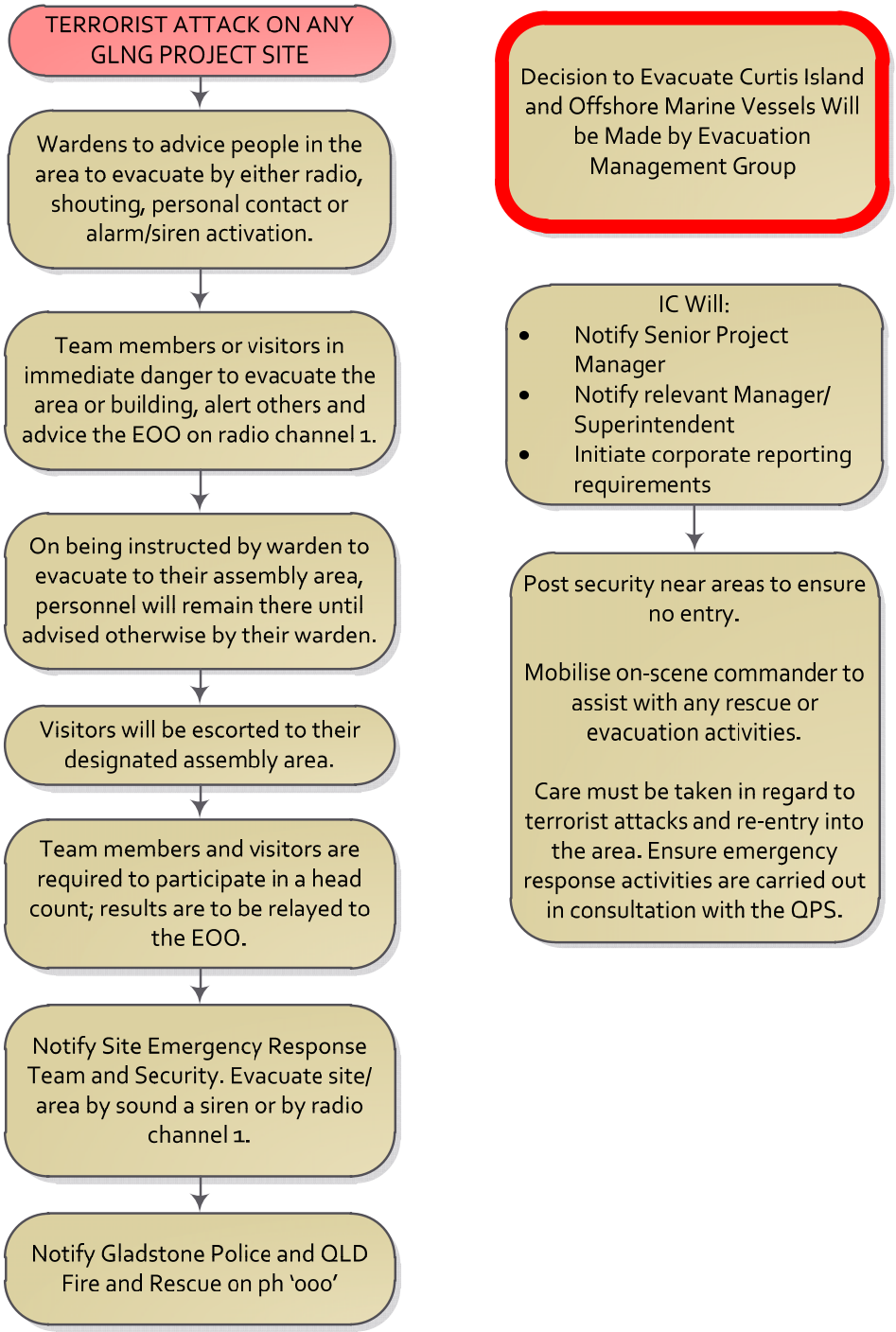
Attachment 24.0 – Offsite Emergency – Mutual Aid



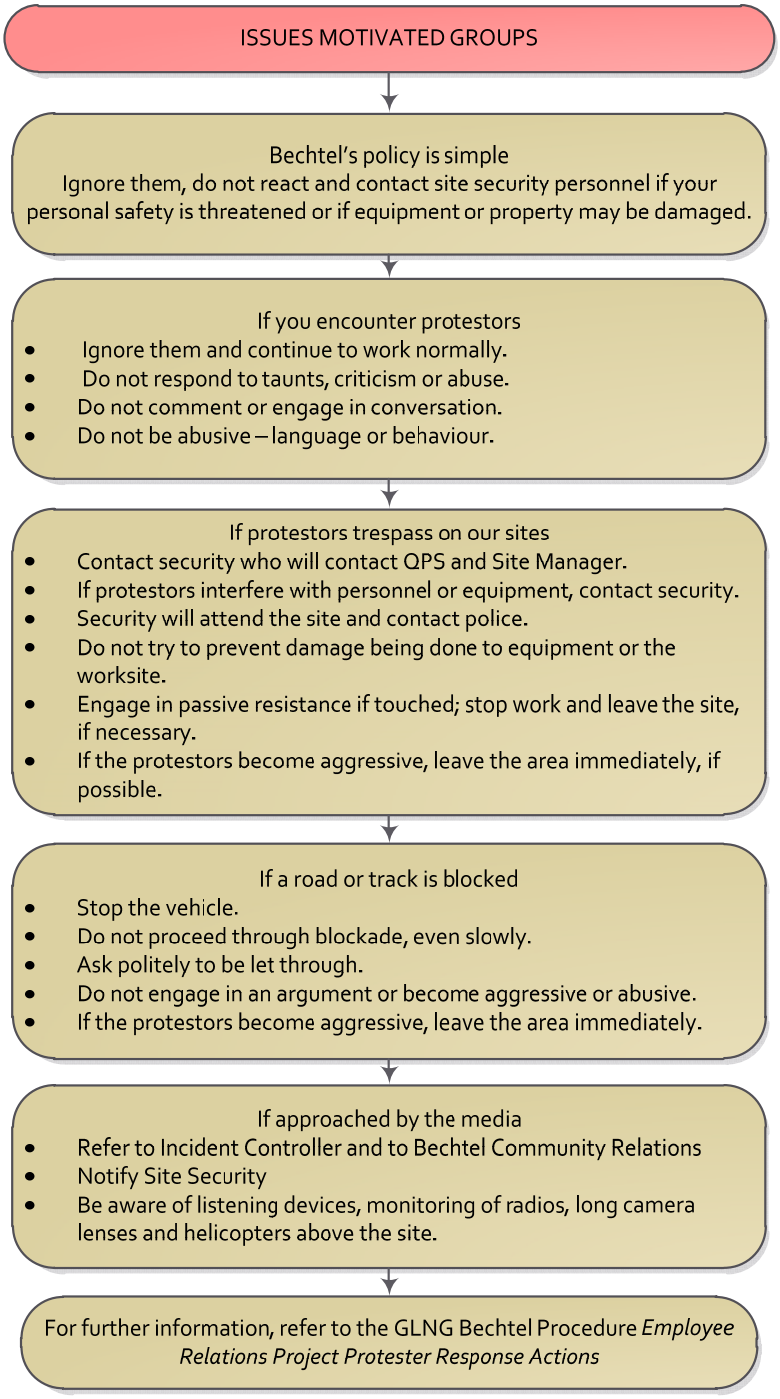
Attachment 25.0 – Pandemic Preparedness



Attachment 26.0 – Terrorist Attack



Attachment 27.0 – Issue Motivated Groups



Aide Memoir - Non-ignited release of feed gas
Process operators
Process operators when dealing with a non-ignited release of feed gas should consider the following: • Raise the alarm when the gas release is detected. • Stop all maintenance work in and around the affected area. • Notify the Central Control Room and the Emergency Response Team. • Initiate emergency process procedures if not automatically initiated for the shutdown, isolation and de-pressuring of the affected area. • Activation of fixed firewater systems and suppression systems, such as monitors and deluge systems (where not automatically activated). • Follow emergency process procedures to control the incident.
On-Scene Commander
The On-Scene Commander in dealing with a non-ignited release of feed gas should consider the following: • Check the wind direction and approach the incident from uphill and upwind. Extreme care must be taken not to drive any emergency vehicles into the vapour cloud as the extent of the vapour cloud will not be visible. • All ignition sources must be eliminated. Ensure equipment used including radios, are intrinsically safe. • Ensure all non-essential personnel are evacuated from the area. • Fixed fire installations should activated if not already operational and are required. • Gas monitoring can be used to identify extent of the release. • Water sprays can be used to assist in the dispersal of gas clouds. Water curtains can dilute and divert gas clouds. • Ventilate adjacent closed confined spaces when entering. • Do not direct water directly at source of leak or safety devices including pressure relief vents. • Determine resources required and make appropriate requests for resources to the Incident Controller. • Determine neighbouring area likely to be affected and the possible extent. Advise of evacuation. • At conclusion of incident secure the scene.
Incident Controller
The Incident Controller in dealing with a non-ignited release of feed gas should consider the following: • Proceed to the Emergency Control centre and establish communication with the On-Scene Commander. • Contact security. • Overall coordination of site activities • Establishing response priorities • Consider and coordinate of site evacuation if required. • Notification and liaison with external emergency services.

Aide Memoir - Non-ignited release of LNG

Process operators

Process operators when dealing with a non-ignited release of LNG should consider the following:

- Raise the alarm when the LNG vapour is detected.
- Stop all work in and around the affected area.
- Notify the Central Control Room and the Emergency Response Team.
- Initiate emergency process procedures if not automatically initiated for the shutdown, isolation and de-pressuring of the affected area.
- Activation of fixed firewater systems and suppression systems, such as monitors and deluge systems (where not automatically activated).
- Follow emergency process procedures to control the incident.

On-Scene Commander

The On-Scene Commander in dealing with a non-ignited release of LNG should consider the following:

- Check the wind direction and approach the incident from uphill and upwind. Extreme care must be taken not to drive any emergency vehicles into the vapour cloud as the true extent of the vapour cloud will not be visible.
- Ensure all non-essential personnel are evacuated from the area.
- All equipment used including radios should be intrinsically safe.
- The On-Scene Commander should initially ensure that all on scene process safety and response measures have been activated. This includes fire water systems and/or fixed suppression systems.
- Avoid water in the liquid pool as this will increase the rate of vapourisation and increase the vapour cloud size.
- Check for gas drift to semi or fully confined areas where an explosion may be possible. Ventilate adjacent closed confined spaces when entering.
- The use of high expansion foam should be considered for suppressing the vapour cloud.
- Water curtains can dilute and divert gas.
- Water monitors may offer limited dilution.
- Emergency response team members should wear full level 2 turnout clothing and consideration should be given to wearing SCBA in case of flash fire.
- Emergency response crews must not come in contact with the liquid pool or any flowing liquid.
- The vapours will extend well beyond the visible vapour cloud and ignition of the cloud may occur some distance from the visible cloud.
- Emergency crews need to be aware that any surfaces that have been exposed the LNG will be extremely cold and any contact with exposed skin may lead to serious injury.
- Do not direct water directly at source of leak or safety devices including pressure relief vents.
- Determine resources required and make appropriate requests for resources to the Incident Controller.
- Determine neighbouring area likely to be affected and the possible extent. Advise of evacuation.
- At conclusion of incident secure the scene.

Incident Controller

The Incident Controller in dealing with a non-ignited release of LNG should consider the following:

- Proceed to the Emergency Control Centre and establish communication with the On-Scene Commander.
- Contact security.
- Overall coordination of site activities
- Establishing response priorities
- Consider and coordinate site evacuation if required.
- Notification and liaison with external emergency services.

Aide Memoir - Ignited release of feed gas

Process operators

Process operators when dealing with an ignited release of feed gas should consider the following:

- Raise the alarm when the fire is detected.
- Stop all maintenance work in the affected area
- Notify the Central Control Room and Emergency Response Team.
- Initiate emergency process procedures if not automatically initiated for the shutdown, isolation and de-pressuring of the affected area.
- Activation of fixed firewater systems and suppression systems, such as monitors and deluge systems (where not automatically activated).
- Follow emergency process procedures to control the incident. See Attachment 4.0 and 16.0.

On-Scene Commander

The On-Scene Commander when dealing with an ignited release feed gas should consider the following:

- Check the wind direction and approach the incident from uphill and upwind. Extreme care must be taken not to drive any emergency vehicles into the vapour cloud as the true extent of the vapour cloud will not be visible.
- Ensure all non-essential personnel are evacuated from the area.
- The On-Scene Commander should initially ensure that all on scene process safety and response measures have been activated. This includes fire water systems and/or fixed suppression systems.
- All equipment used including radios should be intrinsically safe.
- Cooling of exposures should be the highest priority. This includes any vessel of structural steel with flame or heat impingement.
- Care should be taken not to extinguish the gas fire until it is ascertained that the fuel source can be isolated.
- Consider the use of monitors to reduce personnel in the hazardous area.
- Consider water run-off and smoke for impact on surrounding areas and environment.
- Do not direct water directly at source of leak or safety devices including pressure relief vents.
- Determine resources required and make appropriate requests for resources to the Incident Controller.
- Determine neighbouring area likely to be affected and the possible extent. Advise of evacuation.
- At conclusion of incident secure the scene.

Incident Controller

The Incident Controller in dealing with an ignited release of feed gas should consider the following:

- Proceed to the Emergency Control centre and establish communication with the On-Scene Commander.
- Contact security.
- Overall coordination of site activities
- Establishing response priorities
- Consider and coordinate site evacuation if required.
- Notification and liaison with external emergency services.

Aide Memoir - Ignited release of LNG

Process operators

Process operators when dealing with an ignited release of LNG should consider the following:

- Raise the alarm when the fire is detected.
- Stop all maintenance work in the affected area.
- Notify the Central Control Room and the Emergency Response Team.
- Initiate emergency process procedures if not automatically initiated for the shutdown, isolation and de-pressuring of the affected area.
- Activation of fixed firewater systems and suppression systems, such as monitors and deluge systems (where not automatically activated).
- Follow any other emergency process procedures to control the incident. See Attachment 4.0 and 16.0.

On-Scene Commander

The On-Scene Commander when dealing with an ignited release of LNG should consider the following:

- Check the wind direction and approach the incident from uphill and upwind. Extreme care must be taken not to drive any emergency vehicles into the vapour cloud as the true extent of the vapour cloud will not be visible.
- Ensure all non-essential personnel are evacuated from the area.
- The On-Scene Commander should initially ensure that all on scene process safety and response measures have been activated. This includes fire water systems and/or fixed suppression systems.
- All equipment used including radios should be intrinsically safe.
- Any heat or flame affected steel work should be cooled. This can be done with the use of fixed or oscillating monitors, and hand lines from the hydrant system.
- Avoid water getting into the burning pool as this will increase the vaporisation rate of the LNG and cause and increase in fire size and radiant heat.
- Application of high expansion foam should be considered as this will reduce vapour spread, thus reducing the size of the fire and the radiant heat.
- Extinguishment of the fire can be done using dry chemical powder. This will extinguish the fire but the vapour cloud will remain and will need to be managed.
- A method of extinguishment is the use initially of high expansion foam to reduce the fire size and radiant heat. This allows emergency crews closer access to the fire for the application of dry chemical powder for extinguishment. High expansion foam can then be reapplied to control the vapours of the remaining LNG.
- Emergency response teams must wear full level 2 turnout clothing.
- Emergency crews must not come in contact with liquid pool or any flowing liquid.
- Ventilate adjacent closed confined spaces when entering.
- Determine resources required and make appropriate requests for resources to the Incident Controller.
- Determine neighbouring area likely to be affected and the possible extent. Advise of evacuation.
- At conclusion of incident secure the scene.

Incident Controller

The Incident Controller in dealing with an ignited release of LNG should consider the following:

- Proceed to the Emergency Control centre and establish communication with the On-Scene Commander.
- Contact security.
- Overall coordination of site activities
- Establishing response priorities
- Consider and coordinate site evacuation if required.
- Notification and liaison with external emergency services.

Aide Memoir - Toxic gas release
Process operators
Process operators when dealing with a release of toxic gas should consider the following: • Raise the alarm when the gas release is detected. • Stop all maintenance work in the affected area. • Notify the Central Control Room and the Emergency Response Team. • Initiate emergency process procedures if not automatically initiated for the shutdown, isolation and de-pressuring of the affected area. • Activation of fixed firewater systems and suppression systems, such as monitors and deluge systems (where not automatically activated). • Follow emergency process procedures to control the incident. See Attachment 14.0.
On-Scene Commander
The On-Scene Commander when dealing with a release of toxic gas should consider the following: • Check the wind direction and approach the incident from uphill and upwind. Extreme care must be taken not to drive any emergency vehicles into the vapour cloud as the true extent of the vapour cloud will not be visible. • Ensure all non-essential personnel are evacuated from the area. • The On-Scene Commander should initially ensure that all on scene process safety and response measures have been activated. This includes fire water systems and/or fixed suppression systems. • All equipment used including radios should be intrinsically safe. • Initial response PPE should consider the use of self-contained compressed air breathing apparatus. • Determine resources required and make appropriate requests for resources to the Incident Controller. • Determine neighbouring area likely to be affected and the possible extent. Advise of evacuation. • At conclusion of incident secure the scene.
Incident Controller
The Incident Controller in dealing with a toxic gas release should consider the following: • Proceed to the Emergency Control centre and establish communication with the On-Scene Commander. • Contact security. • Overall coordination of site activities • Establishing response priorities • Consider and coordinate site evacuation if required. • Notification and liaison with external emergency services.

Aide Memoir - Refrigerant Fire (Propane and Ethylene storage tanks)

Process operators

Process operators when dealing with an ignited release refrigerant gas should consider the following:

- Raise the alarm when the fire is detected.
- Stop all maintenance work in the affected area.
- Notify the Central Control Room and the Emergency Response Team.
- Initiate emergency process procedures if not automatically initiated for the shutdown, isolation and de-pressuring of the affected area.
- Activation of fixed firewater systems and suppression systems, such as monitors and deluge systems (where not automatically activated).
- Follow emergency process procedures to control the incident. See Attachment 4.0 and 16.0.

On-Scene Commander

The On-Scene Commander when dealing with an ignited release refrigerant gas should consider the following:

- Check the wind direction and approach the incident from uphill and upwind.
- Ensure all non-essential personnel are evacuated from the area.
- The On-Scene Commander should initially ensure that all on scene process safety and response measures have been activated. This includes fire water systems and/or fixed suppression systems.
- Monitor incident for potential tank failure.
- All equipment used including radios should be intrinsically safe.
- Cooling of exposures should be the highest priority. This includes any vessel of structural steel with flame or heat impingement.
- Care should be taken to not extinguish the gas fire until it is ascertained that the fuel source can be isolated.
- Consider the use of monitors to reduce personnel in the hazardous area.
- Consider water run-off and smoke for impact on surrounding areas and environment.
- Do not direct water directly at source of leak or safety devices including pressure relief vents.
- Determine resources required and make appropriate requests for resources to the Incident Controller.
- Determine neighbouring area likely to be affected and the possible extent. Advise of evacuation.
- At conclusion of incident secure the scene.

Incident Controller

The Incident Controller in dealing with an ignited release refrigerant gas should consider the following:

- Proceed to the Emergency Control centre and establish communication with the On-Scene Commander.
- Contact security.
- Overall coordination of site activities
- Establishing response priorities
- Consider and coordinate site evacuation if required.
- Notification and liaison with external emergency services.

Aide Memoir - Diesel/Hot oil fire

Process operators

Process operators when dealing with an ignited release diesel of hot oil should consider the following:

- Raise the alarm when the fire is detected.
- Stop all maintenance work in the affected area
- Notify the Central Control Room and the Emergency Response Team.
- Initiate emergency process procedures if not automatically initiated for the shutdown, isolation and de-pressuring of the affected area.
- Activation of fixed firefighting systems and suppression systems, such as monitors and deluge systems (where not automatically activated) to protect exposures. Water suppression on the fire itself must be avoided as this may spread the fire.
- Follow any other emergency process procedures to control the incident. See Attachment 4.0 and 16.0

On-Scene Commander

The On-Scene Commander when dealing with an ignited release diesel of hot oil should consider the following:

- Check the wind direction and approach the incident from uphill and upwind.
- Ensure all non-essential personnel are evacuated from the area.
- The On-Scene Commander should initially ensure that all on scene process safety and response measures have been activated. This includes fire water systems and/or fixed suppression systems.
- Isolate all ignition sources in the area.
- Surrounding exposures should be cooled using water sprays. Use of monitors should be considered to reduce the need for people in the hazardous area.
- Class B foam should be used and applied using hose lines, monitors or fixed foam installations.
- Ensure sufficient quantities of foam resources before commencing suppression activities.
- Dry chemical or CO2 are considered for small flammable liquid fires.
- Consider water run-off and smoke for impact on surround areas and environment.
- Identify environmental exposures and initiate preventative measures where possible.
- Determine resources required and make appropriate requests for resources to the Incident Controller.
- Determine neighbouring area likely to be affected and the possible extent. Advise of evacuation.
- At conclusion of incident secure the scene.

Incident Controller

The Incident Controller in dealing with an ignited release diesel of hot oil should consider the following:

- Proceed to the Emergency Control centre and establish communication with the On-Scene Commander.
- Contact security.
- Overall coordination of site activities
- Establishing response priorities
- Consider and coordinate site evacuation if required.
- Notification and liaison with external emergency services.

Aide Memoir - Switch room or sub-station fire

Process operators

Process operators when dealing with a switch-room or substation fire should consider the following:

- Raise the alarm when the fire is detected.
- Stop all maintenance work in the affected area
- Notify the Central Control Room and the Emergency Response Team.
- Initiate emergency process procedures if not automatically initiated for the shutdown, isolation and de-pressuring of the affected area.
- Activation of fixed fire systems and suppression systems (where not automatically activated). Water suppression systems may be used to cool exposures but extreme care must be taken to avoid water on live electrical components.
- Follow emergency process procedures to control the incident. See Attachment 4.0 and 16.0.

On-Scene Commander

The On-Scene Commander when dealing with switch-room or substation fire should consider the following:

- Check direction of wind and approach the incident from uphill and upwind.
- Ensure all non-essential personnel are evacuated from the area.
- The On-Scene Commander should initially ensure that all on scene process safety and response measures have been activated. This includes fire water systems and/or fixed suppression systems. Water systems on the fire itself must avoided until the system de-energised. Water systems may be used for cooling exposures but extreme care must be taken.
- Extreme care must be taken to ensure surrounding areas, including the structure itself are not energised.
- Extreme care must be taken when entering. Entry should be on the advice of electrical supervisors.
- Do not use water unless safe to do so.
- Small fires can be extinguished using dry chemical powder or CO2.
- Priority should be given to securing the area and protecting exposures.
- Determine resources required and make appropriate requests for resources to the Incident Controller.
- Determine neighbouring area likely to be affected and the possible extent. Advise of evacuation.
- At conclusion of incident secure the scene.

Incident Controller

The Incident Controller in dealing with a switch-room or substation fire should consider the following:

- Proceed to the Emergency Control centre and establish communication with the On-Scene Commander.
- Contact security.
- Overall coordination of site activities
- Establishing response priorities
- Consider and coordinate site evacuation if required.
- Notification and liaison with external emergency services.

Aide Memoir - Central Control Room fire

Process operators

Process operators when dealing with a central control room fire should consider the following:

- Raise the alarm when the fire is detected.
- Notify the Emergency Response Team.
- Initiate emergency process procedures if not automatically initiated for the shutdown and isolation of the affected area.
- Activation of fixed fire suppression systems and (where not automatically activated).
- Follow emergency process procedures to control the incident. See Attachment 4.0 and 16.0.

On-Scene Commander

The On-Scene Commander when dealing with central control room fire should consider the following:

- Check wind direction and approach the incident from uphill and upwind.
- Ensure all non-essential personnel are evacuated from the area.
- The On-Scene Commander should initially ensure that all on scene process safety and response measures have been activated. This includes fire water systems and/or fixed suppression systems.
- Isolate services including electricity to building. This should be done under guidance from Operations Superintendent to ensure critical services not involved, are not interrupted.
- Determine resources required and make appropriate requests for resources to the Incident Controller.
- Determine neighbouring area likely to be affected and the possible extent. Advise of evacuation.
- At conclusion of incident secure the scene.

Incident Controller

The Incident Controller in dealing with a central control room fire should consider the following:

- Proceed to the Emergency Control centre and establish communication with the On-Scene Commander.
- Contact security.
- Overall coordination of site activities
- Establishing response priorities
- Consider and coordinate site evacuation if required.
- Notification and liaison with external emergency services.

Aide Memoir - Incident involving berth LNGC, loading arms or transfer pipework

Process operator/ Loading operator

Process operators when dealing with an incident involving berth LNGC, loading arms or transfer pipework should consider the following:

- Raise the alarm when the incident is detected.
- Stop all maintenance work in the immediate area.
- Notify the Central Control Room and the Emergency Response Team.
- Initiate emergency process procedures if not automatically initiated for the shutdown, isolation and de-pressuring of the affected area.
- Discontinue loading operation, isolate and consider ESDL.
- Activation of fixed firewater systems and suppression systems, such as monitors and deluge systems (where not automatically activated). Care must be taken when doing this as water on the pipe system may heat the LNG and cause an increase line pressure.
- Follow emergency process procedures to control the incident.
- Advise vessel master of incident.

On-Scene Commander

The On-Scene Commander when dealing with an incident involving berth LNGC, loading arms or transfer pipework should consider the following:

- Check the wind direction and approach the incident from uphill and upwind. Extreme care must be taken not to drive any emergency vehicles into the vapour cloud as the true extent of the vapour cloud will not be visible.
- Ensure all non-essential personnel are evacuated from the area.
- Account for all personnel on the jetty.
- The On-Scene Commander should initially ensure that all on scene process safety and response measures have been activated. This includes fire water systems and/or fixed suppression systems.
- Notify tug master of incident.
- Contact ship master and advise jetty head/ship conditions and gas cloud conditions.
- Liaise with external support personnel at incident scene.
- Determine resources required and make appropriate requests for resources to the Incident Controller.
- Determine neighbouring area likely to be affected and the possible extent. Advise of evacuation.
- At conclusion of incident secure the scene.

Vessel Master

The vessel master when dealing with an incident involving the loading of LNG should consider the following:

- Halt cargo operations.
- Ensure ship fire pump is running and activate water spray systems.
- Monitor gas detection for gas migration to ship
- Prepare ship dry powder system in case of ignition.
- Prepare ship cooling monitors in case of ignition.
- Isolate and drain down LNG line if safe to do so.
- Ship's crew in full PPE and SCBA on standby.
- Advise OSC of conditions on board and fire extent if applicable.

Incident Controller

The Incident Controller in dealing with an incident involving berth LNGC, loading arms or transfer pipework should consider the following:

- Proceed to the Emergency Control centre and establish communication with the On-Scene Commander.
- Contact security.
- Overall coordination of site activities
- Establishing response priorities
- Consider and coordinate site evacuation if required.
- Notification and liaison with external emergency services. Advise Gladstone Port Authority of incident

Appendix C – Incident Scenario Action Plans

Weather Conditions
Wind: South Easterly 11.32 M/s
Temperature: 25 C
❑ Sunny ❒ Cloudy ☑ Windy ❑ Raining

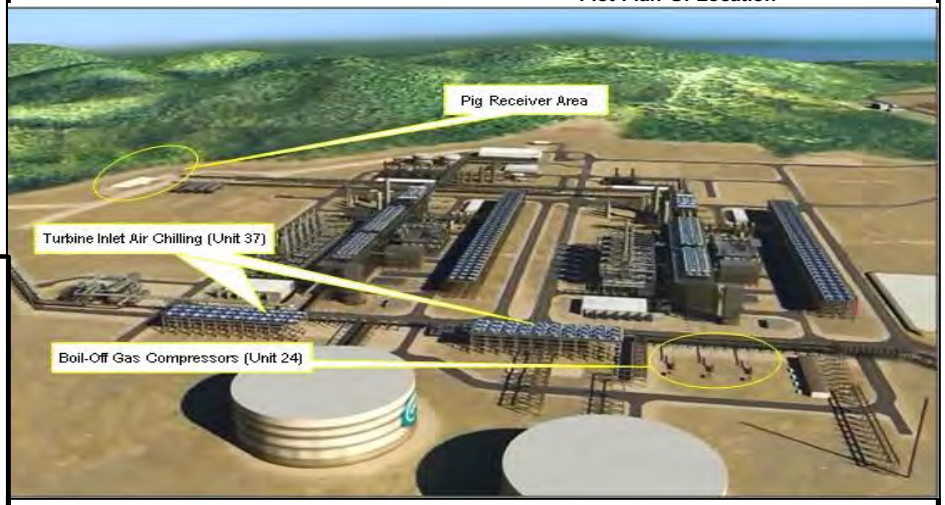
Incident Action Plan For LOC At Pig Receiver

Equipment Specifications/Process Description

1. **PG-401 Pig Receiver.** Long horizontal vessel connected to pipeline with a quick close door at the end, designed for receiving and the removal of pigs that are launched from upstream and flow freely in pipeline for specific reasons. The pig receiver is usually bypassed under normal operation and only lined up during pigging operations.

Incident Description
During pigging operation, the receiving barrel is accidently opened before the barrel is fully depressurised. Gas and debris were spilled at site. The debris and gas were ignited by pyrophoric materials.

Plot Plan Of Location



Adjacent Exposure

Hazards Information At Site

1. Methane is supplied at 22^0 C at 6.5 megapascals gauge.

2. Traces of water, H_2S, CO_2 and mercury may be present.

3. Pyrophoric materials may be present with the debris

Fire Protection At Location

1. Fire hydrant – 1 unit
2. Oscillating fire monitor – 1 Unit
3. Hydrant fire monitor – 4 units
4. Underground hydrant isolation valves – 10 units
5. IR multiple flame detector- 1
6. IR fixed gas detector – 1
7. Manual call point – 2
8. Local alarm (horn/light) – 2
9. Optical line of sight gas detector – 4
10. Ultrasonic gas detector – 1
11. Fusible loop- 5

Response Tactic

Fire Fighting and Control

1. Approach the fire from up wind
2. Set water curtain to prevent the gas from escaping to other areas and to reduce radiant heat
3. Use water monitor to cool the pig receiver and surrounding equipment
4. Do not put out the fire until the gas source has been isolated
5. All personnel to stay down wind at all times
6. Ensure the that the water run-off is directed into the sewer system
7. Keep the slug wet to prevent re-ignition

On-Scene Controller

1. Communicate with Incident Commander on:
   - Wind direction and estimated wind speed
   - Status of fire fighting/ control at site
   - Requirement of additional assistance
2. Use UHF channel xx to communicate
3. Supervise fire fighting activities and make decision to evacuate area if situation is too dangerous for the fire fighting crew

Clean-up Precautions

1. Wear appropriate PPE because mercury might be present
2. Keep the debris wet due to the presence of pyrophoric materials

Incident Action Plan For LOC At Pig Receiver

Fire Equipment Matrix

Fire Equipment	Capacity M^3/hr	Hose Connection	Location	Quantity	Other Information
Fire Hydrant (Monitor)					
Fire Hose Reel					
Fire monitor	115			1	115
Fire truck	1	-	-	-	Standby with extinguishers, BA
Fire Hose Foam Reel					
Hose Hand Line (Fire Hydrant)	30			2	60
Elevated Fire Monitor					
BA				8	May be required if mercury is present in the area

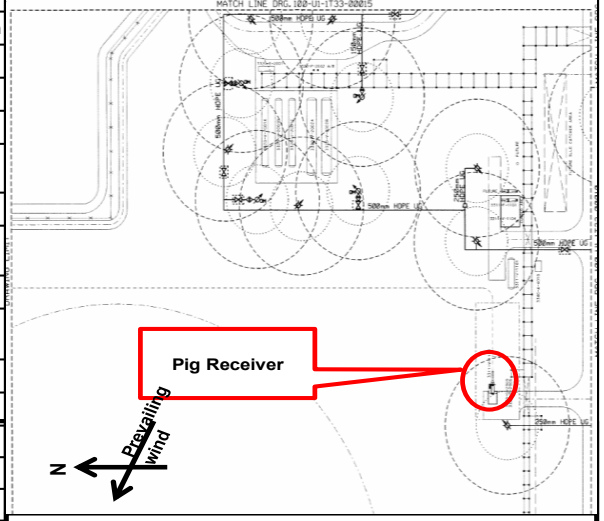
Manpower Requirement

Tactical Activity	Quantity	Unit Designation	Task Objective
Fire fighting Team	4	Incident Control Team	Fire control and clean-up
First aid	1	Incident control team	Basic medical assistance to IP
Fire fighting supervision	1	On-Scene Controller	Fire fighting tactic
Scribe	1	Incident Command Team	Incident recording and reporting

Emergency Information

Position	Telephone No. (Office)	Telephone No. (Mobile)	Telephone No. (Home)
Operations Manager			
Emergency Duty manager			
Gladstone Hospital			
Gladstone Police Station			
Fire & Rescue Department			
Security Adviser			

Fire Fighting Equipment At Location



Assembly Area

Fire Water Resources Requirements

175 M^3/hr

	Name	Signature	Date
Prepared by:			
Approved by:			

Weather Conditions
Wind: South Easterly 11.32 M/s
Temperature: 25 C
❑ Sunny ❒ Cloudy ☑ Windy ❑ Raining

Incident Action Plan Inlet Gas Facility Unit 11

Equipment Specifications/Operations

V-1101 Inlet Separator. designed to remove any liquid slugs (oily water) present in the feed gas stream. Operating pressure 6500kpag to 10200kpag.

F-1101 Inlet Filter Coalescer. Removes solid particles and liquid droplets greater than 100 microns from the feed gas.

V-1104 Inlet De-gassing Drum. Liquids recovered from V-1101 and F-1101 are flashed by depressurisation, hydrocarbon vapours are sent to the dry flare and liquids are sent to the oily water treatment system.

E-1102 Pipeline Gas Pre-heater. Hot oil as the heating medium. Maintain the temperature of the feed gas to design limits of downstream piping, prevent hydrate formation and to optimise the absorption reaction rate of downstream CO2 removal process.

Hazard Information Of Product At Site

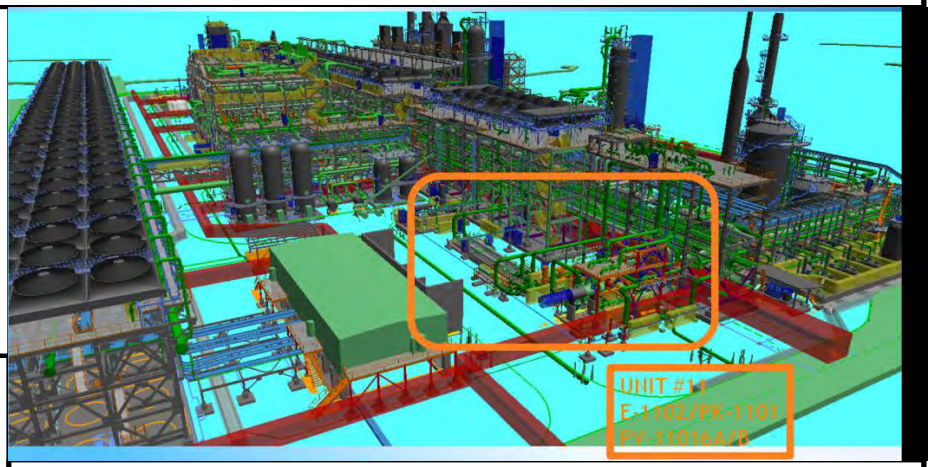
High pressures
Hot surfaces (Hot Oil)
Therminol (hot oil) is hazardous to health.

Incident Description

A flange leak has developed at V-1101. A jet fire has occurred due to static ignition.

Fire Protection At Location

1. Fire hydrant with monitor – 2
2. Fire monitor - 1
3. Fire hose foam reel – 1
4. 9 kg dry chemical - 5



Adjacent Exposure

Response Tactic

Fire Fighting and Control

1. Approach fire from up wind
2. Station fire truck at least 30 meters from source of gas leak
3. Set up 4 water curtains to control gas from escaping to other areas
4. Use all fire monitors to cool adjacent equipment
5. Do not put out the fire until gas source is isolated
6. Use dry powder to extinguish fire once the gas source is isolated if fire is small
7. Use foam to extinguish fire if fire is big

On-Scene Commander

1. Assess the situation and communicate the situation to Incident Commander
2. Withdraw the fire response team to safe place if the situation is too dangerous to continue fire control.
3. Request for additional support if necessary

Precautions

1. Be aware of high noise due to high pressure gas escaping
2. Be aware of hot surfaces due to the presence of hot oil
3. Therminol is hazardous to health
4. Be aware of asphyxiation due oxygen being displaced by gas

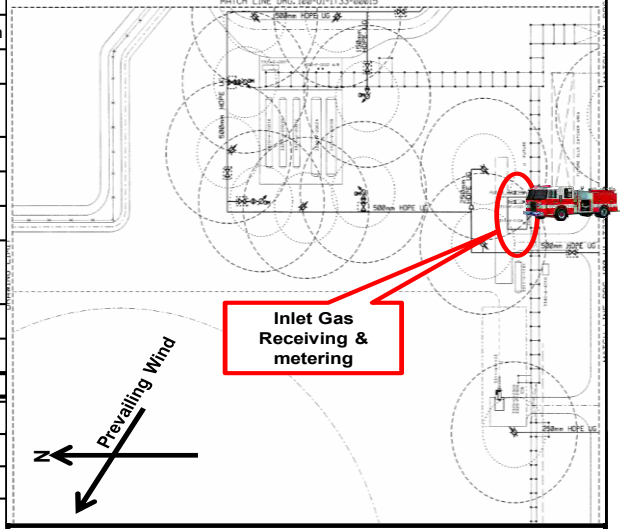
Note: Use the dry powder extinguisher first if the fire is small.

Incident Action Plan Inlet Gas Facility Unit 11

Fire Equipment Matrix

Fire Equipment	Capacity M^3/hr	Hose Connection	Location	Quantity	Other Information
Hand held hose line	30			4	120
Fire oscillating Monitor	115			3	345
Foam				-	
Fire truck monitor				-	
BA				8	

Fire Fighting Equipment At Location



Manpower Requirement

Tactical Activity	Quantity	Unit Designation	Task Objective
Fire fighting Team	4	Incident control team	Standby for fire control
First aid	1	Incident control team	Basic medical assistance to IP
Scribe	1	Incident Command Team	Recording incident information
On-Scene Controller	1	Incident control team	Assessment, control and supervising activities at incident site

Assembly Area

Emergency Information

Position	Telephone No. (Office)	Telephone No. (Office)	Telephone No. (Office)
Operations Manager			
Emergency Duty manager			
Gladstone Hospital			
Gladstone Police Station			
Fire & Rescue Department			
Security Adviser			

Fire Water Resources Requirements

465 M^3/hr

	Name	Signature	Date
Prepared by:			
Approved by:			

Weather Conditions
Wind: South Easterly 11.32 M/s
Temperature: 25 C
❑ Sunny ❒ Cloudy ☑ Windy ❑ Raining

Incident Action Plan For Fire At Propane/Ethylene Storage – Unit 20

Equipment Specifications/Operations

With a storage capacity of over 1017m3 of Ethylene and 2056m3 of Propane the refrigerant storage unit is potentially one of the most hazardous places onsite. As with any large capacity storage facility, any mistake can result in large consequences. Ethylene is stored at -78 degrees C. Appropriate measures must be taken to avoid cold burns

Hazards Information At Site

•Explosive range for Propane is 2.4 – 9.5%. Propane auto ignites @ 468 degC
• Explosive range for Ethylene is 2.2 – 36%. Ethylene auto ignites @ 450 degC
•Static sparking resulting in fire / explosion
•Loss of containment
•Cross contamination
•Cold burns
•Working at heights
•Rotating equipment: Pumps
•Deluge systems
•Fire water monitors
•Hydrocarbons stored at high pressures
•Remote start pumps

Incident Description

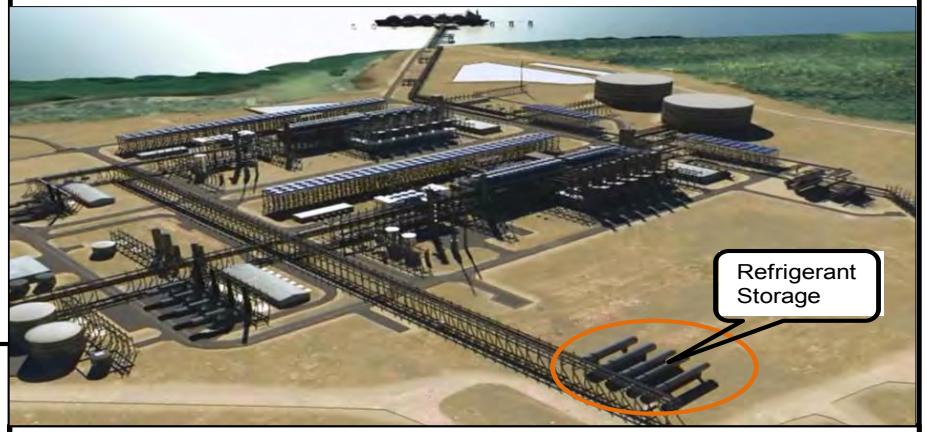
A leak from lower liquid connection could result in jet fire that could impinge ethylene storage drums; however BLEVE is unlikely due to:
(1) double-wall construction and vacuum/Perlite insulation for ethylene storage drums;
(2) ability to remotely isolate and vent to flare;
(3) and automatic water oscillating monitors for storage drums and pumps.
Leak from piping in vapour service would result in jet fire with potential radiant heat impact to top of vessel.

Fire Protection At Location

Propane System
1. Deluge system with fusible plug
2. Fire hose reel – 5 units
3. Fire hydrant – 9 units

Ethylene System
1. Deluge system with fusible plug
2. Fire water monitor – 1 unit
3. Fire water hydrant – 2 units

Plot Plan Of Location



Adjacent Exposure

Response Tactic

Fire Fighting and Control - Ethylene

1. Approach from up wind
2. Cool propane and ethylene tank using monitors at site
3. Do not put out fire if source is not isolated
4. Do not allow water to contact ethylene , it may increase rate of ethylene vaporisation
5. Set water curtain to prevent ethylene vapour from escaping to other areas
6. Use foam to extinguish the fire if the fire is big
7. Use powder extinguisher if fire is small

Fire Fighting and Control - Propane

1. Approach from down wind
1. Cool propane and ethylene tank using monitors at site
2. Do not put out fire if source is not isolated
3. Do not allow water to contact ethylene , it may increase rate of ethylene vaporisation
4. Set water curtain to prevent ethylene vapour from escaping to other areas
5. Use powder extinguisher to extinguish the fire

Precautions

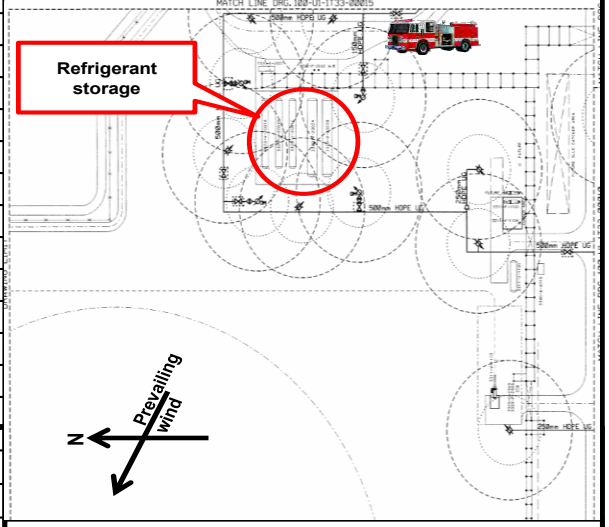
1. Beware of cold burn from ethylene which is stored at - 78 C
2. Expanding ethylene vapour may displace oxygen leading to asphyxiation

Incident Action Plan For Fire At Propane and Ethylene Storage – Unit 11

Fire Equipment Matrix

Fire Equipment	Capacity M³/hr	Hose Connection	Location	Quantity	Other Information
Fire Monitors	115			6	690
Hand Held Line	30			8	240
Fire Nozzles					
Foam					
Fire truck					
BA					

Fire Fighting Equipment At Location



Assembly Area

Manpower Requirement

Tactical Activity	Quantity	Unit Designation	Task Objective
Fire fighting Team	4	Incident Control Team	Standby for fire control
Victim stabilisation	1	Incident Control Team	Basic medical assistance to IP
Scribe	1	Incident command team	Record & reporting of activities
On-Scene Controller	1	Incident Control Team	Assessment, control and supervision

Fire Water Resources Requirements

930 M³/hr

Emergency Information

Position	Telephone No. (Office)	Telephone No. (Office)	Telephone No. (Office)
Operations Manager			
Emergency Duty manager			
Gladstone Hospital			
Gladstone Police Station			
Fire & Rescue Department			
Security Adviser			

	Name	Signature	Date
Prepared by:			
Approved by:			

Weather Conditions
Wind: South Easterly 11.32 M/s
Temperature: 25 C
❑ Sunny ❒ Cloudy ☑ Windy ❑ Raining

Incident Action Plan For Fire At Hot Oil – Unit 34

Equipment Specifications/Operations

The Hot Oil System is a closed-loop circulation system that provides process heating requirements using Therminol 55 as the heat transfer medium. Hot oil is supplied to the Fuel Gas Heater (E-2201), Regenerator Reboilers (E-1204A/B) and Pipeline Gas Preheater (E-1102).

Incident Description

Fracture of an instrument stub or drain point. Subsequent ignition resulting in jet fire. Pool fire resulting from hot oil spill; however, this ignition is unlikely due to high AIT of hot oil (343oC or 650oF). High pressure side gas leak from connection failure resulting in jet fire.

Plot Plan Of Location

Hazards Information At Site

Therminol 55 is the Heat Transfer Fluid used in the LNG Plant. It should be treated in the same manner as used lubricating oil. If it comes into contact with the skin or eyes it should be flushed with plenty of water. Hazardous to the environment. Contains Benzene so exposure times should be kept within the STEL and LTEL.

Fire Protection At Location

1. Foam Hose Reel – 1 units
2. Hand held lines – 4 units

Adjacent Exposure

1. Possible drifting of flammable gas to landing point due to leak or purging from process area
2. Hot exhaust from helicopter may ignite flammable gas
3. Helicopter rotor may strike columns or personnel

Response Tactic

Fire Fighting and Control

1. Approach the from up wind
2. Use fire monitor to cool adjacent equipment
3. Use hand held lines to set up water curtains to prevent gas from escaping to other areas
4. Do not extinguish fire until source of gas is isolated
5. Ensure water run-off is directed to the sump
6. Use foam line to extinguish fire

On-Scene Controller

1. Assess site situation and communicate with IC
2. Withdraw emergency response team from site if situation is too dangerous to continue
3. Request additional assistance if necessary

Precautions

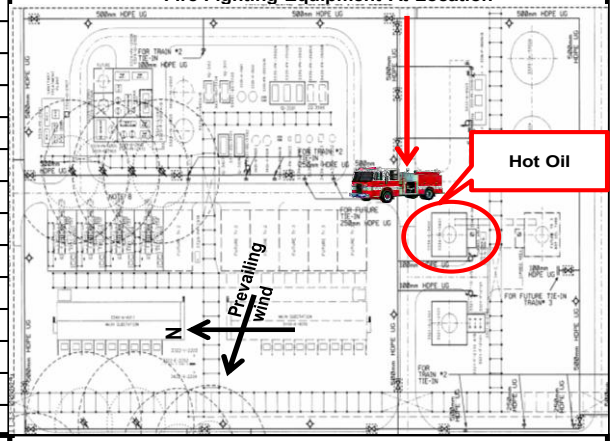
1. Beware of the hot surfaces
2. Avoid contact with Therminol 55
3. Wash with a lot of water if contact made with Therminol 55

Incident Action Plan For Fire At Hot Oil – Unit 34

Fire Equipment Matrix

Fire Equipment	Capacity M³/hr	Hose Connection	Location	Quantity	Other Information
Fire Hydrant					
Hand Held Line	30			4	120
Fire Nozzles					
Foam Hose Reel	30			1	30
Fire truck					
BA					

Fire Fighting Equipment At Location



Manpower Requirement

Tactical Activity	Quantity	Unit Designation	Task Objective
Fire fighting Team	4	Incident Control Team	Standby for fire control
Victim stabilisation	1	Incident Control Team	Basic medical assistance to IP
Scribe	1	Incident command team	Recording of site response activities
On-Scene Commander	1	Incident Control Team	Assess, control and supervise response activities

Driving Direction

Refer to the plot plan

Fire truck route

Assembly Area

Emergency Information

Position	Telephone No. (Office)	Telephone No. (Office)	Telephone No. (Office)
Operations Manager			
Emergency Duty manager			
Gladstone Hospital			
Gladstone Police Station			
Fire & Rescue Department			
Security Adviser			

Fire Water Resources Requirements

150M³/hr

	Name	Signature	Date
Prepared by:			
Approved by:			

Weather Conditions
Wind: South Easterly 11.32 M/s
Temperature: 25 C
❑ Sunny ❒ Cloudy ☑ Windy ❑ Raining

Incident Action Plan For Fire At Acid Removal – Unit 12

Equipment Specifications/Operations

CO_2 and traces of hydrogen sulphide (H_2S) (known as 'acid gases', both are corrosive to carbon steel, freeze out during feed gas liquefaction and reduce the calorific value of the exported LNG), the feed gas is treated to remove the acid gases (known as 'sweetening'). The acid gases are removed from the feed gas stream by contact with an aqueous amine solvent that binds and removes the contaminants.

Hazards Information At Site

CO_2 and H_2S are poisonous to human being.

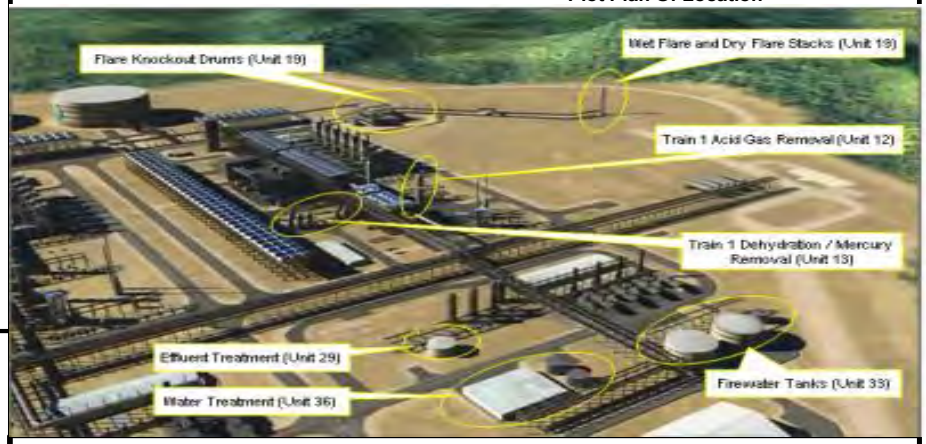
Incident Description

Mechanical damage of instrument tapping . near the feed gas separator or absorber inlet filter coalescer. Leak with subsequent ignition resulting in jet fire. Amine solution is non-combustible, therefore does not present a fire hazard.

Fire Protection At Location

1. Fire hydrant – 3 units
2. Fire extinguisher (powder)
3. Fire hose reel – 1 unit
4. Handlines – 4 units

Plot Plan Of Location



Adjacent Exposure

Response Tactic

Fire Fighting and Control

1. Approach the site from up wind
2. All respond team members to don BA
3. Use 3 monitors to cool the adjacent equipment
4. Use 4 hand held lines and 1 fire hose reel to set up water curtain
5. Do not extinguish fire until gas source is isolated
6. Extinguish fire using dry powder

On-Scene Controller

1. Assess wind condition and ensure emergency response team stay at down wind at all time
2. Communicate with Incident Commander to inform the situation at site
3. Request additional help from IC if necessary

Precautions

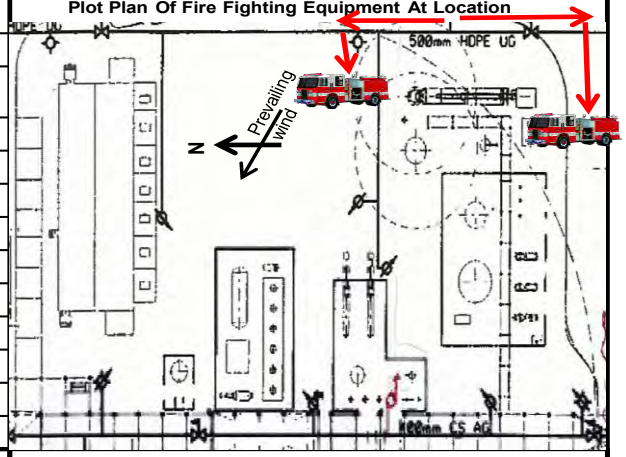
1. Approach site with donning BA
2. Amine solution is not toxic but can irritate skin, mouth and respiratory track if ingested or inhaled

Incident Action Plan For Fire At Acid Removal – Unit 12

Fire Equipment Matrix

Fire Equipment	Capacity (M^3/hr	Hose Connection	Location	Quantity	Other Information
Fire Hydrant Monitors	115			1	115
Fire monitor	115			2	230
Fire Hose Reel	30			1	30
Hand Held Lines	30			4	120
Fire truck foam					2000 litres (1%)
Fire truck	2000			1	Standby
BA				8	To be donned by fire team

Plot Plan Of Fire Fighting Equipment At Location



Driving Direction

Refer to the plot plan — **Fire truck route**

Assembly Area

Manpower Requirement

Tactical Activity	Quantity	Unit Designation	Task Objective
Fire fighting Team	4	Incident Control Team	Fire fighting and control
Victim stabilisation	1	Incident Control Team	Basic medical assistance to IP
Scriber	1	Incident command team	Recording response activities
Overall control of site	1	Incident Control Team	Assessment, control & supervision

Emergency Information

Position	Telephone No. (Office)	Telephone No. (Office)	Telephone No. (Office)
Operations Manager			
Emergency Duty manager			
Gladstone Hospital			
Gladstone Police Station			
Fire & Rescue Department			
Security Adviser			

Fire Water Resources Requirements

495 M^3/hr

	Name	Signature	Date
Prepared by:			
Approved by:			

Weather Conditions
Wind: South Easterly 11.32 M/s
Temperature: 25 C
❑ Sunny ❒ Cloudy ☑ Windy ❑ Raining

Incident Action Plan For Fire At Dehydration and Mercury Remover – Unit 13

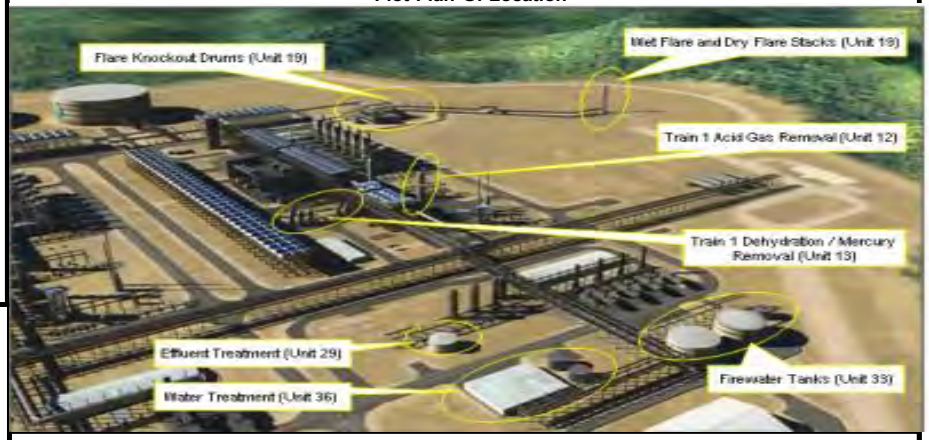
Equipment Specifications/Operations

1. The unit operates at high pressure at 5800 kPa and high temperature at 288 C.

Incident Description

Mechanical damage of instrument tapping etc. at Dryer Phase Separator.
Subsequent jet fire.

Plot Plan Of Location



Hazards Information At Site

1. High noise from compressor C-1301
2. Rotating compressor
3. Free mercury
4. High pressure
5. High temperature

Fire Protection At Location

1. Fire hydrant with monitor – 2 units
2. Oscillating monitor – 1 unit
3. Fixed monitor – 1 unit
4. 9 kg extinguisher – 11 units
5. Above ground hydrant isolation valve – 3 units

Adjacent Exposure

1. Possible drifting of flammable gas to landing point due to leak or purging from process area
2. Hot exhaust from helicopter may ignite flammable gas
3. Helicopter rotor may strike columns or personnel

Response Tactic

Fire Fighting and Control

1. Approach incident site from up wind and wear BA
2. Connect 4 hoses and set up water curtain prevent gas from escaping to other areas.
3. Use monitors to cool adjacent equipment
4. Do not extinguish fire if gas source is not isolated
5. Put out fire once gas source is isolated using dry powder
6. Continue cooling to prevent re-ignition

On-Scene Controller

1. Communicate with Incident Commander on:
   - Wind direction and estimated wind speed
   - Status of fire fighting/ control at site
   - Requirement of additional assistance
2. Use UHF channel xx to communicate
3. Supervise fire fighting activities and make decision to evacuate area if situation is too dangerous for the fire fighting crew

Precautions

1. Wear BA. Area may contains mercury
2. Wear hearing protection if compressor is running
3. Wear glove due to high temperature of certain equipment

Incident Action Plan For Fire At Dehydration and Mercury Remover – Unit 13

Fire Equipment Matrix

Fire Equipment	Capacity M^3/hr	Hose Connection	Location	Quantity	Total water demand
Fire Hydrant (Monitor)	115			2	230
Hose Hand Line	30			4	120
Fire Nozzles					
Fire monitor					
Fire truck					
Fire Hose Foam Reel					
Elevated Fire Monitor					
BA				8	

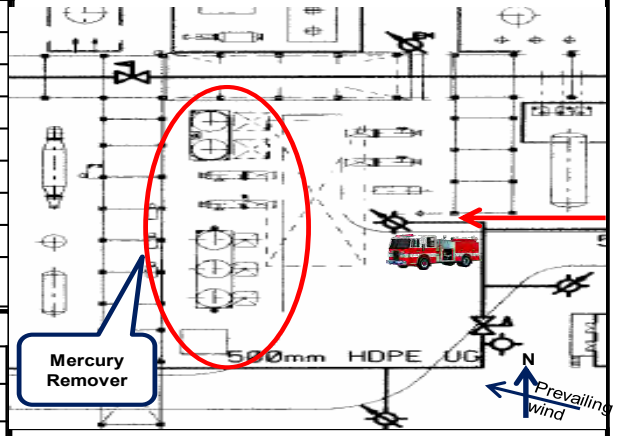
Manpower Requirement

Tactical Activity	Quantity	Unit Designation	Task Objective
Fire fighting Team	4	Incident Control Team	Fire fighting and control
Victim stabilisation	1	Incident Control Team	First aid and patient stabilisation
Scribe	1	Incident command team	Recording of emergency response team activities.
On-Scene Controller	1	Incident Control Team	Assess, control and supervise emergency response activities

Emergency Information

Position	Telephone No. (Office)	Telephone No. (Office)	Telephone No. (Office)
Operations Manager			
Emergency Duty manager			
Gladstone Hospital			
Gladstone Police Station			
Fire & Rescue Department			
Security Adviser			

Plot Plan Of Fire Fighting Equipment At Location



Driving Direction

Refer to the plot plan

Fire truck route

Assembly Area

Fire Water Resources Requirements

350 m^3 /hr

	Name	Signature	Date
Prepared by:			
Approved by:			

Weather Conditions
Wind: South Easterly 11.32 M/s
Temperature: 25 C
❑ Sunny ❒ Cloudy ☑ Windy ❑ Raining

Incident Action Plan For Fire At Propane, Ethylene, Methane Refrigeration Circuit – Unit 14, 15 and 16

Equipment Specifications/Operations

Propane refrigeration circuit: chills the feed gas prior to liquefaction, condenses the ethylene refrigerant compressor discharge and de-superheats the methane refrigerant compressor discharge.
Ethylene refrigeration and liquefaction circuit: further chills and condenses the feed gas flowing from the propane refrigerant circuit and condenses the methane refrigerant compressor discharge.
Methane refrigeration and liquefaction circuit: flashes the condensed feed gas from the ethylene refrigerant circuit to lower pressures with the liquid from the last stage sent to LNG storage tanks. Nitrogen gas (N_2) is rejected to atmosphere as part of the liquefaction process to meet both LNG export and fuel gas specifications.

Chemical Information Of Product At Site

- High pressure feed gas and liquid streams
- Low temperature streams and equipment – Cryogenic Processes
- High temperature streams and equipment
- Noise
- Rotating equipment
- Nitrogen
- Mineral and synthetic lubrication oils
- Propane (E1505A pass)
- Ethylene

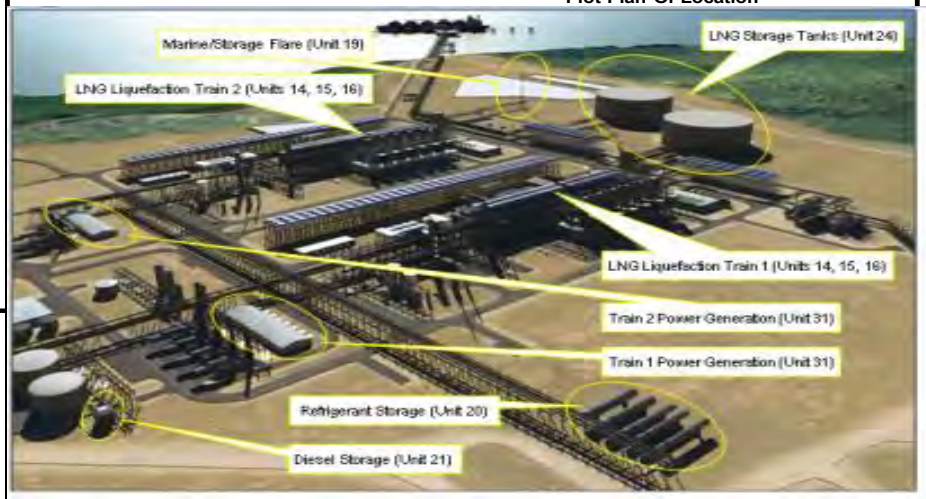
Incident Description

Leak from one compressor, discharge side (high pressure), due to mechanical failure of instrument tapping or similar. An ignited leak would result in a jet fire with potential impingement to other equipment.
An un-ignited leak from any compressor could lead to the formation of an explosive mixture and subsequent ignition could result in explosion.

Fire Protection At Location

1. Fire hydrant – 15 units
2. Foam Hose Reel – 2 units
3. Hose reel – 1 unit
4. 9 kg extinguisher – 13 units
5. 68 kg extinguisher – 3 units
6. Low temperature detector – 2 units
7. Infra red flame detectors – 5 units
8. Optical line gas detector – 12 units

Plot Plan Of Location



Adjacent Exposure

Response Tactic

Fire Fighting and Control

1. Approach incident site from up wind
2. Connect 2 hoses to each hydrant and set up water curtain
3. Use 3 hose foam to cover any pool fire and do not extinguish fire
4. Do not use water to extinguish fire because water will increase vaporisation of ethylene
5. Use water monitors to cool adjacent equipment
6. Extinguish fire using dry powder and covered with foam once gas source has been isolated.
7. Continue cooling to prevent re-ignition

On-Scene Controller

1. Communicate with incident commander on:
   - Condition at site
   - Additional assistance required
2. Use UHF channel xx for communication

Precautions

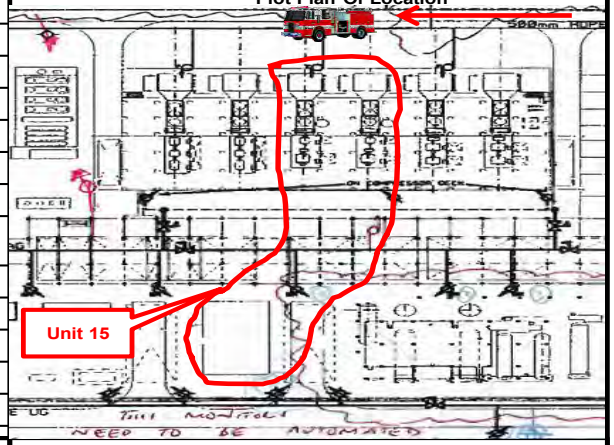
1. Beware of low temperature hazard
2. Do not throw water on cryogenic material
3. Large volume of nitrogen may be present at site

Incident Action Plan For Fire At Ethylene Refrigeration – Unit 15

Fire Equipment Matrix

Fire Equipment	Capacity M^3/hr	Hose Connection	Location	Quantity	Other Information
Fire Hydrant					
Fire Hose	30			4	120 M^3
Fire monitor	115			3	345 M^3
Foam hose reel	30			1	30
Fire truck	120			1	Standby to connect foam
BA				8	Reduced oxygen environment

Plot Plan Of Location



Driving Direction

Refer to the plot plan — **Fire truck route**

Assembly Area

Manpower Requirement

Tactical Activity	Quantity	Unit Designation	Task Objective
Fire fighting Team	4	Incident Control Team	Standby for fire control
Victim stabilisation	1	Incident Control Team	Basic medical assistance to IP
Scribe	1	Incident Command Team	Weather & landing location to pilot
On- Scene Controller	1	Incident Control team	Site control and supervision

Fire Water Resources Requirements

495 M^3/hr

Emergency Information

Position	Telephone No. (Office)	Telephone No. (Office)	Telephone No. (Office)
Operations Manager			
Emergency Duty manager			
Gladstone Hospital			
Gladstone Police Station			
Fire & Rescue Department			
Security Adviser			

	Name	Signature	Date
Prepared by:			
Approved by:			

Weather Conditions
Wind: South Easterly 11.32 M/s
Temperature: 25 C
❑ Sunny ❒ Cloudy ☑ Windy ❑ Raining

Incident Action Plan For Fire At Inlet Air Chilling Circuit – Unit 37

Equipment Specifications/Operations

Unit 37 is a closed Propane refrigeration circuit. Feed Gas which enters at -31ºC and leaves at -91ºC. Ethylene is used to cool the Feed Gas and Propane. Propane is cooled in E-1505. Small leaks in the propane circuit can develop in areas such as liquid level control valve glands. Propane when released to atmosphere will cause moisture in the atmosphere to freeze due to the pressure and temperature drop and can form ice very quickly around a leaking gland. Potential of propane being present in Compressor lube oil must be considered and determined when draining or sampling oil.

Hazard Information At Site

- Low temperature streams and equipment – Cryogenic Processes
- High temperature streams and equipment
- Noise
- Rotating equipment
- Nitrogen
- Mineral and synthetic lubrication oils
- Propane

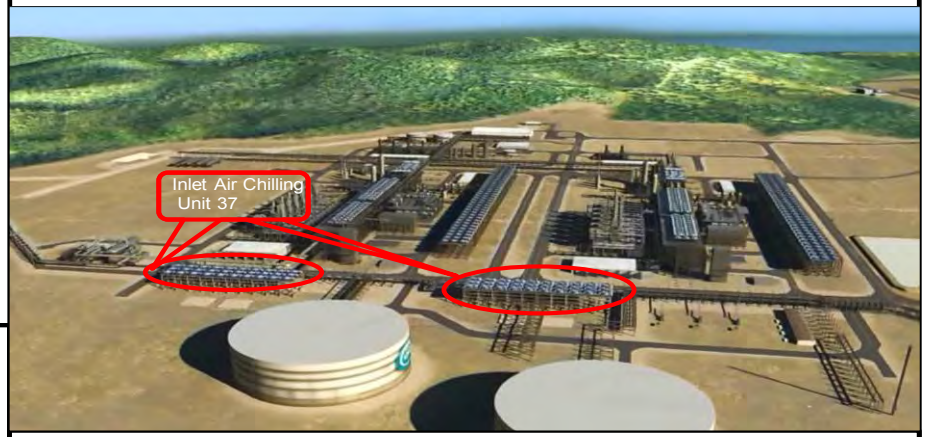
Incident Scenario

A leaking tube in the fan cooler leading to jet fire. No pool fire is expected since the liquid gas will flash.

Fire Protection At Location

1. Fire hydrant – 2 units

Plot Plan Of Location



Adjacent Exposure

Response Tactic

Fire Fighting and Control

1. Park fire truck 30 meters up wind of the incident
2. Set up 4 water curtains to prevent gas from escaping to other areas
3. Use hydrant monitors to cool surrounding areas
4. If pool fire develops, use foam to cover the fire. Do not use water
5. Do not extinguish fire until source of gas is isolated

On-Scene Controller

1. Communicate with pilot by providing information on:
   - Wind direction and estimated wind speed
   - Weather conditions
2. Use colour smoke or big "H" to mark the helipad to help pilot to identify landing point
3. If at night or poor visibility, use lights to indicate the landing point.

Precautions

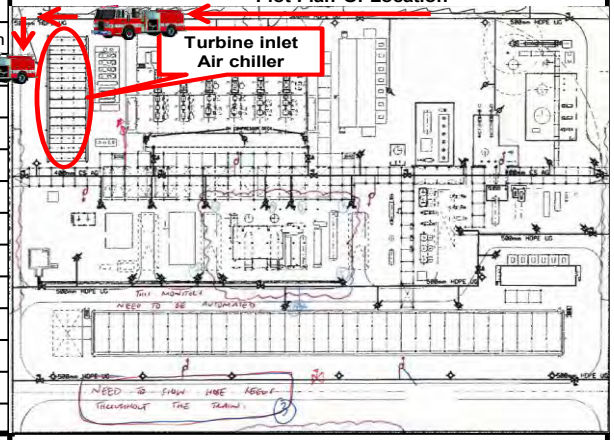
1. Beware of cryogenic hazard
2. Expanding gas may lead to reducedoxygen environment

Incident Action Plan For Fire At Inlet Air Chilling Circuit – Unit 37

Fire Equipment Matrix

Fire Equipment	Capacity M³/hr	Hose Connection	Location	Quantity	Other Information
Fire Hydrant Monitor	115			2	230
Hand Held Hose	30			4	120
Fire Nozzles					
Foam					
Fire truck					
BA					

Plot Plan Of Location



Manpower Requirement

Tactical Activity	Quantity	Unit Designation	Task Objective
Fire fighting Team	4	Incident Control Team	Standby for fire control
Victim stabilisation	1	Incident Control Team	First aid and patient stabilisation
Scribe	1	Incident command team	Record response activity
On-Scene controller	1	Incident Control Team	Assess, control & supervise site

Driving Direction

Refer to the plot plan

Fire truck route

Assembly Area

Emergency Information

Position	Telephone No. (Office)	Telephone No. (Office)	Telephone No. (Office)
Operations Manager			
Emergency Duty manager			
Gladstone Hospital			
Gladstone Police Station			
Fire & Rescue Department			
Security Adviser			

Fire Water Resources Requirements

350 M³/hr

	Name	Signature	Date
Prepared by:			
Approved by:			

Weather Conditions
Wind: South Easterly 11.32 M/s
Temperature: 25 C
❑ Sunny ❒ Cloudy ☑ Windy ❑ Raining

Incident Action Plan For Fire At LNG Tank – Unit 24

Equipment Specifications/Operations

LNG is stored in two, 140 000 m^3 LNG Storage Tanks (TK-2401A/B) which maintain LNG at cryogenic temperature (-162°C) via auto-refrigeration and at slightly above atmospheric pressure (5 kPag). The tanks are equipped with external fire suppression measures including dry chemical extinguishing and fixed nitrogen snuffing systems at relief valve vents as well as flammable gas, fire and low temperature detectors provided on top of the tanks. Any leak from the tank is directed to the sump via drain lined with cryogenic resistant concrete.

Hazards Information At Site

- Cryogenic liquid
- Nitrogen from nitrogen blanketing system
- Trip and fall – Ice formation

Incident Description

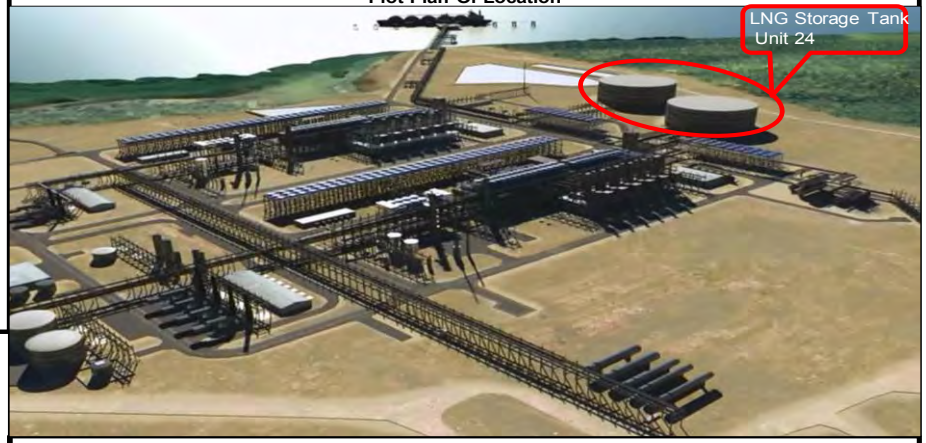
Spillage of LNG from any of the tank due to leak in the tank shell and concrete lining. If ignited a pool fire may result.

LNG flame burns slowly.

Fire Protection At Location

1. Water spray and deluge – 1 unit
2. Fire water hydrant – 9 units

Plot Plan Of Location



Adjacent Exposure

1. Boil-off gas facilities
2. The next LNG tank
3. Turbine Inlet Air Chilling unit 37

Response Tactic

Fire Fighting and Control

1. Activate water spray and deluge system
2. Park fire truck 30 meters up wind of the emergency site
3. Connect 6 hoses to cool adjacent equipment
4. Connect 2 hand held hose to the fire truck and prepare to pour foam if fire develops
5. Use foam sparingly as not to extinguish the fire. The main objective of using foam is to control rate of evaporation of LNG. The freezing foam will form an enclosure on the surface of LNG pool reducing LNG flashing rate
6. Do not pour water on LNG as it may cause violent flashing
7. Fire control team to wear BA at all time

On-Scene Controller

1. Communicate with Incident Commander on situation at site
2. Request additional resources if required
3. Monitor wind direction and move crew down wind

Precautions

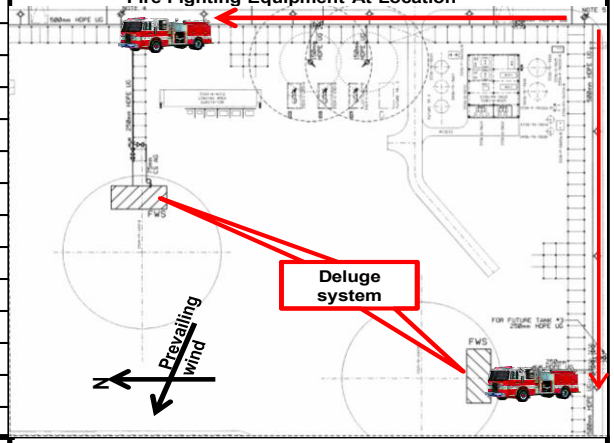
1. Reduced oxygen environment is possible due to large quantity of LNG at site. Always wear BA
2. All equipment to be grounded to prevent accumulation of static electricity charges
3. Ice may forms leading to slippery ground or falling ice from the tank wall

Incident Action Plan For Fire At LNG Tank – Unit 24

Fire Equipment Matrix

Fire Equipment	Capacity M³/hr	Hose Connection	Location	Quantity	Other Information
Water spray/deluge	257			1	257
Foam Hose line	30			2	60
Hand held hose line	30			6	180
Foam					
Fire truck	1				
BA				8	

Fire Fighting Equipment At Location



Manpower Requirement

Tactical Activity	Quantity	Unit Designation	Task Objective
Fire fighting Team	4	Incident Control Team	Standby for fire control
Victim stabilisation	1	Incident Control Team	First aid and stabilisation of patient
Scribe	1	Incident command team	Weather & landing location to pilot
On-Scene controller	1	Incident Control Team	Assess, control & supervise site

Driving Direction

Refer to the plot plan

Fire truck route

Assembly Area

Fire Water Resources Requirements

500 M³/hr

Emergency Information

Position	Telephone No. (Office)	Telephone No. (Office)	Telephone No. (Office)
Operations Manager			
Emergency Duty manager			
Gladstone Hospital			
Gladstone Police Station			
Fire & Rescue Department			
Security Adviser			

	Name	Signature	Date
Prepared by:			
Approved by:			

Weather Conditions
Wind: South Easterly 11.32 M/s
Temperature: 25 C
❑ Sunny ❒ Cloudy ☑ Windy ❑ Raining

Incident Action Plan For Fire At Flare – Unit 19

Equipment Specifications

This fire zone includes:
Hot oil start-up heater (H-3401), waste gas vent stack (B-1904), vent gas thermal oxidizer (PK-1904) and waste gas K.O. drum that are located in the north east corner of ISBL.

Incident Description

Leak of flare gas system upstream of flare could result in jet fire. Pressures in the flare gas line are quite low; therefore, the consequences from a jet fire scenario are expected to be insignificant.

Plot Plan Of Location

Adjacent Exposure

1. Flare knockout drum

Hazards Information At Site

1. Flammable gas and liquid

Fire Protection At Location

1. Fire water monitor – 1 unit
2. Foam Hose Reel – nil
3. Hose reel – nil
4. 9 kg extinguisher – nil
5. 68 kg extinguisher – nil

Response Tactic

Fire Fighting and Control

1. Bring fire truck and park fire truck up wind
2. Cool adjacent area using fire monitor
3. Set up 2 water curtains using two hose connected to the hydrant
4. Run two hoses from fire truck as standby to provide additional cooling if required
5. Extinguish fire using dry powder from fire truck once gas source is isolated
6. If fire involve liquid, use foam to extinguish the fire once liquid source is isolated

On-Scene Controller

1. Communicate with Incident Commander on status at site
2. Request additional help if required to control emergency at site

Precautions

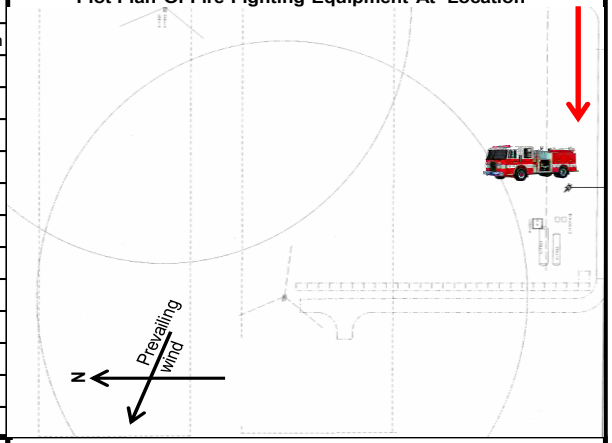
1. Wear BA when first approaching the site

Incident Action Plan For Fire At Flare – Unit 19

Fire Equipment Matrix

Fire Equipment	Capacity M³/hr	Hose Connection	Location	Quantity	Other Information
Fire monitor	115			1	115
Fire Hose	30			2	60
Fire Nozzles					
Foam					
Fire truck					
BA					

Plot Plan Of Fire Fighting Equipment At Location



Manpower Requirement

Tactical Activity	Quantity	Unit Designation	Task Objective
Fire fighting Team	4	Incident Control Team	Standby for fire control
First aider	1	Incident Control Team	Basic medical assistance to IP
Scribe	1	Incident Command Team	Recording and reporting
On-Scene Controller	1	Incident Control Team	Site control & supervision

Driving Direction

Refer to the plot plan

Fire truck route →

Assembly Area

Emergency Information

Position	Telephone No. (Office)	Telephone No. (Office)	Telephone No. (Office)
Operations Manager			
Emergency Duty manager			
Gladstone Hospital			
Gladstone Police Station			
Fire & Rescue Department			
Security Adviser			

Fire Water Resources Requirements

175 M³/hr

	Name	Signature	Date
Prepared by:			
Approved by:			

Weather Conditions
Wind: South Easterly 11.32 M/s
Temperature: 25 C
❑ Sunny ❒ Cloudy ☑ Windy ❑ Raining

Incident Action Plan For Pipeline Rupture Near Populated Area

Equipment Specifications/Process Description

The 107 cm gas transmission pipeline is designed to operate at maximum pressure of 10.2 megapascal. The total distance of the pipeline is 420 km. The gas transmission pipeline is operated at 6.5 megapascal. The gas temperature ranges from 22 C to 13 C. The content of the gas is mainly methane with traces of hydrogen sulphide, mercury and carbon dioxide

Incident Description

A heavy truck passed over the pipeline easement . The weight of the truck has caused slight deformation of the pipe body leading to elongated leak of 4 cm by 0.5 hole.

High pressure gas was released from the pipe with high pitched hissing noise.

Plot Plan Of Location

Hazards Information At Site

1. Traces H_2S, CO_2 and mercury may be present
2. Methane
3. Noise

Emergency Equipment At Location

1. Fire hydrant –x unit
2. Public fire truck – x Unit
3. Fire extinguisher – x units
4. BA – x unit

Adjacent Exposure

Response Tactic

Site and Crowd Control

1. Inform fire and rescue department and police immediately by dialling 000
2. Pipeline Incident Control Team to proceed to site immediately
3. Pipeline control centre to isolate the leaking pipeline by shutting valve no.x and valve no. x
4. Do not allow any person to come closer than 90 meters from leaking point
5. All personnel to stay up wind at all times
6. Ensure that no ignition sources within 30 meters from the leaking point
7. If leaking gas is on fire, do not extinguish fire. Cool surrounding areas to control the fire from spreading

On-Scene Controller

1. Communicate with Incident Commander on response activity at site
2. Use UHF channel xx to communicate
3. Assist local authorities in controlling the emergency

Clean-up Precautions

1. Ensure that the section is purged and free of hydrocarbon prior to attempt repair

Incident Action Plan For Pipeline Rupture Near Populated Area

Fire Equipment Matrix

Fire Equipment	Capacity	Hose Connection	Location	Quantity	Other Information
Fire Truck					
Fire water hydrant					
Fire hose					
Water tank					
BA					

Manpower Requirement

Tactical Activity	Quantity	Unit Designation	Task Objective
Fire fighting Team	8	Local fire & rescue department	Fire control
Crowd control	4	Local police & incident control team	Crowd control and site safety
On-Scene Controller	1	Incident Control Team	Technical advice

Emergency Information

Position	Telephone No. (Office)	Telephone No. (Office)	Telephone No. (Office)
Operations Manager			
Emergency Duty manager			
Local Hospital			
Local Police Station			
Local Fire & Rescue Department			
Security Adviser			

Emergency Equipment Arrangement At Site

Driving Direction

Refer to the plot plan

Assembly Area

Fire Water Resources Requirements

	Name	Signature	Date
Prepared by:			
Approved by:			

Weather Conditions
Wind: South Easterly 11.32 M/s
Temperature: 25 C
❑ Sunny ❒ Cloudy ☑ Windy ❑ Raining

Incident Action Plan For Fire At Maintenance, Warehouse and Workshop

Equipment Specifications/Operations

With a storage capacity of over 1017m3 of Ethylene and 2056m3 of Propane the refrigerant storage unit is potentially one of the most hazardous places onsite. As with any large capacity storage facility, any mistake can result in large consequences. Ethylene is stored at -78 degrees C. Appropriate measures must be taken to avoid cold burns

Hazards At Site

•Explosive range for Propane is 2.4 – 9.5%. Propane auto ignites @ 468 degC
• Explosive range for Ethylene is 2.2 – 36%. Ethylene auto ignites @ 450 degC
•Static sparking resulting in fire / explosion
•Loss of containment
•Cross contamination
• Cryogenic liquid -Cold burns

Incident Description

A leak from lower liquid connection could result in jet fire that could impinge ethylene storage drums; however BLEVE is unlikely due to:
(1) double-wall construction and vacuum/Perlite insulation for ethylene storage drums;
(2) ability to remotely isolate and vent to flare;
(3) and automatic water oscillating monitors for storage drums and pumps.
Leak from piping in vapour service would result in jet fire with potential radiant heat impact to top of vessel.

Fire Protection At Location

Propane System
1. Sprinkler
2. Fire hose reel – 3 units (upper level)
3. Fire hose reel – 6 units (lower level)
4. Fire hydrant – 2 units
5. Fire extinguisher – 4 units (upper level)
6. Fire extinguisher – 20 units (lower level)

Plot Plan Of Location

Adjacent Exposure

None

Response Tactic

Fire Fighting and Control - Ethylene

1. Approach from up wind
2. Cool propane and ethylene tank using monitors at site
3. Do not put out fire if source is not isolated
4. Do not allow water to contact ethylene , it may increase rate of ethylene vaporisation
5. Set water curtain to prevent ethylene vapour from escaping to other areas
6. Use foam to extinguish the fire if the fire is big
7. Use powder extinguisher if fire is small

Fire Fighting and Control - Propane

1. Approach from down wind
1. Cool propane and ethylene tank using monitors at site
2. Do not put out fire if source is not isolated
3. Do not allow water to contact ethylene , it may increase rate of ethylene vaporisation
4. Set water curtain to prevent ethylene vapour from escaping to other areas
5. Use powder extinguisher to extinguish the fire

Precautions

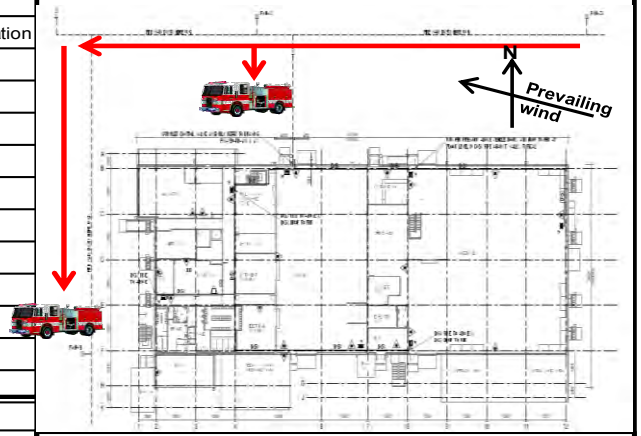
1. Beware of cold burn from ethylene which is stored at - 78 C
2. Expanding ethylene vapour may displace oxygen leading to asphyxiation

Incident Action Plan For Fire At Maintenance, Warehouse and Workshop

Fire Equipment Matrix

Fire Equipment	Capacity M^3/hr	Hose Connection	Location	Quantity	Other Information
Fire Monitors					
Hand Held Line	30			4	120
Fire Nozzles					
Foam					
Fire truck monitor	115			1	115
BA				8	

Fire Fighting Equipment At Ground Level



Driving Direction

Refer to the plot plan — **Fire truck route**

Assembly Area

Manpower Requirement

Tactical Activity	Quantity	Unit Designation	Task Objective
Fire fighting Team	4	Incident Control Team	Standby for fire control
Victim stabilisation	1	Incident Control Team	Basic medical assistance to IP
Scribe	1	Incident command team	Record and report incident activtiy
On-Scene Commander	1	Incident Control Team	Assessment, control and supervision

Emergency Information

Position	Telephone No. (Office)	Telephone No. (Office)	Telephone No. (Office)
Operations Manager			
Emergency Duty manager			
Gladstone Hospital			
Gladstone Police Station			
Fire & Rescue Department			
Security Adviser			

Fire Water Resources Requirements

235 M^3/hr

	Name	Signature	Date
Prepared by:			
Approved by:			

Weather Conditions
Wind: South Easterly 11.32 M/s
Temperature: 25 C
❑ Sunny ❒ Cloudy ☑ Windy ❑ Raining

Incident Action Plan For Loss Of Containment At Jetty

Equipment Specifications/Process Description

The 406 mm (16") loading arms will be used to load LNG ships, berthed at the jetty, at a combined rate of approximately 10,000 m³ per hour (@ 5,000 m³ per hour per loading arm). One (1) loading arm will be a combination loading arm used for either LNG loading or vapour return. Each loading arm will be furnished with an electro-hydraulically operated emergency release system. The powered emergency release coupling (PERC) is installed between two product ball valves. The ball valves can be adjustable to close from 5 seconds up to 20 seconds. Only after both emergency release system (ERS) ball valves are closed, the PERC can be released.

Hazards Information At Site

1. Cryogenic LNG
2. Flammable methane liquid and gas
3. Asphyxiation

Incident Description

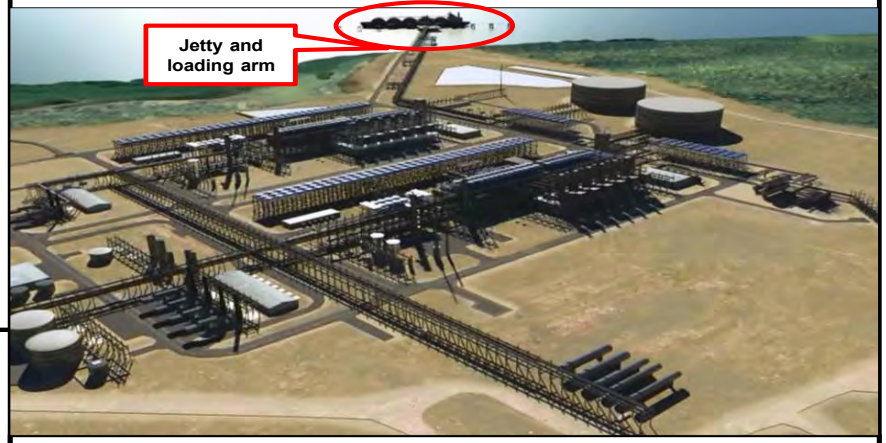
During LNG loading the LNG vessel has moved beyond the design limit causing resulting in the loading arm to disconnect.

About 75 M³ of LNG was spilled on the jetty and part of the spill run into the sea below.

Emergency Equipment At Location

1. Fire hydrant – 2 units (Y-Hydrant)
2. Oscillating Fire monitor – 2 Units
3. 65 mm sea water tie-in – 4 units
4. Extinguisher – nil

Plot Plan Of Location



Adjacent Exposure

Response Tactic

Fire Fighting And Control

1. Approach the site from up wind
2. Stay away from the LNG mist
3. Do not use water monitor if LNG is not ignited
4. Allow the LNG to evaporate and dissipate into the atmosphere
5. If LNG caught fire, cool the surrounding equipment and facility using fire monitor s and fire fighting tug
6. Set up water curtain to prevent LNG vapour from escaping to other areas. Allow the fire to burn until all LNG is consumed
7. All fire fighting personnel to carry escape BA during fire fighting activities

On-Scene Controller

1. Communicate with Incident Commander on response activity at site
2. Use UHF channel xx to communicate
3. Coordinate to close ERS valves from local panel due failure of electrical/hydraulic system
3. Assist Gladstone Port Authority in controlling the emergency

Precautions

1. LNG vapour may cause vapour cloud explosion. Remove all sources of ignition
2. Asphyxiation is possible due to the violent evaporation of LNG when in contact with sea water.

Incident Action Plan For Pipeline Rupture Near Populated Area

Fire Equipment Matrix

Fire Equipment	Capacity M³/hr	Hose Connection	Location	Quantity	Other Information
Fire oscillating monitor	180			2	360
Fire hose	30			4	120
BA					
Fire fighting tug	460			2	920
BA				8	

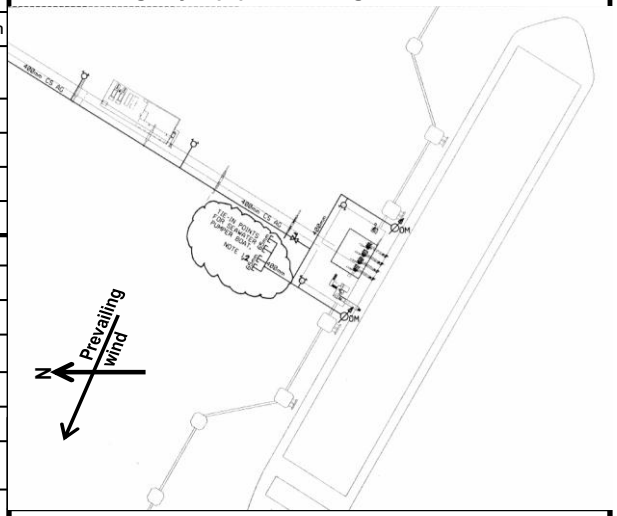
Manpower Requirement

Tactical Activity	Quantity	Unit Designation	Task Objective
Fire fighting Team	4	Incident Control Team	Fire control
Fire fighting team	4	Fire fighting tug	Fire control
Scribe	1	Incident Command Team	Record and report incident
On-Scene Controller	1	Incident Control Team	Control incident at site
Mutual aid	1	Incident Command Team	Logistic Chief to liaise with mutual aid members

Emergency Information

Position	Telephone No. (Office)	Telephone No. (Office)	Telephone No. (Office)
Operations Manager			
Emergency Duty manager			
Local Hospital			
Local Police Station			
Local Fire & Rescue Department			
Security Adviser			
Gladstone Port Authority			

Emergency Equipment Arrangement At Site



Assembly Area

Fire Water Resources Requirements

1400 M³/hr

	Name	Signature	Date
Prepared by:			
Approved by:			

Weather Conditions
Wind: South Easterly 11.32 M/s
Temperature: 25 C
❑ Sunny ❒ Cloudy ☑ Windy ❑ Raining

Incident Action Plan – Vessel Collision Within Port Area

Equipment Specifications/Operations

Passenger ferries, barges and ships are used within the Gladstone harbour to transport people, materials and LNG. The sizes of the vessels vary from small recreational boats to very large ships that carry coal and LNG. Except for LNG tankers which are powered by gas, other vessels are powered by diesel or fuel oil.

Gladstone harbour is vey busy and narrow.

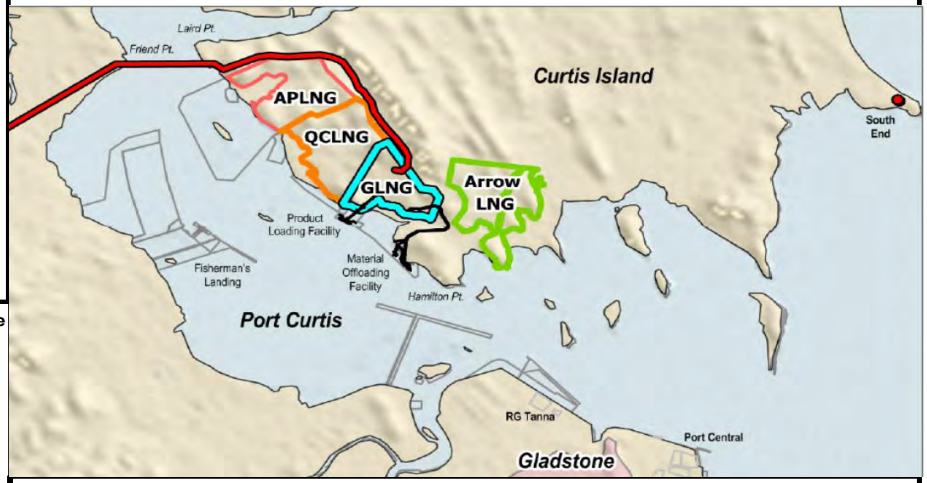
Incident Description

A vehicle ferry transporting a diesel truck tanker for GLNG collided with a medium size fishing vessel. The collision ripped the port of the ferry and diesel truck tanker was thrown overboard.

The fuel tank of the ferry and the diesel tank of the truck was badly ruptured causing massive diesel and fuel oil spill.

The ferry captain and two crew and the truck driver was missing in the sea.

Plot Plan Of Location



Hazards Information At Site

- Spilled fuel oil or diesel from ship fuel
- Spilled chemical or hazardous materials transported by the vessels
- Vapour cloud explosion if LNG is spilled

Emergency Equipment Available

1. Tug boats – x unit
2. Tug boat with fire fighting capability – x unit
3. Boat or jet ski – x unit
4. Oil spill boom – x meters
5. Saw dust/absorbent

Adjacent Exposure

1. Unit n

Response Tactic

Spillage and Pollution Control

1. Inform Gladstone Port Authority
2. Get any available vessel or boat to search for the missing persons
3. Warn other vessels to move slowly as not to create big waves which may cause the spilled fuel oil and diesel to travel far and faster
4. If spills land on the beach, cover the spill with saw dust or absorbent materials
5. Collect the saw dust or absorbent materials and put them into drums and disposed to approved legislated waste disposal site

Incident Commander

1. Inform Gladstone Port Authority
2. Organise man-overboard search
3. Organise waste disposal

Precautions

1. Diesel and fuel oil are hazardous to health
2. LNG will vaporise violently when it comes in contact with water which may cause VCE if ignited

Incident Action Plan - Vessel Collision Within Port Area

Emergency Equipment Matrix

Fire Equipment	Capacity M^3/hr	Hose Connection	Location	Quantity	Other Information
Tug boat					
Tug boat with fire fighting capability					
Oil spill boom					
Waste container drum					
Saw dust					
Absorbent					
Boat/jet ski					
Oil skimmer					
Spade/scoop					

Manpower Requirement

Tactical Activity	Quantity	Unit Designation	Task Objective
Man overboard search & rescue	4	Incident Control Team	Locate and rescue man overboard
Spillage control & recovery	1	Gladstone Port Authority	Recovery of spilled materials
Scribe	1	Incident Commander Team	Record and report emergency response activity
On- Scene Controller	1	Incident Control Team	Site control and supervision

Emergency Information

Position	Telephone No. (Office)	Telephone No. (Office)	Telephone No. (Office)
Operations Manager			
Emergency Duty manager			
Gladstone Port Authority			
Gladstone Police Station			
Fire & Rescue Department			
Security Adviser			
Gladstone Hospital			

Oil Spill Boom Deployment Arrangement

Legislated Waste Disposal Site

1. Wanless Enviro Services – Tel: 1300137240
2.
3.

	Name	Signature	Date
Prepared by:			
Approved by:			

Appendix D – Incident Controllers Checklist

Incident Controllers Checklist
Initial Actions
❑ Establish initial contact with relevant site personnel and establish the nature of the emergency, the potential and current status of personnel, assets and the environment
❑ Establish who has been informed and who needs to be informed external to Bechtel
❑ Activate the On-Scene Commander, ERT and Medical Team
❑ Classify the emergency - be prepared to reclassify as the emergency unfolds
❑ Establish ERT at EOC, if emergency warrants such action
❑ Consider whether Site or Curtis Island evacuation is potentially required
❑ Inform Senior Project Manager of current status of emergency
❑ Ensure that the relevant authorities have been notified
❑ Establish contact with key subcontractor management as applicable
❑ React to un-availability of any ERT or Medical Team members
General Actions
❑ Ensure all ERT members are aware of the current situation
❑ Hold a 'time-out' as soon as practical to confirm latest information and status with all ERT Members – hold regularly (20-30 minutes) thereafter
❑ If possible maintain an 'open' line with the subcontractor representatives
❑ Consider the need to have External Affairs or HR support
❑ Contact and liaise with Contractor Company as appropriate.
❑ Oversee the maintenance of the situation board & record log to ensure accuracy & timeliness
❑ Maintain regular contact with the On-Scene Commander
❑ Regularly confirm casualty and POB status to maintain accuracy
❑ Confirm all ERT members understand that all media comment will be made by the Senior Project Manager or Owner's (GLNG) nominated repetitive
❑ Call for information on any external contacts already made by other EMT members
❑ Ensure business and regulator/government notifications are made as per requirements
❑ If you have to leave the ER Room – what is this? ensure you appoint a deputy
Strategic Actions
❑ Discuss potential with On-Scene Commander
❑ Step back from the detail on a regular basis to look at the overall response and potential escalation
❑ Consider impact minimisation options
❑ Keep ERT on track regarding response/communications/strategy objectives
❑ Make decisions without consensus when necessary
❑ Encourage proactive/lateral thinking from ERT and encourage regular discussions
Concluding Actions
❑ Collect all Logs and chair ERT debrief session
❑ Request and follow up on full incident reports and recommendations

Appendix E – Emergency Log

Emergency Log			
DATE: ……../……../……..			
TIME	**CALLED BY**	**MESSAGE** **YES ☐** **NO ☐**	**PHONE**
LOCATION & NATURE OF EMERGENCY EVENT:			
HISTORY:			
ACTION:			
NOTIFICATION:			
TIME		**ACTION**	
INCIDENT CONTROLLER'S REPORT:			

Appendix F – Emergency Contact Information

Emergency Contact Information	
Emergency and Related Services	
Organisation	**Contacts**
Fire Service **Ambulance** **Police**	**Call 000 (or 112 if call is from a mobile telephone)** "This is (**GLNG PROJECT CURTIS ISLAND, I repeat, GLNG PROJECT CURTIS ISLAND**) calling"
Gladstone Hospital	**Main Telephone: (**07) 976 3200 **Emergency: (07) 4976 3218** Park Street GLADSTONE QLD 4680 (See Map Below)
Marine Unit Coordinator for Gladstone Ports Corporation	Office: (07) 4976 1333 (24 hours)
Report a discharge or probable discharge **Gladstone Harbour Control**	VHF Radio: VHF 13 and 16 0 Telephone: +61 7 4973 1208 Fax: +61 7 4972 5520 Email: VTS-Gladstone@msq.qld.gov.au
MSQ - Gladstone Harbour Master	Regional Harbour Master (Gladstone) Telephone: (07) 497 31200 Main Office Mobile: 0407878852 Registered Harbour Master Fax: (07) 497 25520
Queensland Ambulance	OIC - Mobile: 0404 474820, Office: 4972 9278QAS Communications 4931 7111
QLD Fire & Rescue Service	OIC – Mobile: 0419675816, Office: 4979 6582, QFRS Fire Communications Centre 4922 1130 Gladstone Fire Station: (07) 4979 6589
QLD Police Service	OIC – Office: 4971 3222 (Gladstone Police Communications Centre) Gladstone Police Station (07) 4971 3209
Curtis Ferry Services	Mobile: 0428 180079 / 0418 729 641, Office: 4972 6990
Workplace Health and Safety Queensland	Main line: 1300 369 915
Aus. Maritime Safety Authority	Office: (02) 6279 5000 – Switch Board Gladstone: (07) 4972 9045
Harbour Control:	Office: 4973 1208
Dept of Main Roads	4931 1500 – Rockhampton (07) 4971 5208 – Gladstone Road Safety (07) 4971 5206 – Regional Compliance and Enforcement

Emergency Contact Information	
Emergency and Related Services	
Organisation	**Contacts**
Environmental Protection Agency	Office: 4971 6500
Poisons Information Service	Emergency call number: 13 1126
State Emergency Service	Office: 4975 7585, 132 500
Gladstone Regional Council	Office: 4975 8100
(RACQ) Capricorn Helicopter Rescue Service	000 or (07) 4922 9093 Canoona Road, Rockhampton Helipad Coordinates – Curtis Island: S –23^{o} 47' 0.02" E 151^{o} 13' 12.00"

Bechtel /GLNG/Subcontractor Emergency Contact List Template					
Contact Name	**Position**	**Office**	**Mobile**	**Radio Channel**	**Email**

Note: The above template will be used to develop a list of emergency response telephone numbers and radio channels for designated emergency response personnel and associated management personnel on the GLNG Project

Appendix G – Reporting and Emergency Template

Reporting an Emergency

(Usually first on scene)

Raise The Alarm

EMERGENCY CHANNEL: 1

EMERGENCY PHONE: 0411 313 889 / 0419 747 941

"EMERGENCY-EMERGENCY-EMERGENCY"

STAY ON PHONE / RADIO UNTIL YOU'RE SURE

EMERGENCY MESSAGE HAS BEEN UNDERSTOOD

ALWAYS BE THE LAST PERSON TO HANG UP!

ACTION

1. Stop and Think!
2. Raise the alarm and notify the Emergency Response Team on Channel 1 or by Telephone: Medical on 0419 747 941 or Emergency Response Team on 0411 313 889. Provide them with an initial incident assessment and extent of the emergency. Provide:
    a. Your name
    b. Exact location
    c. What is the emergency (spill, fire, injury)
    d. People – injured or missing
3. Declare radio silence if necessary.
4. Attempt to rectify any hazards but do nothing to endanger yourself or other lives.
5. If you or other people are in immediate danger, evacuate the area or building. Alert others by shouting or activating an evacuation alarm/siren if provided.
6. Assist with evacuation of area if necessary and proceed to Evacuation Assembly Area.
7. Protect yourself and any injured persons.
8. If safe and trained to do so, respond to incident (fight fire).
9. Continue to assist until help arrives.
10. Assist with assessing initial likely requirements.
11. Act as guide if required.

Appendix H – Bomb Threat Form

BOMB THREAT CHECKLIST

Initial Actions:

Time of call: AM/PM	**Do not hang up!** Keep caller talking

Exact Wording of Threat:

Questions to Ask:

When is the bomb going to explode?	
Where exactly is the bomb?	
When did you put it there?	
What does the bomb look like?	
What kind of bomb is it?	
What will make the bomb explode?	
Did you place the bomb?	
Why did you place the bomb?	
What is your name?	
Where are you?	
What is your address?	

Listen For:

VOICE	Accent / Impediment / Tone / Speech / Diction / Manner
LANGUAGE	Polite / Incoherent / Irrational / Taped / Read Out / Abusive
NOISES	Traffic / Voices / Machinery / Music / Noises On The Line / Local Call
OTHER	Sex of Caller: M F Estimated Age:

Do Not Hang Up

After the Call

Note The Time of The End of the Call: AM / PM	
Name of Recipient (Print):	
Signature:	Date:
Report The Call to Site Manager/HSE Manager, Who Will Contact the Local Police	

Appendix I – Suspicious Parcels

IDENTIFYING SUSPICIOUS PARCELS

Pay attention to the appearance, wrapping, addressing, postage, or any other irregularities of the parcel. Be alert to:

1. Lopsided or uneven packages or envelopes
2. Excessive postage
3. Hand-written or badly typed addresses
4. Absence of return address or nonsensical return address
5. Generic or incorrect titles
6. Misspelling of common words
7. Strange odours
8. Unusual sounds, particularly ticking or buzzing noises
9. Oil stains or discoloration
10. Protruding wires, tinfoil, or string
11. Excessive weight
12. Rigid envelope
13. Excessive securing material, such as masking tape, string, etc.
14. Restrictive markings, such as Confidential, Personal, etc.

Do you know the sender? If not, and you feel the item is "suspicious," contact your Supervisor and Security for further action and refer to the guidelines below:

HANDLING SUSPICOUS PACKAGES (All Cases)

If a letter, parcel or package is suspicious:

1. Do not touch it, and do not allow anyone else to touch it.
2. Keep people away from the area.
3. Notify your team leader or a senior manager immediately
4. Notify the Emergency Controller
5. Do not handle the suspicious object and do not try to carry it outside.
6. Carefully place the item on your desk or table and step away.

IF YOU THINK IT IS A BOMB

1. Evacuate the room. If the device appears to be very large, evacuate surrounding rooms.
2. During evacuation, leave doors and windows open to reduce any blast effects.
3. Do not place the device in water.
4. Do not use radios or cell phones to call the authorities. Real bombs are often radio controlled
5. Do not touch

IF YOU ENCOUNTER AN UNIDENTIFIED SUBSTANCE IN A PACKAGE OR LETTER:

1. Do not panic.
2. Do not touch, smell, taste, or try to analyse the substance.
3. Alert others to keep away from the area.
4. Remain in the immediate area to minimise the spread of contamination.
5. Turn off any circulating fans, air conditioners or heaters.
6. Do not attempt to wash off or disperse the agent.
7. Wait for trained medical and decontamination personnel to arrive.
8. Do not pass the letter or package to others. Handling may only spread the substance and increase the chances of getting it in the air.

Appendix J – Cyclone Response Guide

The HSE Manager will regularly monitor the Bureau of Meteorology internet site for forecasts and warnings during the cyclone season and will arrange for automatic alerts to be provided by Australian Bureau of Meteorology to enable appropriate assessments to be made.

TROPICAL CYCLONE CATEGORY SYSTEM

Category	Wind Strength	Typical Effects
1	90 - 125 km/h	Negligible property damage. Damage to some crops, trees and caravans. Craft may drag moorings.
2	125 – 164 km/h	Minor property damage. Significant damage to signs and trees. Risk of power failure. Small Craft may break moorings.
3	165 – 224 km/h	Some roof and structural damage. Power failures likely.
4	225 – 279 km/h	Significant roofing loss and structural damage. Dangerous airborne debris. Widespread power failure.
5	> 280 km/h	Extremely dangerous with widespread destruction.

Source: Australian Bureau of Meteorology Website
http://www.bom.gov.au/cyclone/about/intensity.shtml

CYCLONE WARNING SYSTEM

Section 1

Cyclone preparation

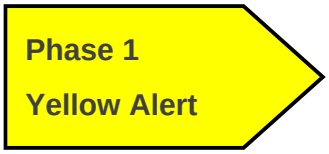
72 hours before destructive winds are expected

Advice and modelling received from Bureau of Meteorology, Severe Weather Warning Centre of the possibility of inundation or severe damage to Island.

- Gladstone District Disaster Co-ordinator will advise all sites to prepare for possible evacuation and report back of number of persons that are present.
- GLNG Incident Controller through the Emergency Operations Officer will contact Transport Operations to confirm vessels / aircraft availability, capability and capacity in present conditions.
- The Emergency Management Group to meet and assess / consider the evacuation of site based residents back to point of hire or to suitable accommodation south of Gladstone outside the Cyclone Watch Area. Due to possible flooding of major highways and the potential increased risk of cyclonic activity the areas north and west of the City should be avoided. Mainland based staff may also be able to provide emergency accommodation if required
- All vessels contracted to the GLNG project to be advised of the situation and start cyclone preparations.
    1. All barge crews must be responsible for lashing of all deck equipment upon the 72 hour notice call.
    2. Barge masters are responsible for making ready & attaching bridles to their barges. (Bridles & bouy shackle must be ready for deployment to line boat @ designated mooring).

Section 2

Phase 1 – Initial Warning Only



Declared 48 hours before destructive winds are expected

1. Bureau of Meteorology has advised there is a cyclone in the area via a 'cyclone watch';
2. There is a possibility it may head towards Gladstone;
3. The project considers it prudent to initiate a warning.

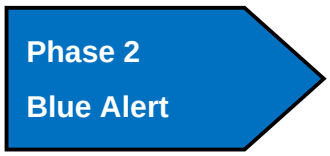
Actions Include:

1. IC to advise Bechtel Leads and Subcontractors of the cyclone status.
2. Emergency Response Team and Subcontractors conduct a risk assessment of impending situation and review actions.
3. Team Leaders to cease all work and advise all site team members of cyclone alert via toolbox safety meetings.
4. Team Leaders to reinforce warning system and actions.
5. Detailed clean-up of site to commence, including removal of all surplus equipment and materials from the site.
6. Consider completion of new installation work to cease and fastening down of existing work.
7. All items that may become airborne are to be lowered to ground level and stored inside enclosed containers or buildings, which are tied down by an approved method.
8. Steel scaffolds to be secured to a permanent structure.
9. Aluminium scaffolds are to be dismantled, stacked and stored or tied down.
10. All rubbish bins and skips to be secured or removed from site where practicable.
11. IC and EOO to audit the site and report deficiencies to Subcontractor Site Managers.
12. Due to the large number of vessels contracted to the project consider commencing securing vessels to their storm mooring.

Note: Sandbags, steel cable, netting and other such equipment will be provided to tie down equipment in the field to prevent it from becoming airborne in the event of a tropical storm or cyclone. Where practicable, equipment and materials will be housed indoors and large equipment will be used to contain equipment likely to become airborne.

Section 3

Phase 2 – Cyclone Conditions Likely Within 24 hours



Declared 24 hours before destructive winds are expected

Actions Include:

1. EOO to plot cyclone movement every two hours
2. IC to advise subcontractors of the change in cyclone status
3. Complete storage and tying down of all items previously identified
4. Scaffolds to have all boards lowered to ground and stored or tied down
5. Oxy and acetylene cylinders to have gauges removed and stored
6. Secure cranes and mobile equipment. Hydraulic crane booms to be retracted and lowered
7. Lattice jib cranes to have booms lowered and secured and parked with outriggers extended
8. Mobile equipment to be moved as close as practical to site buildings with handbrake on and in low gear
9. Windows of mobile equipment, crib room facilities and offices to be taped and covered where practicable
10. Valuable site office equipment (computers, printers etc.) and records to be placed on floor of site buildings, under tables and sealed in plastic sheet
11. Temporary power boards to be switched off and secured
12. All contractors and project management team to cease work and personnel sent home once site is secured and made safe. *Note:-* The Harbour Master will close the harbours to all vessel movements with wind speeds 40 knots and above.
13. Isolate main power supplies to all areas except the Camps and Dinning facility.
14. Tape up all windows in the Dining Room facility.
15. All Vessels to be secured to their storm mooring or a safe haven as per the Port of Gladstone Cyclone Contingency Plan.
16. All loose items on deck space to be removed below deck or made safe
17. Personnel living on mainland and non-essential personnel and visitors to return to mainland and be provided transport home or to safe shelter.
18. Vessel Masters to comply with instructions from Gladstone Harbour Master
19. Camp staff to make camp ready for occupancy by personnel living in camp and ensure following items are available in Accommodation Blocks and Medical Clinic:
    - Bottled water
    - Flashlight with spare batteries
    - Light meals and snacks
    - Toilet requirements
    - Medical coverage and associated medical consumables and equipment
    - Communications with mainland

Note: During the early stages of work on Curtis Island, when there is no onsite accommodation or safe shelters, all personnel shall return to the mainland where they will be transported home if living locally or to an agreed safe haven on the mainland if not a resident of the Gladstone area.

Section 4

Phase 3 – Cyclone conditions Probable within 8 hours

Phase 3
Red Alert

Declared 8 hours before destructive winds are expected on site.

Actions Include:

1. Final check of site by IC & EOO with Bechtel and Subcontractor Area Superintendents to assess status of preparations and address any last minute items.
2. All personnel to return to camp and check their rooms for following items:
    - Bottled water
    - Flashlight with spare batteries
    - Snacks
    - Toilet requirements
3. All employees to report to the Dining Room facility and be briefed by the Incident commander on their action and responsibilities. Section 5 & 6 below.
4. Area and Chief Wardens to conduct roll calls and ensure all persons accounted for. On completion of the roll call all persons must return directly to their accommodation block and remain until further advised.
5. Consideration to be given to isolating mains power supply to selected areas of the camp.

Section 5

Cyclone in area

Actions Include:

1. All personnel to remain in the safety of their accommodation blocks.
2. All personnel to obey directions given by the onsite Incident Controller
3. Keep listening to the radio for information on the cyclones progress
4. Disconnect electrical appliances and turn off gas supply valves
5. Stay away from doors and windows, and keep them closed and locked
6. Stay inside until the All Clear is given. The all clear will be given by 3 blasts of evacuation siren or the siren on an Emergency Response Vehicle.

Note: - The eye of the cyclone is a region of mostly calm weather found at the centre of tropical cyclones. The eye of a storm is a roughly circular area and typically 30–65 km (20–40 miles) in diameter. It is surrounded by the eye wall, a ring of towering thunderstorms where the second most severe weather of a cyclone occurs. If the eye of the cyclone passes directly over the project site do not be tricked in thinking the cyclone has passed. Remain indoors until the all clear has sounded.

Section 6

Phase 5 – Cyclone moving away

Cyclone passed but still active / not active

Actions Include:

1. Personnel advised to remain within safety of their accommodations blocks until the all clears (3 blast of the evacuation siren) is given
2. All persons to report to the dining room facility and a role call conducted to determine all persons are accounted for.
3. Any injuries are to be immediately report to the Clinic Staff
4. IC to determine if safe to return to site/work.
5. IC to contact project Team Leaders and confirm availability of team members.
6. IC to advise Subcontractor Site Managers of return to work intentions.

7. Inspect site. Conduct hazard analysis to eliminate and control hazards prior to commencing work.
8. Recovery Plan to be formulated to address severe damage.
9. IC to assess damage and report to Senior Project Manager.
10. Site returned to steady state when all is safe.
11. Note: Local Radio Station will be used to alert all employees in the Gladstone region of status for their return to work. Text messaging may be used for certain disciplines, e.g., supervisors, foremen, etc.

Appendix K – Pandemic Overview Guide

A Pandemic is an epidemic disease of widespread prevalence around the globe. The Bechtel Pandemic Response Plan will guide the Project's preparedness and response to a pandemic, with the intent of:

- Limiting the impact of a pandemic event on the Project and personnel
- Taking responsible actions to limit the spread of a pandemic and alleviating disease, suffering and death, and;
- Sustaining critical infrastructure and reducing the economic impact to construction and local communities

In the event of a pandemic, Bechtel will initiate this Pandemic Response Plan which will serve to advise and guide the project once the World Health Organisation (WHO) declares a Phase 1-6 (1-7 in Australia) Pandemic Event.

Pandemic Phases

The World Health Organisation has 6 global phases to describe the status of a pandemic worldwide. Australia, however, has 7 phases to guide the Australian response to the pandemic as it develops:

Pandemic influenza - Australian phases			
Australian Phase			Phase Description
Prevention and Response	Alert	1	**A new flu virus with pandemic potential causes severe disease in humans who have had contact with infected animals. There is no effective transmission between humans. The new virus has not arrived in Australia.**
	Delay	2	Small clusters of human infection with the virus overseas. Virus is becoming increasingly better adapted to humans, but may not yet be fully adapted (substantial pandemic risk).
	Contain	3	Pandemic virus has arrived in Australia causing a small number of cases.
Response	Protect	4	A new disease of moderate severity (mild in most but severe in some) is spreading in Australia.
	Sustain	5	Pandemic virus is established in Australia and is spreading in the community.
	Control	6	Customised pandemic vaccine is widely available.
RECOVER		7	Pandemic is controlled in Australia but further waves may occur.

Roles and Responsibilities
Depending on the Australian Pandemic Phase Level, various positions will be created whose purposes are outlined below:

Corporate Pandemic Coordinator (CPC)

This position will be held by the Bechtel Corporate HSE Manager or designee, and is to act as the single-point-of-contact for all issues and concerns pertaining to a Pandemic Event. The CPC shall be appointed upon the declaration of a Phase 1 Pandemic Event and responsibilities include:

- Provide special emergency resources, as may be required
- Identify and select special equipment and materials (including appropriate PPE) that may be required by the Project
- Provide special response personnel and services, if necessary (i.e., medical specialists, risk assessment personnel, evacuation services);

GBU Pandemic Coordinator (GPC)

This position will be held by the Bechtel OG&C GBU HSE Manager or designee, and is to act as the single-point-of-contact within Bechtel OG&C for all matters pertaining to or arising from the occurrence of a pandemic event. The GPC shall be appointed upon the declaration of a Phase 3 Pandemic Event

Pandemic Coordinator (PC)

The project HSE Manager or designee will act at the Pandemic Coordinator (PC) in the event of a declaration of a Phase 4 Pandemic Event. The role of the PC will be to act as the single-point-of contact for the Project for all matters pertaining to or arising from the occurrence of a pandemic event. The PC will also be responsible for:

- Provision of general or specific education and training to all personnel on:
- Nature and extent of the pandemic event
- Risks to health and welfare
- Contents of the Pandemic Procedure
- Responsibilities of project personnel to ensure the provisions of this procedure are met in order to limit the spread and scale of the pandemic event;
- Ensure subcontractors understand their roles and responsibilities during the pandemic event that affects their area of work
- Ensure that the name of the designated Project PC is forwarded to the GPC

The table below outlines, in further detail, the actions Bechtel will implement in the event of an Australian declaration of a Pandemic Event.

Pandemic Influenza Phase	GLNG HHS Response	Bechtel Corporate Pandemic Response Procedures	Communications in The Event of Pandemic
Phase 0-3	Project HSE initiates root cause analysis & lessons learned Facilitates recuperation of medical supplies if applicable	Directs Business Continuity goals and procedures Corporate Pandemic Coordinator (CPC) appointed	Root cause analysis documentation to Corporate Health Patient Records to Corporate Health
Phase 3	Routine Public Health Surveillance using health performance indicators. Routine interventions to control infectious diseases including education, hygiene practices. Etc Routine Emergency Planning coordinating with drills, Emergency Command Centre training, evacuation plans, addresses pandemic in tool box talks In the event of a Notifiable disease within the GLNG camp population, the HSSE department shall conduct an investigation and a risk analysis to determine infectivity of the disease and the risk to the rest of the population. The PC shall remain within the HSSE department and is responsible for the further treatment and possible evacuation of the employees. Site management shall be notified of the outcome and risk mitigation measures. Identify sources of pandemic response medications (e.g., Tamiflu, vaccinations etc.)	Bechtel OG&C president appoints GBU pandemic coordinator (GPC) GPC plans for command centre, trains Pandemic Coordinators (PC), evaluates site specific plans External Affairs – Plan communication program, stock materials, create virtual website, distribute awareness materials, plan pandemic help-line IS&T identifies technical solutions to work from home, and trains staff Legal & risk management evaluates insurance & coverage risk Travel during Pandemic Phase 3 will not be restricted but CPC will monitor local regulations for travel restrictions	Infectious disease awareness training Pandemic awareness material GLNG Project HSSE Corporate Health (monthly reports, interesting cases)

Pandemic Influenza Phase	GLNG HHS Response	Bechtel Corporate Pandemic Response Procedures	Communications in The Event of Pandemic
Phase 4 Small cluster(s) with limited human-to-human transmission. Spread of the disease is highly localized suggesting that the virus is not well adapted to humans.	Heightened level of public health surveillance including the use of screening procedures if applicable Heightened interventions including education, social distancing, quarantine, preparation for medical evacuation of non-essential personnel if applicable Heightened emergency planning including *table top* and *what if analysis*, information gathering by the project response team If applicable, GPC Initiates Evacuation Actions for Non-Essential Personnel and Dependants. It is likely that international travel shall become progressively more complex as an infectious disease outbreak progresses, therefore lessons learned Coordinate the procurement and delivery of anti-viral or bactericidal medications applicable to the public health emergency Pandemic Coordinator, (PC) will close projects and offices if nature of pandemic so dictates	GBU issues all staff informational e-mail GPC establishes command centre, alerts project PC. External Affairs monitors international developments, activates website, publicizes help line CPC monitors local regulations for travel restrictions CPC to review and approve all travel to pandemic areas. GBC will initiate evacuation of designated personnel if nature of pandemic so dictates Where possible, following the declaration of Pandemic Phase 4, travellers should be equipped with a Personal Travel Pack, including potentially protective medications such as Tamiflu and personal hygiene cleansers The employee self-assessment questionnaire shall be deployed including education and resources along with actions to take for its usage.	GLNG Project HSSE → Corporate Health (monthly reports, interesting cases) Project HSSE facilitates awareness material and information dispersion throughout project.

Pandemic Influenza Phase	GLNG HHS Response	Bechtel Corporate Pandemic Response Procedures	Communications in The Event of Pandemic
Phase 5 Larger cluster(s), but human-to-human spread is still considered localized, suggesting that the virus is becoming increasingly better adapted to humans but may not yet be fully transmissible (substantial pandemic risk).	Activate Infectious Disease Emergency Response Plan (Appendix C) Vigilant public health surveillance including self-assessment, restricted movement, camp isolation, quarantine measures if applicable. Assists in emergent medical evacuations if applicable. Assist in coordination of site evacuation if applicable Notifies authorities as required (US CDC, WHO, Australian Department of Health) Open isolation ward in clinic if applicable and safe to do so.	GPC activates control centre, alerts site specific PC to phase 5 conditions. CPC will review and approve any travel orders for any personnel returning from Pandemic Area if nature of pandemic so dictates CPC will not authorize travel TO Pandemic Area if nature of pandemic so dictates. External Affairs activates pandemic helpline, updates websites	Project all hands meeting, awareness training, social distancing seminars, hygiene practices
Phase 6 PANDEMIC: Increased and sustained human-to-human transmission in the general population.		When Pandemic Phase 6 is declared, all travel will cease, unless specifically authorized by the GBU President and in accordance with Corporate travel policies to be determined at that time.	
Phase 7 Global pandemic levels decreased or returned to normal seasonal levels	Work activities to return to normal while remaining vigilant	Travel to region may resume but CPC will monitor local regulations for travel restrictions	Inform personnel of pandemic control and continue to emphasize disease awareness training

Appendix L – Helicopter Support Guidelines

For some emergency responses, it may be appropriate for injured personnel to be evacuated by helicopter. It may also be appropriate for personnel or resources to be delivered to the work location in this manner.

Note that injured personnel are not able to be transported via a standard helicopter if they are not in a stable condition.

Providing Location Information

The following information is required when requesting helicopter support:

- Site Location
- Latitude/longitude
- Communication available at the location i.e. radio communications including channel, mobile phone
- Type of terrain and hazards i.e. trees or power lines
- Weather conditions in the area
- Identify any obvious landmarks or potential landing locations
- Passenger weight/build.

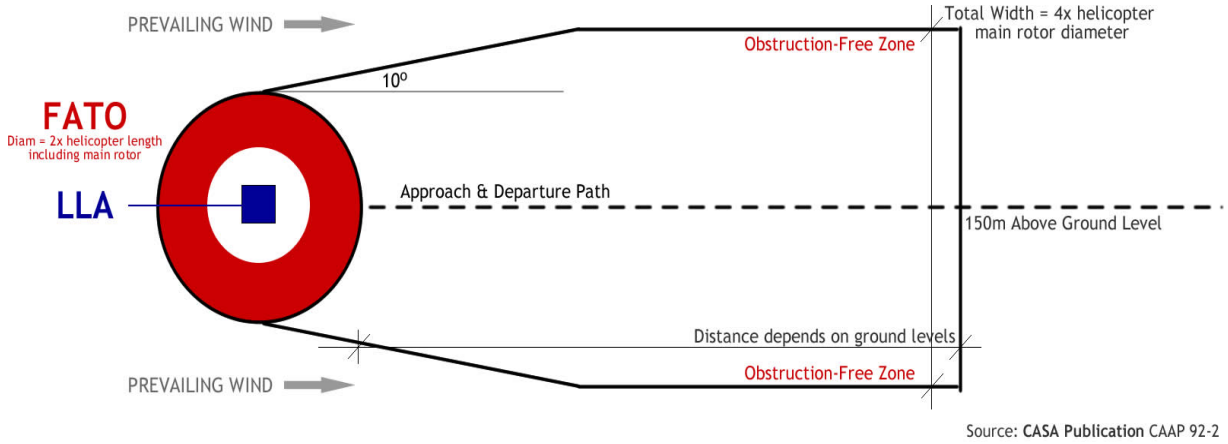
Helicopter – Suitable Landing Sites

A basic Helicopter landing site should:

- Have a Final Approach and Take Off (FATO) area large enough to accommodate the helicopter safely – a circular area of 30 m diameter (or equal to twice the length of the helicopter, when the rotor(s) are turning); free of obstacles, no scrub more than 0.5 m high, no loose materials or any rubbish likely to interfere with the operation of the helicopter.
- Maintain a safe approach and departure path that should extend outwards from the edge of the Final Approach and Take Off area as indicated in Figure 2 and have an obstacle free gradient of 7.5º (1:8 vertical to horizontal). This approach and departure path may be curved left or right to avoid obstacles or take advantage of a more advantageous approach or departure.
- Include a Landing and Lift-off Area (LLA), at minimum, having an area equal in size to the undercarriage contact points plus one meter on all sides.
- Have a surface capable of withstanding the static and dynamic loads imposed by the helicopter.
- Only be used for day operations under helicopter visual meteorological conditions.

Helicopter rotor blades are very finely balanced and even a light object such as a plastic bag drawn up into the rotor disc can cause major damage. Additionally, loose objects may be drawn into the engine air intakes causing catastrophic engine damage.

Figure 1 – Final Approach and Take Off Area for Helicopter



Source: **CASA Publication** CAAP 92-2

Helicopter – Preparation for Arrival

- Where possible, the Final Approach and Take Off area should be wetted down to minimise dust brought up from the rotor blades
- Ensure the flight path for take-offs and landings (upwind and downwind of the Landing and Lift-off Area) does not require the helicopter to pass over power or phone lines, tall trees, buildings or vehicles
- If using a road for a Final Approach and Take Off area, do not select an area with poor visibility, bends, tee junctions and make certain to stop all traffic
- Keep all vehicles, injured persons, other emergency personnel and others at least 30 m from the Landing and Lift-off Area
- Keep any livestock, kangaroos and in particular dogs (which are attracted to the high frequency pitch of the helicopter tail rotor) away from the Final Approach and Take Off area.

Helicopter – safety procedures

- Remove hats and secure or remove loose clothing when approaching the helicopter and when indicating wind direction
- Only approach the helicopter from the side and remain outside the rotor path after it has landed and only approach after the pilot gives you the thumbs up signal.
- Before approaching the aircraft, extend right arm sideways with thumb extended upwards.
- Never approach helicopter through the danger zones indicated in Figure 2.
- Do not proceed past rear locker on fuselage due to danger of the tail rotor.

Figure 2 – Helicopter Approach Safety

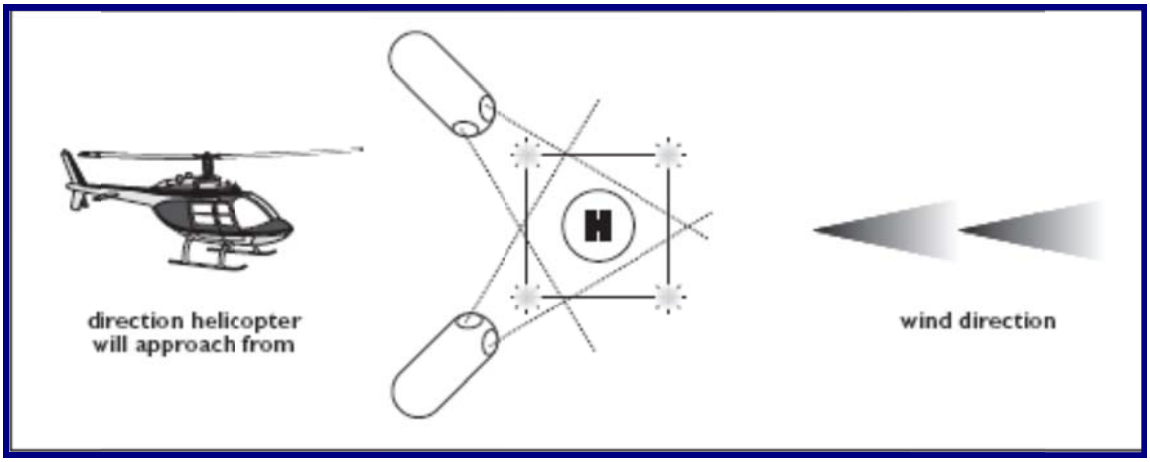
Night Procedures for Helicopters – Helipad illumination

Upon confirmation that a helicopter will be arriving, undertake the following actions:

- Place two vehicles in an arrowhead formation to illuminate the landing area as shown in Figure 3
- Ensure the vehicles are placed at a 45º angle with the wind blowing towards them
- Ensure the headlights are on low beam
- Remove antennas etc from the vehicles and place the vehicles approximately 6 m back from the landing area
- If possible, place four perimeter lights around the landing area
- Ensure the landing area is located on short grass or gibber stone or is watered down to minimise dust. Dust recirculation by the helicopter at night is a potentially dangerous situation.

Figure 3 – Lighting for Landing Area

Night Procedures for Helicopters



In preparation for landing, turn on all available lighting. This includes building, toilet and vehicle lights.

Appendix M – Duty Cards

Incident Controller (IC)

Performed By:	**Site Manager/ Start-Up Manager**
Reports To:	**Senior Project Manager**

Role

1. Responsible for the effective leadership of the Emergency Response Team (ERT) from the Emergency Operations Centre (EOC)
2. Responsible for the management of the emergency response at the construction site, camp facility and mainland activities
3. Ensure that all necessary support is provided to the affected site
4. Ensures effective communications are established with all appropriate internal and external parties.

Responsibilities

Pre-incident:

1. Remain contactable while on duty and adhere to the drug and alcohol policy. Nominate a delegate as required in the event of absence
2. Attend all training activities organised for the ERT
3. Remain familiar with responsibilities within the ERT and Incident Controller (IC) duties.

Immediate actions:

1. Implement the Bechtel GLNG Emergency Preparedness and Response Plan (EPRP) immediately and assign roles (build the team for the situation)
2. Nominate and deploy person to meet with Emergency Services at the relevant location as defined in Attachments 1 - 25
3. Ensure the EOC has been activated and setup
4. Confirm that the Incident Response Team (IRT) members have been contacted and are attending the EOC
5. Appoint a Log Keeper and ensure a log of events is commenced as soon as possible
6. Establish clear, uninterrupted lines of communications with the affected site and the On-Scene Commander
7. Establish and clarify the details of the emergency and then provide ongoing assistance and guidance to the On-Scene Commander.
8. Brief all IRT members on factual information and the current status of the emergency
9. Ensure IRT members are fully aware of their respective roles and responsibilities
10. Assess need for senior management to be at the emergency site
11. Consult with the Senior Project Manager as to the emergency classification level and determine if the emergency is to be escalated up to Bechtel's OG&C Functional Management Team in Houston

During incident:

1. Establish IRT relief/shift arrangements as necessary
2. Monitor and ensure effectiveness of information flow to/from affected site
3. Communicate on a regular basis with the On-Scene Commander (OSC) and ask for SITREPS. Set call-back times so as not to detract from the response efforts
4. Continually assess the emergency to meet any changes in the situation
5. Ensure all personnel are accounted for and that their welfare is monitored
6. Obtain details of any personnel injured
7. Confirm that the Emergency Services are attending/are in attendance
8. If warranted ensure that the emergency site is cordoned off so as not to disturb any evidence that may be required
9. Conduct regular briefings with IRT to keep all informed of emergency status and forward planning process
10. As required – provide Situation Reports (SITREPS) to the Senior Project Manager
11. Ensure all need-to-know Bechtel and GLNG personnel have been notified of the emergency.
12. Ensure the Log Keeper and IRT Status Board are up to date
13. Identify potential problem areas and issues that may arise directly or indirectly as a result of an ongoing response, i.e., risk and exposure to personnel/environmental/ company assets and consider production/commercial impacts
14. Consider site HR and ER issues resulting from the emergency and take appropriate action
15. As a result of an emergency situation at site assess site security arrangements
16. Ensure the IRT and all of its supporting functions continue to operate effectively
17. Ensure a complete filing system of documents is established and all documents pertinent to the emergency and the response are collected, recorded and securely stored.

Post-incident:

1. In consultation with the On-Scene Commander ensure that all personnel have been accounted for and that it is safe to resume normal operations
2. Ensure all actions have been closed out and the emergency log completed
3. Brief all IRT members of the termination of the emergency
4. Ensure the termination of the emergency is communicated to all personnel involved
5. Consider what investigations will be appropriate in relation to the emergency
6. Conduct a detailed debrief with the IRT to ensure all issues, actions and lessons learnt are captured
7. Ensure the On-Scene Commander at site provides a detailed debrief report that includes issues arising from the assistance provided by the IRT and external parties i.e. Emergency Services
8. Ensure that a responsible person has been delegated the role of commencing an investigation into the emergency and is provided with the necessary support.

Log Keeper

Performed By:	**Safety Administrator**
Reports To:	**Incident Controller**

Role

1. Responsible for the efficient recording of all emergency information, requests, actions, decisions, strategies and relevant information in the emergency response log
2. Provide administration support to the Incident Response Team (IRT) and undertake other duties as directed by the Incident Controller (IC).

Responsibilities

Pre-incident:

1. Attend all training activities organised for the IRT
2. Remain familiar with responsibilities within the IRT and Log Keeper duties.

Immediate actions:

1. Assemble at the Emergency Operations Centre (EOC) and receive a detailed briefing on the emergency
2. Perform the set up of the EOC and all facilities
3. Obtain adequate briefing and likely requirements of the role
4. Establish as soon as possible the Emergency Log and record all matters in a chronological and concise manner
5. Utilise a desktop PC or Notebook computer to electronically record the emergency log and if possible display the log with a data projector
6. Ensure IRT members are aware of the emergency document flow process
7. Prepare the IRT status and information boards for recording – if electronic whiteboards are used ensure copies are made prior to the removal of any information
8. Act as a recording secretary, taking meeting minutes when requested
9. Remain focused on the log keeping role, but assist the IRT when possible.

During incident:

1. As your recording role is critical - DO NOT get involved in any activities other than on this checklist unless directed by the IC
2. Continually review the Log for accuracy and if recording by electronic means, ensure that the data being entered is saved or backed up
3. As requested, copy or print off log sheets for ERT members and mark the log sheet as an uncontrolled copy
4. Update the IRT Status Board at regular intervals

5. Assist with the efficient filing and recording of all ERT/ Emergency Response Team documentation
6. Confirm SITREPS for Log with IC
7. Clarify any confusion of events/actions as soon as apparent
8. In a shift operation situation, or when assigning a deputy, brief incoming person on individual role, status of situation, log and record keeping requirements.

Post-incident:

1. On advice from the IC, complete all necessary log keeping and administration requirements
2. Collect and collate all personal records and log sheets from all IRT members
3. Participate in the IRT debrief
4. Assist with the restoration of the EOC and secure filing of all records.

Emergency Operations Officer (EOO)

Performed By:	**HSE Manager**
Reports To:	**Incident Controller**

Role

1. Responsible for managing the immediate event response, including activating and coordinating resources and activities
2. Maintaining ongoing communication with key stakeholders throughout the response and recovery activities
3. Assist in other duties as directed by the Incident Controller (IC).

Responsibilities

Pre-incident:

1. Remain contactable while on site and adhere to drug and alcohol policy. Nominate a delegate as required in the event of absence
2. Attend all training activities organised for the Emergency Response Team (ERT)
3. Remain familiar with responsibilities within the ERT and Operations Officer duties.

Immediate actions:

1. Assemble at the Emergency Operations Centre (EOC) and receive a detailed briefing on the emergency
2. Assist in the set up of the room and ensure an up to-date 'Emergency Contact' list is available to the IRT
3. Following initial contact by the IC with the scene, maintain communications and receive ongoing Situation Reports (SITREPS)
4. Ensure that you have the appropriate communication mediums available to you at all times (i.e. radio/landline/mobile)
5. Ensure that a direct line of communication is established with the affected site as requested by the IC communicate with nominated parties and relay messages/instructions given by the IC
6. Obtain contact details (if not on Emergency Contact List) for any external parties involved in the emergency.

During incident:

1. Continually review and assess the effectiveness of all communication mediums within the IRT and with the field and rectify any problems
2. Ensure that the On-Scene Commander (OSC) is adequately supported and kept informed of IRT actions
3. Manage and monitor all event response activities including site evacuation if required
4. Ensure that Emergency Services are briefed, inducted and appropriately guided in their response to the emergency

5. Assist in the timely delivery of all correspondence, internal and external communiqués
6. Assist in the setup of any conference calls with either the affected site or Queensland IMT
7. As required consult with the IC to maintain effective liaison with all key stakeholders
8. Review all site SITREPs to assess long term communication issues
9. Ensure that important correspondence and messages are delivered to IRT members
10. If necessary, maintain your own log of events or notes
11. Liaise closely with IRT members and keep Log Keeper informed of any developments at EOC or affected site.

Post-incident:

1. Consult with the IC on the completion of all necessary internal and external emergency termination communications
2. Liaise with the affected site as to final emergency communication issues with all key stakeholders, including the OSC and Emergency Services
3. Ensure that any post emergency communication commitments are completed
4. Liaise with the Log Keeper to ensure that all issues and actions have been recorded in the Log
5. Ensure that no information is deleted from the status or information boards until all comments have been captured
6. Any audio recordings must be labelled, retained and sealed with the EOC confidential files
7. Participate in the ERT debrief
8. Assist with the restoration of the EOC and secure filing of all records.

On-Scene Commander

Performed By:	**Emergency Response coordinator**
Reports To:	**Incident Controller (initial contact)** **Operations Officer (ongoing communications)**

Role

1. Remain contactable while on site and adhere to drug and alcohol policy. Nominate a delegate as required in the event of absence
2. Responsible for the activation of requisite site Emergency procedures by the site Emergency Response Team (ERT)
3. Responsible for the safe and effective evacuation of site personnel
4. Ensures that appropriate Emergency Shut Down procedures are implemented
5. Responsible for factual information being communicated to the Incident Controller (IC) / Emergency Response Team (ERT).

Responsibilities

Pre-incident:

1. Attend all training activities organised for the ERT
2. Remain familiar with responsibilities within the ERT and On-Scene Commander (OSC) duties.

Immediate actions:

1. When emergency alarm is raised – determine the source/type of emergency and gather all available information.
2. Assume initial responsibility for control of the emergency at site and ERT
3. Ensure site emergency response procedures are immediately implemented
4. If required initiate site evacuation to assembly areas and ensure an Assembly Area Warden is present to conduct a headcount of all personnel
5. Arrange for the safe shutdown of equipment/plant in the affected area (if possible) as long as personnel are not endangered in the process
6. If safe to do so, make the area/site safe & render assistance to affected personnel
7. Assess what immediate response can safely be undertaken by personnel at the emergency site prior to the arrival of further assistance (i.e. Emergency Services)
8. Notify the IC of the emergency and provide a full Situation Report (SITREP)
9. Assess whether the nominated control room will be a safe area to manage the emergency. Advise IC if evacuation to the camp (alternate location) is required
10. Maintain an open line of communication with the IC and EOC
11. Further assess the emergency and in consultation with the IC determine the emergency response classification level and what assistance / support / resources are required at the site.

During incident:

1. Ensure that any injured personnel are provided with appropriate first aid treatment

and monitored at all times

2. Maintain a chronological record of activities record events/actions/messages/ decisions
3. Provide regular SITREPS to the IRT Operation Officer (Aim for 15 minute update intervals if possible)
4. Assist in the coordination of response support/resources coming to site
5. Ensure any responding agencies have the correct details/location of the emergency & give directions as required
6. Act as the primary point of contact for the Emergency Services upon their arrival and provide a detailed briefing on the emergency & known hazards
7. Continually monitor the site for any other hazards that may be present
8. Gather permits that are in use & ascertain what work is currently in progress and what other work may impact on the emergency
9. If warranted, ensure that the emergency site is cordoned off so as not to contaminate any evidence that may be required
10. Monitor the welfare of all personnel at site and ensure that any provisions required are provided (i.e., water/food/shelter)
11. In consultation with the IC ensure that access to the site is restricted to authorised personnel only
12. Assess the impact the emergency may have on the environment and advise the ERT
13. Continue to provide IC with SITREPs at intervals of 15-30 minutes – or as required
14. Ensure that all personnel/contractors (shift workers) employed at site are provided with details of the emergency and given a factual briefing during shift handover
15. Assess need for additional assistance at the affected site and relieving of ERT personnel.

Post-incident:

1. Account for all personnel and ensure the site has been made safe before standing down personnel and stating that the emergency has concluded
2. Conduct a debrief with all ERT personnel
3. Maintain security of the emergency site until an investigation has been completed
4. Assist in the assessment and integrity of plant/equipment for use after the emergency
5. Compile and record a factual description of the emergency
6. Collect/collate all recorded information/documents and retain
7. Provide the IC with a comprehensive debrief
8. Assist in the investigation process
9. Assess the emergency response equipment utilised and arrange for repair/ replacement if required.

Emergency Response Team Members

Performed By:	**Site Nominated Field Personnel**
Reports To:	**On Scene Commander**

Role

1. Responsible for fire and rescue emergency response
2. Responsible for assisting site medical response team and administering first aid where required
3. Responsible for assisting with safe and effective evacuation of site personnel
4. Assist with appropriate Emergency Shut Down procedures where required

Responsibilities

Pre-incident:

1. Remain contactable while on site and adhere to drug and alcohol policy. Nominate a delegate as required in the event of absence
2. Attend all training activities organised for the ERT
3. Remain familiar with responsibilities within the ERT duties
4. Participate in mock and desktop exercises
5. Conduct daily inspections of ERT related emergency equipment and maintain equipment accordingly

Immediate actions:

1. When emergency alarm is raised – determine the source/type of emergency and report to On-Scene Commander (OSC)
2. Mobilise required emergency equipment, i.e., rescue vehicle, fire appliance, etc.
3. Ensure site emergency response procedures are immediately implemented
4. Maintain an open line of communication with the OSC
5. Further assess the emergency and in consultation with the OSC determine the emergency response classification level and what assistance/support/resources are required at the site.

During incident:

1. Ensure that any injured personnel are provided with appropriate first aid treatment and monitored at all times
2. Assist in the coordination of response support/resources coming to site
3. Ensure any responding agencies have the correct details/location of the emergency & give directions as required
4. Assist Emergency Services upon their arrival at site
5. Continually monitor the site for any other hazards that may be present
6. Assist with cordoning off emergency site if time allows, so as not to contaminate any evidence that may be required
7. Assist with the welfare of all personnel at site and ensure that any provisions

required are provided (i.e. water/food/shelter)

Post-incident:

1. Assist with ensuring the site has been made safe before standing down
2. Participate in a debrief
3. Assist with compiling a factual description of the emergency
4. Assist in the investigation process
5. Assess the emergency response equipment utilised and arrange for repair/ replacement if required.

Assembly Area Warden

Performed By:	**Nominated Site Personnel (Usually Volunteers)**
Reports To:	**On-Scene Commander/EOO**

Role

1. Maintain information on location and medical status of evacuated personnel
2. Assist and coordinate the effective and safe evacuation of personnel from the emergency site
3. Assist in other duties as directed by the On-Scene Commander/EOO.

Responsibilities

Pre-incident:

1. Attend all training activities organised for the Emergency Response Team (ERT)
2. Remain familiar with responsibilities within the ERT and Assembly Area Warden duties.

Immediate actions:

1. Ensure that the assembly area is safe to have people congregate and nominate an alternate assembly area if required
2. Arrange first-aid for any injured persons at the assembly area
3. Conduct the initial headcount of evacuated personnel – compare against site personnel register if possible
4. Confirm emergency status with Emergency Response Team (ERT) (i.e. ensure the whole site is aware of the emergency and mobilising accordingly)
5. Communicate headcount result; including details of injured and missing personnel to the Emergency Operations Officer located at the Emergency Operations Centre (EOC)] and On-Scene Commander (OSC) via radio or via messenger.

During incident:

1. Don warden identification (reflective vest)
2. Maintain a log of personnel movements in and out of the assembly area (ensure there are no non-essential movements)
3. Communicate relevant Situation Report (SITREP) information with personnel at the assembly area
4. Report and update relevant emergency information to the IC/OSC (whichever is applicable at the time)
5. Provide back-up support to emergency response efforts as directed by the IC. Involve additional persons as required to assist.

Post-incident:

1. Pass on stand-down information to assembly area, including any no-go areas as directed by the OSC
2. Arrange safe transfer of all assembly area personnel to any nominated assembly/de-brief area
3. Attend ERT debrief.

Appendix N – Task Specific Emergency Action Plan Request Form

Section 1 – Work Details			
Name of Requestor			
Company			
Location of Work Activity			
Description of Work Activity			
Date of Work			
Number of workers involved			
Section 2 – Safety Concerns (If answer Yes provide details)			
Hot Work Involved	☐ Yes	☐ No	Details-
Hazardous Energy Involved	☐ Yes	☐ No	Type of energy- ☐ Pressure ☐ Electricity ☐ Other_____
Hydrocarbons involved	☐ Yes	☐ No	Hydrocarbon Details- • Type_____ • State – ☐ Gas ☐ Liquid • Quantity_____ • Pressure_____
Potential Atmospheric Discharge	☐ Yes	☐ No	Type of Discharge - • Name – _____ • State – ☐ Gas ☐ Liquid • Estimated Potential Quantity- _____
Area Fire Systems Isolated	☐ Yes	☐ No	Details-
Section 3 – Additional Notes			

Requestor Signature_____

<u>Emergency Response Advisor to Complete Following</u>

Based on the above information the Emergency Response Advisor will determine the need for a Task Specific Emergency Action Plan.

Task Specific Emergency Action Plan required ☐ Yes ☐ No

If answered yes then complete a Task Specific Emergency Action Plan and attach.

Emergency Response Advisor _____

Signature_____

Date_____

Appendix O – Task Specific Emergency Action Plan Template

# TASK SPECIFIC EMERGENCY ACTION PLAN		**DATE:** **REGISTERED No.**
PRINCIPAL CONTRACTOR: Bechtel Australia Pty Ltd	**CONTRACTOR NAME:**	
PROJECT: Bechtel GLNG Plant Project	**ADDRESS:**	
	PHONE:	
	CONTRACTOR ABN:	
NUMBER OF PERSONS INVOLVED:		

PLANNED HIGH RISK ACTIVITY:

☐ Pressurisation	☐ Explosives Use	☐ Temperature extreme
☐ Hot work	☐ Gas/chemical/fuel line work	☐ Mobile plant movement
☐ Introduction of hydrocarbons	☐ Energised electrical work	☐ Flammable/ contaminated atmosphere
☐ Hazardous Substance Use	☐ Other	

DEVELOPED BY:					**REVIEWED BY:**				
No	Name	Signature	Position	Date	No	Name	Signature	Position	Date.
1					1				
2					2				
3					3				

APPROVED BY:							
Name:	**Signature:**	**Position:**	**THIS PLAN IS EFFECTIVE**				
		Emergency Response Advisor	**FROM :**		**UNTIL:**		

REVIEW: ***(NOTE: Work SHALL NOT proceed until the Action Plan is signed and dated by the HSE Manager or nominee)***

Name:	Signature:	Position:	Date :

Part - II

Work Team Requirements

P.P.E / EMERGENCY and COMMUNICATION REQUIREMENTS "Check ☒"				PLANT, EQUIPMENT & TOOLS FOR JOB "Check ☒"				TAGGING & SIGNS "Check ☒"		PERMITS & INSTRUCTION "Check ☒"	
Safety Harness	☐	Air Purifying Respirator	☐	Ladder	☐	Excavator	☐	Persons Working Above	☐	MSDSs	☐
Static Line	☐	Confined Space Harness	☐	Hand Tools	☐	Winch	☐	Barrier Mesh	☐	Instruction Manual	☐
Tinted Safety Glasses	☐	Gloves - PVC	☐	Shovel	☐	Extension Leads	☐	Flagging	☐	HV Access	☐
Clear Safety Glasses	☐	Gloves – Hyflex (Nitrile)	☐	Welding Machine	☐	Backhoe	☐	Personal Locks	☐	Floor/Roof Opening	☐
Goggles	☐	Gloves -Leather Riggers	☐	Compactor	☐	Power Source	☐	Personal Danger Tags	☐	Hot Work	☐
Face Shield	☐	UHF Radio	☐	Drill	☐	Crane	☐	Out of Service Tags	☐	Isolation	☐
Sun Screen	☐	Digital radio	☐	Grinder	☐	EWP	☐	Information Tags	☐	Excavation	☐
Hearing Protection	☐	Mobile Phone	☐	Scaffold	☐	Fans	☐		☐	Confined Space	☐
SCBA	☐	Airline	☐	Fire Extinguisher	☐	Scissor Lift	☐		☐	High Pressure / Abrasive Blasting	☐
	☐		☐	Fire Blanket	☐		☐		☐	Suspended Personnel Platform	☐

Work team Responsibilities

Responsibilities of team performing task.	• Ensure Area and plant has been inspected prior to use and that it is suitable for the task. • Ensure there is a communication system in place. • Ensure emergency services can access the area in case of emergency • Provide clear directions to emergency services

Hazards Associated With Location

Hazard	Description
☐ Limited Access	
☐ No vehicle Access	
☐ Operational equipment in surrounding area	
☐ Other.	

Potential Hazards Related to Task			
Hazard	**Description**	**Hazard**	**Description**
☐ Oxygen Deficient		☐ Entrapment	
☐ Atmospheric Contaminates		☐ Fire and Explosion	
☐ Engulfment		☐ Pressure	
☐ Extreme Temperature		☐ Adjoining work activities	
☐ Oxygen Enrichment		☐ Operating Plant	
☐ Solid / Solution Contaminates			

Planning Considerations			
Principal Road Access		Assembly Areas	
Alternate Road Access		Equipment Staging Area	
Water Supplies		Forward Control Point	
Installed Fire Safety Systems		Evacuation Considerations	
Escape Routes			

Response Strategies				
Equipment Required				
☐ Fire Appliance	☐ Rescue Appliance	☐ Foam Concentrate	☐ Bi-Pods / Rescue Winch	☐ Rescue Air Bags
☐ Mechanical Cutter	☐ Lighting	☐ Oxy – Viva	☐ Bolt Cutters	☐ Rescue Harnesses
☐ Rescue Stretcher / Scoop Stretcher	☐ Mobile Air Station (Hose Fed Breathing Apparatus)	☐ Self Contained Breathing Apparatus	☐ Ambulance and Associated First Aid Equipment	☐ Rescue Ropes and Associated Equipment
☐ Fire Extinguisher (type) …… …..	☐ Holmatro Rescue Equipment (Cutters, Spreaders & Hydraulic	☐ Atmospheric Testing Equipment ……	☐ Communications	

Communications		
Emergency contact details	Onsite Paramedics	Mobile Phone 0419 747 941 / UHF Channel 1
	Emergency Response (Fire & Rescue)	Mobile Ph 0411 313 889 / UHF Channel 1
	Supervisor	

Appendix P – Example Decontamination Plan

Introduction

Decontamination – the process of removing or neutralizing contaminants that have accumulated on personnel and equipment – is critical to health and safety at hazardous waste sites. Decontamination protects workers from hazardous substances that may contaminate and eventually permeate the protective clothing, respiratory equipment, tools, vehicles, and other equipment used on site; it protects all site personnel by minimizing the transfer of harmful materials into clean areas; it helps prevent mixing of incompatible chemicals; and it protects the community by preventing uncontrolled transportation of contaminants from the site.

This plan describes the types of contamination that workers may encounter, the factors that influence the extent of contamination, and methods for preventing or reducing contamination. In addition, this plan provides general guidelines for implementation of a decontamination system at site and includes a decision aid for evaluating the health and safety aspects of decontamination methods.

Prevention of Contamination

The first step in decontamination is to minimize contact with spilled materials and thus the potential for contamination. For example:

- Work practices that minimize contact with hazardous substances (e.g., do not walk through areas of obvious contamination; do not directly touch potentially hazardous substances).
- Use remote sampling, handling, and container-opening techniques (e.g., drum grapplers, pneumatic impact wrenches).
- Protect monitoring and sampling instruments by bagging. Make openings in the bags for sample ports and sensors that must contact site materials.
- Wear disposable outer garments and use disposable equipment where appropriate.
- Cover equipment and tools with a strippable coating which can be removed during decontamination.
- Encase the source of contaminants, e.g., with plastic sheeting or overpacks.

Personnel entering a control zone will be required to suit up in designated personal protective equipment (PPE) prior to entering the control zone in order to minimize the potential for contaminants to bypass the protective clothing and escape decontamination. In general, all fasteners on protective equipment will be used (i.e., zippers fully closed, all buttons used, all snaps closed, etc.) Gloves and boots will be tucked under the sleeves and legs of outer clothing, and hoods (if not attached) will be worn outside the collar. Another pair of tough outer gloves may be worn over the sleeves. All junctures will be taped to prevent contaminants from funning inside the gloves, boots, and jackets (or suits, if one-piece construction).

Prior to each use, the PPE must be checked to ensure that is contains no cuts or punctures that could expose workers to chemicals. Similarly, any injuries to the skin surface, such as cuts and scratches, may enhance the potential for chemicals or infectious agents that directly contact the worker's skin to penetrate into the body. Particular care must be taken to protect these areas. Workers with large areas of damaged skin will be kept from working within established control zones, as applicable.

Types of Contamination

Contaminants can be located either on the surface of personal protective equipment or permeated into the PPE material. Surface contaminants may be easy to detect and remove; however, contaminants that have permeated a material are difficult or impossible to detect and remove. If contaminants that have permeated a material are not removed by decontamination, they may continue to permeate to either surface of the material where they can cause an unexpected exposure.

Five major factors affect the extent of permeation:

- Contact time. The longer a contaminant is in contact with an object, the greater the probability and extent of permeation. For this reason, minimizing contact time is one of the most important objectives of a decontamination program.
- Concentration. Molecules flow from areas of high concentration to areas of low concentration. As concentrations of wastes increase, the potential for permeation of personal protective clothing increases.
- Temperature. An increase in temperature generally increases the permeation rate of contaminants.
- Size of contaminant molecules and pore space. Permeation increases as the contaminant molecule becomes smaller, and as the pore space of the material to be permeated increases.
- Physical state of wastes. As a rule, gases, vapours, and low-viscosity liquids tend to permeate more readily than high-viscosity liquids or solids.

Decontamination Methods

All personnel, clothing, equipment, and samples leaving the contaminated area of a site must be decontaminated to remove any harmful chemicals or infectious organisms that may have adhered to them. Decontamination methods, either (1) physically remove contaminants, (2) inactivate contaminants by chemical detoxification or disinfection/sterilization, or (3) remove contaminants by a combination of both physical and chemical means. For the Purposes of this plan only physical removal is addressed.

Physical Removal

In many cases, gross contamination can be removed by physical means involving dislodging/displacement, rinsing, wiping off, and evaporation. Physical methods involving high pressure and/or heat should be used only as necessary and with caution since they can spread contamination and cause burns. Contaminants that can be removed by physical means can be categorized as follows:

- Loose contaminants. Dusts and vapours that cling to equipment and workers or become trapped in small openings, such as the weave of the clothing fabrics, can be removed with water or a liquid rinse. Removal of electrostatically attached materials can be enhanced by coating the clothing or equipment with anti-static solutions. These are available commercially as wash additives or anti-static sprays.
- Adhering contaminants. Some contaminants adhere by forces other than electrostatic attraction. Adhesive qualities vary greatly with the specific contaminants and the temperature. Physical removal methods for gross contaminants include scraping, brushing, and wiping. Removal of adhesive contaminants can be enhanced through certain methods such as solidifying, adsorption or absorption (e.g., with powdered lime or kitty litter), or melting.

- Volatile liquids. Volatile liquid contaminants can be removed from protective clothing or equipment by evaporation followed by a water rinse. Evaporation of volatile liquids can be enhanced by using steam jets. With any evaporation or vaporization process, care must be taken to prevent worker inhalation of the vaporized chemicals.

Recommended Equipment for Decontamination of PPE, Clothing and Equipment

- Drop cloths of plastic or other suitable materials on which heavily contaminated equipment and outer protective clothing may be deposited.
- Collection containers, such as drums or suitably lined trash cans, for storing disposable clothing and heavily contaminated personal protective clothing or equipment that must be discarded.
- Lined box with absorbents for wiping or rinsing off gross contaminants and liquid contaminants.
- Large galvanized tubs, stock tanks, or children's wading pools to hold wash and rinse solutions. These should be at least large enough for a worker to place a booted foot in, and should have either no drain or a drain connected to a collection tank or appropriate treatment system.
- Wash solutions selected to wash off and reduce the hazards associated with the contaminants.
- Rinse solutions selected to wash off and reduce the hazards associated with the contaminants.
- Long-handled, soft-bristled brushes to help wash and rinse off contaminants.
- Paper or cloth towels for drying protective clothing and equipment.
- Lockers and cabinets for storage of decontaminated clothing and equipment.
- Metal or plastic cans or drums for contaminated wash and rinse solutions.
- Plastic sheeting, sealed pads with drains, or other appropriate methods for containing and -collecting contaminated wash and rinse solutions spilled during decontamination.
- Shower facilities for full body wash or, at a minimum, personal wash sinks (with drains connected to a collection tank or appropriate treatment system).
- Soap or wash solution, wash cloths, and towels for personnel.
- Lockers or closets for clean clothing and personal item storage.

Personal Protection for Decontamination Workers

Decontamination workers who initially come in contact with personnel and equipment leaving a controlled zone will require more protection from contaminants than decontamination workers who are assigned to the last station in the decontamination line. In some cases, decontamination personnel should wear the same levels of PPE as workers in a particular control zone. In other cases, decontamination personnel may be sufficiently protected by wearing one level lower protection.

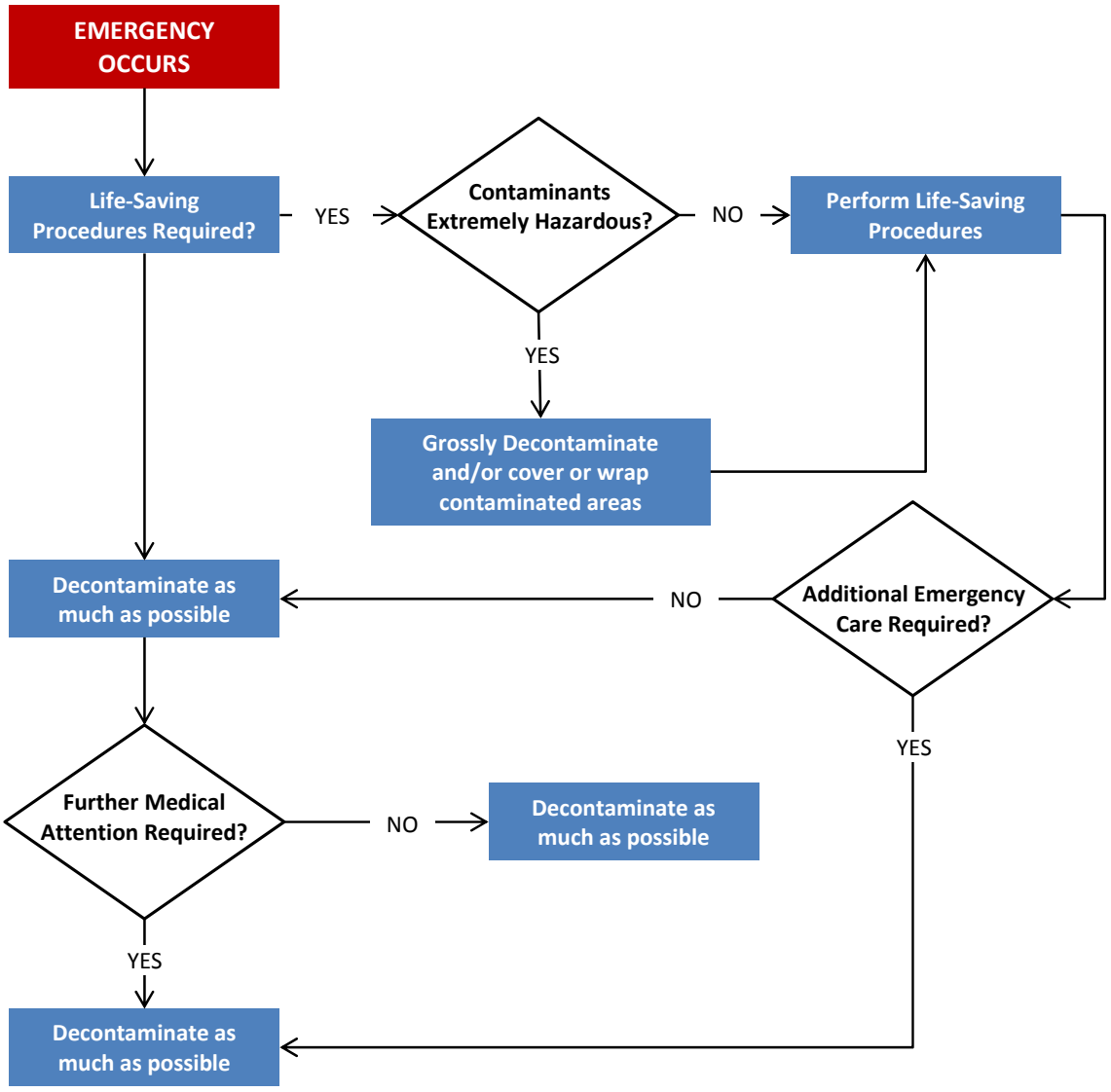
The level of protection required will vary with the type of decontamination equipment used. For example, workers using a steam jet may need a different type of respiratory protection than other decontamination personnel because of the high moisture levels produced by steam jets. In some situations, the cleaning solutions used and wastes removed during decontamination may generate harmful vapours. Appropriate equipment and clothing for

protecting decontamination personnel should be selected by a qualified health and safety expert.

Emergency Decontamination

In addition to routine decontamination procedures, emergency decontamination may be required. In an emergency, the primary concern is to prevent the loss of life or severe injury to site personnel. If immediate medical treatment is required to save a life, decontamination should be delayed until the patient is stabilized. If decontamination can be performed without interfering with essential life-saving techniques or first aid, or if a worker has been contaminated with an extremely toxic or corrosive material that could cause severe injury or loss of life, decontamination must be performed immediately. If an emergency due to a heat-related illness develops, protective clothing should be removed from the victim as soon as possible to reduce the heat stress. During an emergency, provisions must also be made for protecting medical personnel and disposing of contaminated clothing and equipment. The figure below details the decision making process regarding emergency decontamination.

FIGURE 1. DECISION AID FOR EMERGENCY DECONTAMINATION



Sample Decontamination Procedures for (Maximum Decontamination Layout)

The objective of this example procedure is to minimise the risk of exposure to hazardous substances. This procedure was derived from the U.S. Environmental Protection Agency, Office of Emergency and Remedial Response's (OERR), "Interim Standard Operating Safety Guides {revised Sep. 82).

Protective equipment must be worn by personnel when response activities involve known or suspected hazardous substances. The procedure for decontaminating personnel upon leaving the contaminated area is addressed for the maximum level of protection. Naturally, the plan would need to be scaled back to address lower levels of contamination and corresponding lower levels of protection. However, for the purpose of this example procedure, maximum levels are assumed.

The maximum decontamination procedure consists of specific activities at nineteen stations. Each station emphasizes-an important aspect of decontamination. When establishing a decontamination line, each aspect should be incorporated separately or combined with other aspects into a procedure with fewer steps.

Decontamination lines are site specific since they are dependent upon the types of contamination and the type of work activities on site. A cooling station is sometimes necessary within the decontamination line during hot weather. It is usually a location in a shaded area in which the wind can help to cool personnel. In addition, site conditions may permit the use of cooling devices such as cool water hose, ice packs, cool towels, etc. When the decontamination line is no longer required, contaminated wash and rinse solutions and contaminated articles must be contained and disposed of as hazardous wastes in compliance with regulatory requirements.

FIGURE 2. MAXIMUM DECONTAMINATION LAYOUT

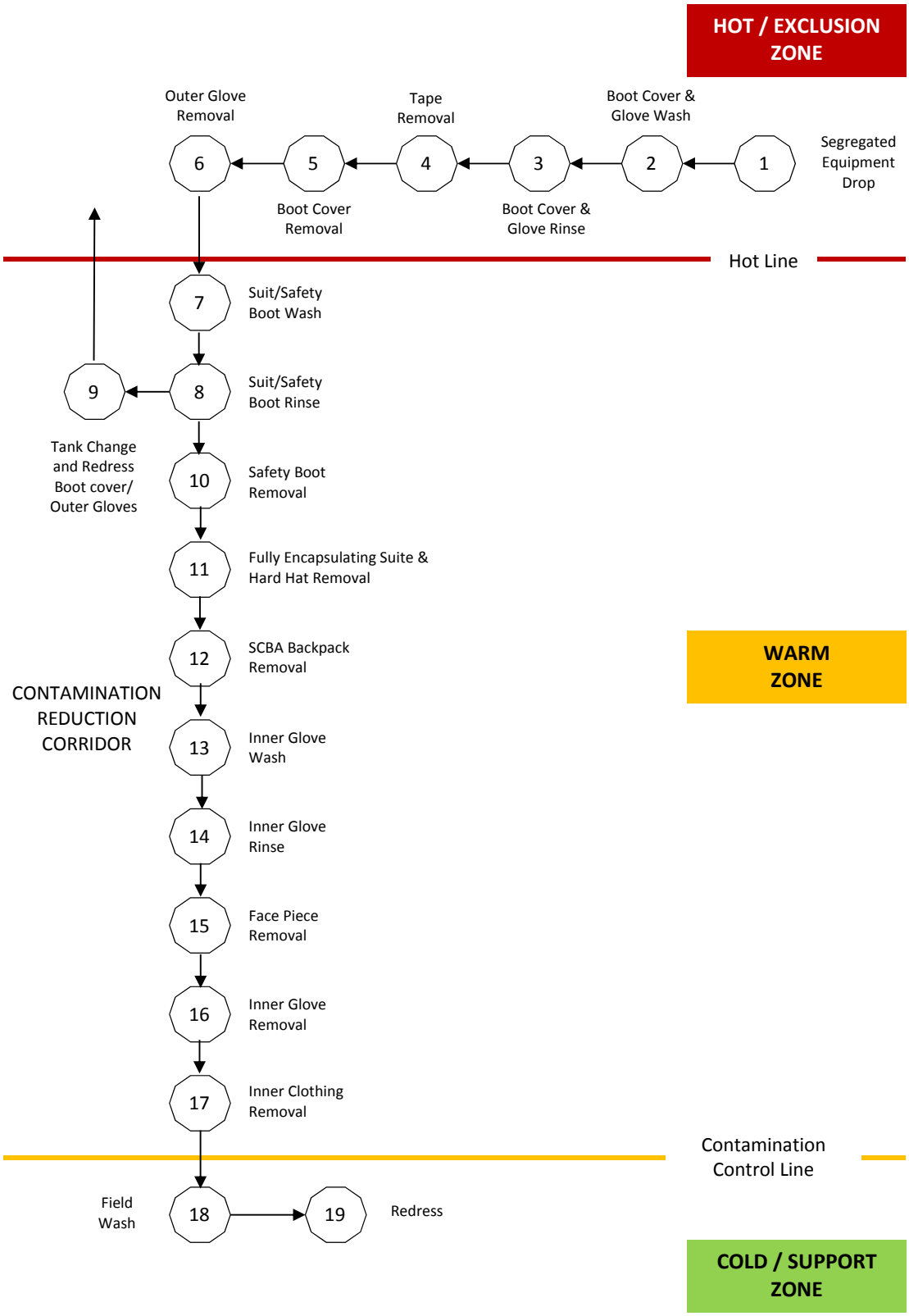


TABLE 1. EQUIPMENT NEEDED TO PERFORM MAXIMUM DECONTAMINATION MEASURES

STATION	EQUIPMENT	STATION	EQUIPMENT
Station 1:	a. Various Size Containers b. Plastic Liners c. Plastic Drop Cloths	Station 11:	a. Rack b. Drop Cloths c. Bench or Stools
Station 2:	a. Containers (20-30 Gallons) b. Decon Solution or Detergent Water c. 2-3 Long-Handled. Soft Bristled Scrub Brushes	Station 12:	a. Table
Station 3:	a. Containers (20-30 Gallons) Station OR High-Pressure Spray Unit b.Water c. 2-3 Long-Handled. Soft Bristled Scrub Brushes	Station 13:	a. Basin or Bucket b. Decon Solution c. Small Table
Station 4:	a. Containers (20-30 Gallons) b. Plastic Liners	Station 14:	a. Water b. Decon Solution c. Small Table
Station 5:	a. Containers (20-30 Gallons) b. Plastic Liners c. Bench or Stools	Station 15:	a. Containers (20-30 Gallons) b. Plastic Liners
Station 6:	a. Containers (20-30 Gallons) b. Plastic Liners	Station 16:	a. Containers (20-30 Gallons) b. Plastic Liners
Station 7:	a. Containers (20-30 Gallons) Station b. Decon Solution c. 2-3 Long-Handled. Soft Bristled Scrub Brushes	Station 17:	a. Containers (20-30 Gallons) b. Plastic Liners
Station 8	a. Containers (20-30 Gallons) Station OR High-Pressure Spray Unit Station b.Water c. 2-3 Long-Handled. Soft Bristled Scrub Brushes	Station 18:	a. Water b. Soap c. Small Table d. Basin or Bucket e. Field Showers f. Towels
Station 9:	a. Air Tanks or Face Masks and Cartridge Depending on Level b. Tape c. Boot Covers d. Gloves	Station 19:	a. Dressing Trailer is Needed in Inclement Weather b. Tables c. Chairs d. Lockers e. Cloths
Station 10:	a. Containers (20-30 Gallons) b. Plastic Liners c. Bench or Stools d. Boot Jack		

GLNG

ENVIRONMENTAL MONITORING PLAN

(Attachment H of CEMP)

REV	DATE	REASON FOR REVISION	BY	CK'D	SiteMgr	APE	PM
4	05-Dec-13	Issued for Update	ER	PN	BF	HH	BT
3	28-Jun-13	Issued for Update	SMP	EMR	BF	RR	BT
2	12-Apr-13	Issued for Annual Review and Update	RJF	SMP	BF	RR	BT
1	1-Nov-11	Updated for Publication	RW	RR	BF	BT	AP
0	01-June-11	Issued for Use	RW	RRR	BF	CJK	BT / AP
D	09-Feb-11	Client comments incorporated; Reissued for Permit	RW	CJK	JJM	CJK	BT / AP
C	11-Jan-11	Updated to include EPBC Act Approval; Issue for Permit	RW	CJK	JJM	CJK	BT / AP
B	11-Aug-10	Client comments incorporated; Issue for permit	RW	CJK	JJM	CJK	BT / AP
A	21-Jun-10	Issue for Review	RW	MD	JM	CJK	BT / AP

BECHTEL OG&C INC.		JOB NO. 25576	
BECHTEL	ENVIRONMENTAL MONITORING PLAN	DOCUMENT NO.	REVISION
		100-G01-GHX-00028	4
		GLNG Doc No. 3310-BTH-3-3.3-6828	

TABLE OF CONTENTS

1 INTRODUCTION

This Environmental Monitoring Plan is Attachment H of the Construction Environmental Management Plan (CEMP) for the Gladstone LNG Plant Project and shall be read and interpreted in conjunction with the CEMP (ref. 25576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617), in particular section 1.1.

This Environmental Monitoring Plan describes the environmental monitoring programs and requirements during the construction and commissioning of the GLNG Plant Project. The roles and responsibilities for environmental monitoring by Bechtel and its subcontractors during the construction and commissioning phases are outlined below per normal construction practices; the Coordinator General's Evaluation Report for the EIS identifies several additional potential environmental monitoring measures. Environmental monitoring requirements during operation of the project are not included in the scope of this plan.

This Plan will be updated and/or modified as required throughout the duration of construction.

1.1 Project Background and EIS

The Environmental Impact Statement (EIS), related studies and Environmental Management Plans, conditions of the Queensland Coordinator General's Evaluation Report, Federal EPBC Approval, and regulatory permit requirements for construction of the LNG facility have identified environmental monitoring requirements during the construction phase of proposed project activities. The Environmental Monitoring Plan consolidates the monitoring requirements for parameters detailed in these plans/reports/permits with the aim to provide early detection of undesirable impacts to the environment. The Environmental Monitoring Plan has been developed with the intention of measuring environmental performance against applicable standards, guidelines and expectations. The information obtained through environmental monitoring will be used to demonstrate compliance with regulatory requirements and amend work practices and action plans when necessary.

1.2 Scope of Monitoring

Routine environmental inspections (described in the CEMP) will be conducted by the environmental team. Inspection reports and corrective/preventative actions will be created and maintained with findings based primarily on observations. Environmental monitoring, as described in this Plan, goes beyond routine inspection by incorporating collection of quantitative and qualitative data derived largely from scientific instruments (e.g., portable noise devices) or laboratory results (e.g., from soil or water samples).

2 MANAGEMENT OBJECTIVES

The project recognizes the potential for environmental impacts and the need to provide early detection of these occurrences. Environmental monitoring enables the project to identify undesirable impacts that may occur arising from construction related activities. Monitoring also demonstrates compliance with project regulatory requirements.

The objectives of this Plan are to:

- Detail the required environmental monitoring programs during construction and commissioning;
- Summarize monitoring frequency, locations, and sampling protocols;
- Describe the responsibilities and actions required by Project personnel;
- Provide a framework for recording and reporting environmental monitoring data.

Baseline studies and data collected for the project EIS allowed for the identification of impacts and subsequent proposed mitigation measures, controls, and monitoring requirements to minimize environmental impacts in the areas of project activities.

3 SEQUENCING OF WORKS

The construction works will be progressive over time. The Bechtel Environmental Manager will monitor the parameters detailed in this Plan to verify conformance with project requirements. The sequence outlined below is subject to modification depending on a range of factors, including weather conditions.

Environmental monitoring will be focused on, but not limited to, the following construction and commissioning activities:

- Site clearing;
- Establishment of camp and associated infrastructure;
- Installation of temporary and permanent cross drainage, for access roads and for the Project site infrastructure;
- Installation of environmental controls as detailed on the project drawings;
- Bulk earthworks (cut and fill);
- Infrastructure construction;
- Marine work including MOF dredging and construction, pile driving, and construction of jetty;

- Construction of permanent plant and facilities;
- Transport of materials, including via ferry/barge to Curtis Island;
- Operation of temporary sewage treatment plant and desalination plan;
- Discharges from the stormwater system;
- Noise, lighting, and dust during construction;
- Air and effluent emissions Demolition and removal of temporary camps and construction structures;
- Rehabilitation and revegetation following construction.

4 MONITORING PROGRAMS

The following monitoring programs are described in the Project EIS and its associated documents. Monitoring programs will be subject to change including additions and updates as additional activities and subsequent environmental aspects arise or impacts are identified. Monitoring programs that are quantitative and or reportable can be found in Appendix A, Appendix A contains the specific monitoring elements that are known at this time. Monitoring requirements may change due to works progressing or the cessation of certain activities, this plan will be updated to reflect these changes where possible.

Additionally, the Site Manager and the Commissioning and Start-Up Manager shall be familiar with the GLNG Plant Project's Construction Environmental Management Plan and relevant procedures which may contain additional mitigation and inspection requirements.

A weather station located on Curtis Island collects on-site wind, precipitation, and other weather data for use in assessment of various environmental monitoring data.

4.1 Acid Sulfate Soils

Treatment and monitoring of acid Sulfate soil is described in the Acid Sulfate Soils Management Plan (CEMP, Att. C).

4.2 Air Quality

The main objectives of the air quality monitoring program are focused on dust and equipment maintenance during construction and are intended to:

- Demonstrate compliance with applicable air quality guidelines and standards;
- Provide data for the analysis of air quality changes and determine appropriate remedial action;
- Detect trends with respect to air quality performance;

- Minimisation of emissions generated by construction activities and equipment;
- Track the progress made by control measures.

Dust shall be visually monitored on a daily basis. Dust and air emission specifications and controls are detailed in the Air Quality Management Plan (CEMP, Att. D).

The Appendix A matrix contains the monitoring specifics for emissions monitoring as required by the relevant project permits/approvals and will be included in the monitoring program as necessary.

4.3 Chemical and Dangerous Goods

Inspections and audits shall examine all Bechtel and subcontractor hazardous chemical and dangerous goods storage areas on a regular basis. Records of the corrective/preventative actions identified and implemented subsequent to inspections/audits shall be maintained along with the project approvals materials list' by the Environmental department. Manifests of chemical and Dangerous Goods inventories are maintained by area supervisors.

4.4 Clearing and Grading

The Site Manager is responsible to verify that the approved boundaries for clearing and grading are correct and properly marked in the field so clearing and grading crews stay within bounds. By regular inspection the Environmental Manager shall oversee the storage of topsoil and vegetation, and that erosion and sediment control practices are in place as per the project Stormwater Management and Erosion Control Plan (CEMP, Att. O).

4.5 Cultural Heritage

The project shall conduct an annual audit of compliance with the GLNG Cultural Heritage Management Plan.

4.6 Emergency Response

An annual audit as a minimum shall assess any use of the environmental element of the project's Emergency Response and Preparedness Plan. The Emergency Response and Preparedness Plan shall be updated as necessary.

4.7 Fauna& Flora

The project owner is ultimately responsible for the long term monitoring programs established in the EIS reports for flora and fauna. During construction and start-up/commissioning Bechtel and its subcontractors shall follow mitigation measures detailed in the Wildlife and Habitat Management Plan (CEMP, Att. T).

The main objectives of Bechtel with regard to the flora and fauna monitoring program during construction are to:

- Demonstrate compliance with regard to protection of habitat and wildlife protection, mitigation and minimization of impacts;
- Monitor effectiveness of any site rehabilitation;
- Prevent invasive species/weeds from becoming established within the work areas;
- Facilitate in the detection of any non-conformance of the requirements detailed in the Wildlife and Habitat Management Plan;
- Monitor the success of control measures.

Bechtel shall monitor the introduction of weeds and invasive species on an ongoing basis in all work areas and implement removal/treatment measures as needed as per the Weed and Plant Pathogen Control Plan (CEMP, Att. S 25576-100-G01-GHX-00038). Revegetation and effectiveness of rehabilitation activities also shall be monitored throughout the process according to the Landscaping and Site Rehabilitation Plan (CEMP, Att. K 25576-100-G01-GHX-00026).

Erosion control monitoring, an element of flora and habitat protection, will be ongoing and require visual inspections of the site during the wet and dry seasons. During the wet season erosion monitoring may be required on a daily basis. All areas shall be monitored with particular scrutiny of those areas where active construction or restoration works are taking place. Management practices to prevent accelerated soil erosion will be applied as per the project Stormwater Management and Erosion Control Plan (CEMP, Att. O 25576-100-G01-GHX-00033).

4.8 Groundwater

The main objectives of the groundwater monitoring program are to:

- Detect trends with respect to groundwater quality and environmental performance; and
- Detect any water supply/resource changes.

Any groundwater quality monitoring program shall be undertaken in accordance with conditions identified in the relevant permits/approvals.

4.9 Incident and Complaints

Incidents and complaints are the responsibility of GLNG. If GLNG requests Bechtel support, incidents and complaints shall be tracked and addressed by the project environmental lead per the CEMP.

4.10 Land Contamination

Locations where spills have occurred shall be inspected to verify adequate clean-up of spilled materials in accordance with the Contaminated Soil Plan (CEMP, Att. F 25576-100-G01-GHX-00021).

4.11 Mosquito Control

Mosquito and biting midge control programs shall be undertaken according to the Mosquito Management Plan (CEMP, Att. L 25576-100-G01-GHX-00041).

4.12 Noise and Vibration

The main objectives of the noise and vibration monitoring program are to:

- Demonstrate compliance with applicable noise/vibration level guidelines and standards as triggered by incidents or complaints;
- Provide baseline data for a reference database to establish deterioration of equipment; and
- Track the progress made by control measures.

Noise/vibration monitoring requirements identified for construction include routine measurement of ambient noise by handheld devices and equipment noise audits. Standardized noise/vibration measurements are required for all individual equipment upon delivery to site. In addition, all equipment shall undergo regular noise checks to verify equipment sound attenuation devices are not deteriorating.

Specifications for project noise and noise controls, as contained in the EIS and its associated documents, are detailed in the Noise/Vibration, Visual/Aesthetics & Lighting Plan (CEMP, Att. M 25576-100-G01-GHX-00029).

4.13 Social and Community

The project shall conduct regular assessments of compliance with the GLNG Social Management Plan and its associated Aboriginal engagement plan.

4.14 Surface Water

The main objectives of the water monitoring program are to:

- Demonstrate compliance with applicable water discharge standards;

- Detect trends with respect to water quality;
- Facilitate in the detection of any non-conformance of water discharge standards;
- Provide data for the analysis of changes and determine appropriate remedial action;
- Detect any water supply/resource changes;
- Provide input for health risk assessments; and
- Monitor the success of control measures.

The water discharge monitoring program shall be in accordance with the relevant project approvals/ permits. The surface water monitoring program includes stormwater runoff, discharge from the Sanitary Treatment Plant, discharge of hydro-test water, water from flushing activities and intake and discharge from the Water Treatment Plant (reverse osmosis (RO) desalinization plant).

4.15 Waste

The main objectives of the waste monitoring program are to:

- Demonstrate compliance with applicable waste management practices;
- Detect trends with respect to waste handling, disposal and recycling performance;
- Facilitate early detection of any hazardous materials leaks or inappropriate disposal methods; and
- Track the progress and success of waste minimization and recycling measures.

A monthly waste inventory of Project generated waste will be maintained for all Project locations. Volume (kg) for each type of waste generated (e.g., wood, copper, plastic) and method of disposal (e.g., landfill, recycle) is to be recorded. If waste is recycled the Project will provide further information regarding the specific method of recycling (e.g., aluminium cans donated to the community).

Hazardous materials' monitoring will occur through regular inspections/audits of all Project areas where hazardous substances are stored by Bechtel and subcontractor staff. Leaks from storage facilities will be identified during these area inspections. Appropriate disposal methods will be used for the disposal of hazardous materials.

Waste management for the project is described in the project Waste Management Plan (CEMP, Att. R 25576-100-G01-GHX-00037).

5 RECORDING AND REPORTING

Monitoring program data shall be maintained in an electronic database and reporting shall follow requirements garnered from project permits/approvals or upon request as contained in Appendix A.

6 AUDITS AND INSPECTIONS

Regular inspections and auditing programs for environmental monitoring shall occur and should be viewed as discrete from the regular monitoring data/information addressed in this Plan. Specific construction area inspections related to environmental compliance are detailed in the CEMP.

Appendix A - Environmental Monitoring Matrix

CEMP Monitoring Plan Summary (March 2014)

Category	Phase: C = Construction O = Operations	Permit Holder	Media to Monitor	Driver			Responsible Party	Type of Monitoring			Methodology Reference	Monitoring Locations		Frequency			Reporting			Corrective Actions	
									Quantitative												
				Regulatory Permit	Permit Condition	Due Diligence Note: refer to permit for tables		Qualitative	Grab Sample	On-line		Point	General	Baseline	Routine Based	Event Based	Format	Frequency	To Whom	Trigger	Corrective Action
CURTIS ISLAND FACILITY																					
Acid Sulfate Soils	C	GLNG	Acid Sulfate Soils	Environmental Authority - EPPG00712213	F6, F7	(F6) - Acid sulfate soil investigations must be conducted prior to construction. (F7) - Acid sulfate soils must be managed in accordance with the QASST 2000, contaminants are not to be directly released to waters as a results of the activity.	Bechtel		X		State Planning Policy 2/02 Development involving Acid Sulfate Soils Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland 1998.		Shoreline Works/Site wide	X		X	Letter/ Report	Annual	Env Authority	Acid sulfate soil that cannot be defined within the guidance material.	Contact regulatory authority for additional guidance.
Acid Sulfate Soils	O	GLNG	Acid Sulfate Soils	Environmental Authority - EPPG00712213	F8	(F8) - 3 Months after cessation of authorised activities that cause disturbance to land the holder must investigate contaminated land status in accordance with EP Act 1994 & NEPM	GLNG	Inspection			Environmental Protection Act 1994 NEPM		Side wide	X		X	Letter/ Report		Env Authority		
Air	O	GLNG	Visible Smoke/Particulate Emissions	Environmental Authority – EPPG00712213	B14	(B14) – Visible smoke and particulate emissions must not be permitted for more than five minutes in any two hour period during normal operating conditions	GLNG	Inspection				Flare Stacks				X	Letter/Report	Annual	Env. Authority	Visible smoke or particulate emissions for more than five minutes	Service equipment, adjust operation or install controls.
Air	C	GLNG	Air emissions	Environmental Authority - EPPG00712213	BB2, BB3	The holder of this environmental authority must undertake emission testing within three (3) months post commissioning of any three (3) fuel burning and combustion equipment capable of burning at least 500kg of fuel in an hour to verify the estimates used in the air dispersion.	GLNG		X			Selected equipment				X	Letter Report	Should results exceed as per condition BB3	Env Authority	Exceedance of Sch BB, Table 1.	Service equipment, adjust operation or install controls.
Air	C	GLNG	Dust & particulate matter	Environmental Authority - EPPG00712213	B3	(a) Dust deposition of 120 milligrams per square metre per day over a 30-days averaging period, when monitored in accordance with Australian Standard AS 3580.10.1 of 2003 (or more recent editions); OR b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) (PM10) suspended in the atmosphere of 50 micrograms per cubic metre (with five one day exceedances allowed in any one year period); and over a 24 hour averaging time, at a dust sensitive place downwind of the licensed place, when monitored in accordance with: i. Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or ii. Any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. Note: The above 5 days exceedances per year are based on the expected frequency of natural events such as bushfires and dust storms.	Bechtel		X		(i) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or (ii) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. Project Dust Monitoring Procedure	4 x Dust Monitoring Locations on Curtis Island		X	Monthly	X	Letter Report	Complaint	Env Authority	Dust complaint or Coordinator General's report for the EIS. Appendix 4, part 4, schedule B - Air Emissions.	Locate source, change work practice, apply water or other dust suppressant measures
Air	O	GLNG	Release of Contaminants to the Atmosphere	Environmental Authority - EPPG00712213	B5-B8, B10	(B5) - Contaminants must not be released to the atmosphere from a release point at a height and flow rate.. Stated in Schedule B, Table 1 - Contaminant Release Points (B6) - Contaminants must not be released to the atmosphere from a release point at a mass emission rate/concentration...Stated in Schedule B, Table 1 - Contaminant Release Points (B7) - Contaminants must not be monitored less frequently than specified in Schedule B, Table 1 - Contaminant Release Points (B8) - Monitoring of released must be carried out in accordance with B8(1) & B8(2). Schedule B – Table 2 – All stacks must be monitored during commissioning of the facility and at least one stack of each source type per year must be monitored thereafter on a rotational basis.	GLNG		X		Australian Standard AS4323.1 1995 Stationary Source Emission, Method 1: Selection of sampling positions. (or more recent editions)	Points listed in Schedule B Table 2 – Contaminant Release Limits to Air			Annually after initial monitoring of one source type on a rotational basis	3 Months after Commissioning the Facility	Report/ Letter	3 Months after Commissioning Facility and results received.	Env Authority	High or exceeded levels of specified limits	Assess operating procedures and work practices
Air	C/O	GLNG	Fugitive VOCs from all units/components including pumps, piping and controls, vessels and tanks	Environmental Authority - EPPG00712213	B16-B18	B16 -The holder of this environmental authority must ensure that all reasonable and practicable measures are taken in the design and operation of the plant to minimise fugitive VOC emissions. Reasonable and practicable measures include but are not limited to: (a) implementation of a monitoring program to regularly leak test all units/components including pumps, piping and controls, vessels and tanks; and (b) operating, maintenance and management practices to be implemented to mitigate fugitive VOC sources. B17 – The ducting and extraction systems that transfer effluent gases from one location to another must be constructed, operated and maintained so as to minimise any leakage of VOC's and vapours to the atmosphere occurring from thee sources. B18 – In the event of emissions of contaminants occurring from industrial plant or ducting systems that transfer effluent gases from one location to another, the fault or omission that resulted in that emission must be corrected as soon as practicable.	Bechtel / GLNG	Inspection		X	Plant Inspection Procedure/Permanent gas detection design		All units and components per permit		Continuous		Letter Report	As requested	Env Authority	Detection of fugitive emission or leak	Investigate leak ,cap emission, repair leak
Chemicals & Dangerous Goods	O/C	GLNG	Storage and handling	Environmental Authority - EPPG00712213	G1 & G2	Explosives, hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids must be stored in accordance with the relevant Australian Standards	Bechtel / GLNG	Inspection, site records			- Relevant Australia Standard(s) - Work Health and Safety Act and Regulation		Sitewide		Regular		Report	As requested	.Env Authority	Noncompliance with selected Australian standards.	Report of any incidents/non compliance, modify practices
Dredging water turbidity	C	GLNG	Seawater turbidity downstream of dredge area	Permit 27 - DMP (Dredge Mgmt Plan)	W3 (SPDE0161141 1)	Project will qualitatively monitor and cooperate in regional Port Curtis water quality monitoring program	GPC	Field Notes	X		Western Basin Dredging and Disposal Project - Water Quality Management Plan	5 x Water Quality Monitoring Locations in Port Curtis	Per Western Basin Dredging and Disposal Water Quality Management Plan		Continuous (Every 15 Minutes) during dredging activities		Letter Report	Monthly Within 28 days upon request	GLNG Env. Authority	Relative turbidity likely to generate environmental harm.	Modify dredge practices, install area controls.
Fauna	C/O	GLNG	Migratory shorebirds	Permit 2.1 EPBC_Marine (2008/4058)	Condition 22	Survey Migratory Shorebirds during northward and southward migration during low tide	GLNG	Survey			Migratory Shorebirds Environmental Management Plan	Low Tide Foraging Survey High Tide Roost Survey	Site to be advised as part of the Gladstone Western Basin Dredging and Disposal Project Referral EPBC No 2009/4904.		Twice annual surveys during northward and southward migration periods over 5 years of construction.		Letter Report	Annual	SEWPaC	Significant reduction in baseline numbers of Migratory Shorebirds during construction of the LNG Marine Facilities.	Remove disturbance, increase protection of salt flats

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									Quantitative												
				Regulatory Permit	Permit Condition	Due Diligence Note: refer to permit for tables		Qualitative	Grab Sample	On-line		Point	General	Baseline	Routine Based	Event Based	Format	Frequency	To Whom	Trigger	Corrective Action
Fauna	C/O	GLNG	Sea turtles	Permit 2.1 EPBC_LNG (2008/4057)	Condition 36b	10 year sea turtle population monitoring.	GLNG	Survey			per Turtle Management Plan		TBD per Management Plan		TBD per Management Plan		Letter Report	Annual	SEWPaC	TBD per Management Plan	TBD per Management Plan
Fauna	C/O	GLNG	Water mouse	Permit 2.1 EPBC_LNG (2008/4057) and Permit 2.2 EPBC_Marine (2008/4058)	Permit 2.1 Condition 32c; and Permit 17c	Ensure disturbance to intertidal habitat from lighting and noise is minimised.	GLNG	Survey			Water Mouse Management Plan	Intertidal area			Continuous		Letter Report	Annual	SEWPaC	Disturbance from lighting and noise to all intertidal habitat.	Remove disturbance, increase protection intertidal area
Fauna	C/O	GLNG	Water mouse	Permit 2.1 EPBC_LNG (2008/4057) and Permit 2.2 EPBC_Marine (2008/4058)	Permit 2.1 Condition 32c; and Permit 17c	Inspection of mangrove habitat for feral weed and animal species every six months.	GLNG	Survey			Water Mouse Management Plan	Mangrove area			Biannual (every 6 month) inspection of Mangrove habitat		Letter Report	Annual	SEWPaC	Disturbance of vegetation within 30m of identified potential Water Mouse Habitat	Remove disturbance, increase protection of mangroves
Fauna	C/O	GLNG	Water mouse	Permit 2.1 EPBC_LNG (2008/4057) and Permit 2.2 EPBC_Marine (2008/4058)	Permit 2.1 Condition 33; and Permit 2.2 Condition 18	Inspection of freshwater inflow areas of China Bay to be inspected after rainfall events to ensure no changes to hydrology and sedimentation regimes.	GLNG	Survey			Water Mouse Management Plan	Freshwater inflow areas				Inspect freshwater inflow areas of China Bay after rainfall events	Letter Report	Annual	SEWPaC	Significant alteration of freshwater inflow quantities/quality to China Bay	Revise stormwater management plan to meet water discharge standards
Fauna	C/O	GLNG	Tampering with Animal Breeding Places	Species Management Plan – Appendix B	Condition 4.2	The approved entity must maintain a register of tampering with animal breeding places (the register). For projects where the species management program applies, the register must record the number of obvious animal breeding places destroyed. Where the species management program does not apply, DERM's authority is required for tampering with breeding places of species.	GLNG	Survey			Species Management Plan	Animal breeding places				X	Register/ Letter/ Report	Annual/ On request	Env Authority	The need to remove an animal breeding place without of the limits of the SMP	Contact regulatory authority for approval
Fauna	C	GLNG	Fauna	Permit 2.1 EPBC_LNG (2008/4057)	Condition 20 & 21	Conduct pre clearing survey and list any threatened, migratory species and their habitats, the survey must be undertaken according to Condition 21.	GLNG	Survey			DEHP survey guidelines at the time of survey		Clearing area			X	Letter/ Report	Before clearing commences	Env Authority	Areas unable to be surveyed due to safety risk or are unable to be accessed.	Mark areas and advise regulatory authority with the submittal of survey.
Flora	C	GLNG	Protected Plants Exemption	Species Management Plan Approval Conditions	Condition 2(1, 2)	The authority holder must employ suitably qualified and experienced persons to undertake on-ground ecological assessments prior to disturbance, in addition to desktop analysis. Where such an assessment identifies that whole near' threatened, vulnerable and endangered plants are to be taken and the take cannot otherwise~ be reasonably avoided, the authority holder must seek the relevant clearing permits under the Nature Conservation Act 1992. A record of clearing activities where whole plants are taken under the exemption must be kept by the authority holder operating under the exemption. This record must be kept in a form which identifies the area cleared in a manner acceptable to DERM and outlines any mitigation activities undetailed.	GLNG	Survey			Species Management Plan	Protected plant species		X		X	Register/ Letter/ Report	Annual/ On request	Env Authority	Large amount of plant species needing to be removed.	Contact regulatory authority for approval
Flora	C	GLNG	Marine Plants	Operational Works 2011DB0082	Condition 13, 14, 15	The area of marine plant disturbance resulting from placement of the Jack-up Barge support legs, barge anchors or spud piles must be recorded and quantified. A report is to be provided to the Manager, Planning and Assessment (North), Fisheries Queensland within four (4) weeks of the completion of construction works detailing the area of marine plants disturbed by the Jack-up Barge legs, barge anchors and spud piles. The health and structure of the marine plant community shoreward of the proposed Bulk Aggregate Berth and LoLo Berth specified in Condition 1) sub section 3) of this authority is to be monitored for a period of twelve (12) months from the completion of the Bulk Aggregate Berth and LoLo Berth. The marine plants in this area may be removed should monitoring show wide spread mortality. A report is to be provided to the Manager, Planning and Assessment (North), Fisheries Queensland, within one (1) month of the conclusion of monitoring. The health and structure of mangrove and other marine plant communities between the facilities and within the authorised incidental damage area specified in Condition 1) sub section 4) (Location 4) of this authority is to be monitored for a period of twelve (12) months from the completion of the Materials Offloading Facility. A report is to be provided to the Manager, Planning and Assessment	Bechtel (Condition 13) GLNG (Condition 14/15)	Survey				Marine Plants				As barge legs are placed	Register/ Letter/ Report	4 weeks after the completion of works/ On request	Env Authority	Exceedance of barge placements	Reassess work practices and alter work method to reduce footprints
Flora	C	GLNG	Marine Plants	Operational Works 2011DB0082	Condition 1(Proposal Details1-5)	Monitor and record the removal of mangroves/marine plants to ensure the amount removed is within the specified amount at the MOF	Bechtel / GLNG	Survey				Marine Plants				As mangroves are removed	Register/ Letter/ Report	Annual/ On request	Env Authority	Nearing removal thresholds	Reassess if additional marine plants are to be removed, contact regulatory authority before continuing
Flora	C	GLNG	Marine Plants	Operational Works 2011DB0082	Condition 1(11)	Monitor the regeneration of marine plants for 5 years after the completion of the MOF	GLNG	Survey				Marine Plants				X	Register/ Letter/ Report	Annual/ On request	Env Authority	Observation of sub standard rehabilitation	Assess rehabilitation practices or activities that could be effecting rehabilitation.
Flora	C	GLNG	Marine Plants	DAFF Approval Conditions 2012RO0388	Condition 8	The area of marine plant disturbance resulting from placement of barge anchors and trestles are to be recorded and quantified and report supplied to DAFF 4 weeks after the completion of the PLF.	Bechtel	Survey				Marine Plants				As barge anchors are placed	Register/ Letter/ Report	4 weeks after completion of works/ On request	Env Authority	Land unable to surveyed due to infrastructure.	Provide justification and advise the regulatory authority.
Land	C/O	GLNG	Contaminant Release to Land	Environmental Authority – EPPG00712213	L1	Contaminant(s) are not permitted to be released directly or indirectly to land unless otherwise authorised under this environmental authority.	Bechtel /GLNG	Inspection					Sitewide		Regular		Letter/Report	Annual	Env. Authority	Release of contaminants to land	Locate and stop source of contamination and remediate if necessary.
Noise	O/C	GLNG	Noise	Environmental Authority -	D1-D8	Per Schedule D – Table 1: Noise Limits for the LNG Plant at Sensitive Receivers	GLNG	Inspection	X		EHP Noise Measurement Manual	P1 – P7	Sensitive Receptors			X	Letter Report	Complaint	Env Authority	Noncompliance with Sch. D	Locate source and consider

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									Quantitative												
				Regulatory Permit	Permit Condition	Due Diligence Note: refer to permit for tables		Qualitative	Grab Sample	On-line		Point	General	Baseline	Routine Based	Event Based	Format	Frequency	To Whom	Trigger	Corrective Action
				EPPG00712213									(Schedule D – Table 1)							Table 1	Best Environmental Management abatement measures
Pest & Weeds	C/O	GLNG	Pest & Weeds	Environmental Authority - EPPG00712213	F9	Managed pest and weed species to prevent growth and proliferations	Bechtel / GLNG	Survey					Site wide	X	Quarterly	X	Letter/ Report	Annual	Env Authority	Report or observation of increased pest and weed activity	Increase pest trapping or weed spraying activities as required.
Potable water	C	GLNG	Potable water	Coordinator General Report	Appendix 4, Condition 3	Relevant contaminant limits for the production and distribution of potable water using a reverse osmosis process	Bechtel	X	X		Most recent DEHP Water Quality Sampling Manual	FPOD Tanks and TWAF (furthest point of distribution) and S8 Water Treatment Plant)			Weekly	X	Sampling Results/Field Notes	Annual	Env. Authority	ADWG and Public Health 2005 Water Quality Targets.	Adjust process control and operation.
Potable water	C	GLNG	Potable water	Coordinator General Report	Appendix 4, Condition 3	Relevant contaminant limits for the production and distribution of potable water using a reverse osmosis process	Bechtel	X	X		Most recent DEHP Water Quality Sampling Manual	Satellite locations on Curtis island, including the sites on the mainland.			Weekly	X	Sampling Results/ Field Notes	Annual	Env. Authority	ADWG and Public Health 2005 Water Quality Targets.	Adjust process control and operation.
Stormwater	O/C	GLNG	Stormwater	Environmental Authority - EPPG00712213	BC20 & BC19	Monitoring to be undertaken at the locations and frequencies specified per Schedule BC - Table 3: Stormwater Release Limits - Early works, construction and operations.	Bechtel / GLNG		X		Most recent DEHP Water Quality Sampling Manual	Stormwater Discharge Points 1–9 (Includes Sediment Basins 1-3				Storm water discharges. Treated discharges.	Letter Report	Annual	Env Authority	Exceedance of Sch BC, Table 3	Modify stormwater management plan and implementation
Surface Water	C/O	Bechtel	Tyres used as fenders at the Materials Offloading Facility	ENBU03133711 - Beneficial Resource Reuse	Condition 18-20	Visual monitoring of the fender system in which the resource is used, must be conducted at least monthly to detect structural damage of the system (including deterioration of tyres). The following records must be kept of any visual monitoring undertaken: a) date and time of monitoring; b) location of monitoring undertaken; and c) details of any structural damage detected. Any tyres identified as having exposed steel must be removed and taken to a place lawfully able to accept the waste as soon as practicable.	Bechtel	Survey				Tyres used as fenders at the Materials Offloading Facility			Monthly		Letter Report	Annual	Env Authority	Observation of fatigued or damaged tyres	Schedule maintenance or replacement
Surface Water	O/C	GLNG	All discharges to sea	Environmental Authority - EPPG00712213	C2	Visual monitoring of releases to note they do not produce any slick or visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease scum, litter or other objectionable matter	Bechtel / GLNG	Inspection			Most recent DEHP Water Quality Sampling Manual	Identified discharge area.			Regular	X	Letter Report	Annual	Env Authority	Contaminated water, Dewatering of sea water from construction areas.	Locate source of contamination and clean, modify upstream practices, clean contaminated seawater.
Vibration and Blasting	C	GLNG	Blasting	Environmental Authority - EPPG00712213	BF15-BF18	(BF15) - Noise from blasting operations must not exceed an air blast overpressure level of 120dB. (BF16) - Ground borne vibration peak particle velocity must not exceed 10mm/s when measuring at any sensitive receptor Blasting monitoring to be undertaken according to Conditions BF17 & BF18.	Bechtel		X		Australian Standard 2187	Sensitive receptors identified near the blasting zone				During each blast event	Letter/ Report	Per Event Annual	Bechtel Env. Authority	Monitoring at sensitive receptors show an exceedance of the defined limits	Reassess blasting methodology and monitor results to note their effectiveness.
Waste	C	GLNG	General waste	Environmental Authority - EPPG00712213	BE2	Date of waste transport, quantity of waste (by type) removed and transported, quantity of waste delivered, any incidents (e.g. spillage) that may have occurred en route	Bechtel	Inspection, site records					Sitewide		Regular		Letter/ Report	Annual	Env Authority	No waste records maintained	Maintain waste disposal records
Waste	O/C	GLNG	Regulated waste	Environmental Authority - EPPG00712213	E1-E6, BE3, BE4	(E1) - Waste to be handled, stored and transported in an efficient manner and must not be released to the environment. (E2) - Waste management activities must not release a hazardous contaminant to land or waters. (E3) - All general waste must be disposed of at a facility that is permitted to accept such waste. (E4) - Waste removed from site must be conducted by a person who holds authority to transport such waste. (E5) - Date of waste transport, quantity of waste (by type) removed and transported, quantity of waste delivered, any incidents (e.g. spillage) that may have occurred en route (E6) - Regulated waste must not be disposed of on site. (BE4) – Waste containers must be clearly marked to identify the contents when waiting to be transported off site.	Bechtel / GLNG	Inspection, site records					Sitewide		Regular		Letter/ Report	Annual	Env Authority	No or insufficient waste records maintained	Maintain waste disposal records
																				Weekly inspections show poor waste handling practices	Re train operators, reassess process methodology and fix faulty equipment.
																				Weekly inspections show unauthorised disposal of waste on site or mainland facilities	Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
Waste water	C	GLNG	Construction WTP (reverse osmosis concentrate) discharge to sea prior to outfall	Environmental Authority - EPPG00712213	C3	Totally quantity of ROC released in a day must not exceed 12 mega litres	Bechtel			X	Metito Specifications.	WTP Discharge S4/ WW2 Diffuser			Daily		Letter Report	Annual	Env Authority	Release of a total daily volume in excess of 12 mega litres	Modify plant efficiency, reduce water consumption, review plant specs.
Waste water	C/O	GLNG	Operational WTP (reverse osmosis concentrate) discharge to sea prior to outfall	Environmental Authority - EPPG00712213	C4-C5	The waste water effluent release via the diffuser discharge point WW1 must not exceed the release limits specified in Schedule C, Table 1 when monitored at S9. Monitoring of contaminants released to Port Curtis must be undertaken for the quality characteristics and parameters specified in Schedule C Table 1.	GLNG/ Bechtel			X	Most recent DEHP Water Quality Sampling Manual	WW1 seawater outfall and Operational Monitoring Point S2			Weekly		Letter Report	Annual	Env Authority	Exceedance of Schedule C, Table 2	Adjust process control and operation.

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									Quantitative												
				Regulatory Permit	Permit Condition	Due Diligence Note: refer to permit for tables		Qualitative	Grab Sample	On-line		Point	General	Baseline	Routine Based	Event Based	Format	Frequency	To Whom	Trigger	Corrective Action
Waste water	C/O	GLNG	All discharge to sea; toxic substances; acute and chronic direct toxicity assessment (DTA)	Environmental Authority - EPPG00712213	C6 - C22	Direct toxicity Assessment (DTA) Monitoring of Toxic substances into waters. EA Conditions C6 to C22	Bechtel / GLNG		X		Most recent DEHP Water Quality Sampling Manual - Diffuser Validation.	As per the Receiving Environment Monitoring Program			Quarterly		Letter Report	20 business days after receiving initial results Annual	Env Authority Env Authority	Exceedance of Sch, C Table 2 or table 3 and EA condition levels C7 - C22.	Adjust process control and operation. Apply Monitoring as per EA C15, C23, C24 and C25.
Waste water	C	GLNG	WTP influent, effluent, and brine	Environmental Authority - EPPG00712213	C23 – C27	(C23) The daily volume and daily average flow rate of seawater influent... (C24) The daily volume and daily average flow rate of desalination effluent... (C25) The daily volume and daily average flow rate in m3/s of the brine component of the desalination effluent... (C26) Monitoring of seawater influent for pH, temperature, turbidity, and conductivity (continuous)... (C27) Monitoring of desalination effluent for pH, chlorine, dissolved oxygen concentration and precent saturation, temperature, turbidity, and conductivity (continuous)...	Bechtel / GLNG			X	Must be determined or estimated by an appropriate method with an accuracy of +/- 5%, and records kept of such determinations. Metito Specifications.	Points S6 and S4 at the Water Treatment Plant and S5 combined discharge (WTP & STP)			Daily		Letter Report	Annual	Env Authority	Exceedance of conditions: C5 and BC8.	Adjust process control and operation.
Waste water	C	GLNG	Treated sewage effluent	Environmental Authority - EPPG00712213	BC8	The total quantity of treated sewage effluent released to waters via the release points listed in *Schedule BC – Table 1: Contaminant Release Points*, after wet weather storage is exceeded, on any one day must not exceed: (a) 1.08 mega litres during construction; or	Bechtel			X	Metito Specifications.	S3 monitoring point at the Sewage Treatment Plan and S5 monitoring point of the combined stream (WTP & STP)			Daily		Letter Report	Annual	Env Authority	Exceedance of discharge quantities.	Adjust process control and operation to increase efficiency.
Waste water	C	GLNG	Treated sewage effluent	Environmental Authority - EPPG00712213	BC9	Quality characteristic of release to waters must comply with Schedule BC, Table 2 Quality characteristic limits.	Bechtel		X	X	Most recent DEHP Water Quality Sampling Manual	S5 monitoring point at the STP			Weekly		Letter Report	Annual	Env Authority	Exceedance of Sch BC, Table 2	Adjust process control and operation.
Waste water	O	GLNG	Operational WTP (reverse osmosis concentrate) discharge to sea prior to outfall	Environmental Authority - EPPG00712213	BC29	Total quantity of ROC released in a day during operation must not exceed 0.24 mega litres.	GLNG			X	Metito Specifications.	WW1 seawater outfall			Daily		Letter Report	Annual	Env Authority	Release of a total daily volume in excess of 0.24 mega litres	Modify plant efficiency, reduce water consumption, review plant specs.
Waste water	C	GLNG	Construction WTP (reverse osmosis concentrate) discharge to sea prior to outfall	Environmental Authority - EPPG00712213	BC30	The ROC released via the diffuser discharge point WW2 during Stage 2 construction works must not exceed the release limits specified in Part B – Schedule BC – Table 4 when measured at monitoring point S4	Bechtel		X	X	Most recent DEHP Water Quality Sampling Manual	S4 monitoring point at the WTP			Weekly		Letter Report	Annual	Env Authority	Exceedance of Sch C, Table 5.	Adjust process control and operation.
Waste Water	C	GLNG	Sewage Effluent	Permit 2.1 EPBC_LNG (2008/4057)	Condition 29	Any discharge of treated sewage effluent into the waters surrounding Curtis Island must, at minimum, meet the definition of tertiary treatment as specified in section 135(3) of the Great Barrier Reef Marine Park Regulations 1983 and be in accord with GBRMPA Sewage Discharge Policy March 2005, unless studies required to develop the CEMP under conditions 23 and 24 indicate that more stringent pollutant limits are necessary. **Not applicable as more stringent limits have been specified in the Environmental Authority/ CEMP**	Bechtel / GLNG		X	X	Great Barrier Reef Marine Park Regulations 1983 GBRMPA Sewage Discharge Policy March 2005	S3 and S5 monitoring points at the STP			Weekly		Letter Report	Annual	Env Authority	Exceedance of Sch C, Table 5.	Adjust process control and operation.
Waste water	C/O	GLNG	All discharges to sea	Environmental Authority - EPPG00712213	C28 - C32, BC11	Receiving Environment Monitoring Program (REMP)	GLNG / Bechtel	Field Notes	X	X	REMP	as per the Receiving Environment Monitoring Program		X	As per the REMP – 16 plume dilution monitoring events Monthly intake samples	X	Letter Report	Annual	Env Authority	REMP Water Quality Targets	Evaluate process control.
MAINLAND SITE – FISHERMANS LANDING																					
Stormwater	C	GLNG	Stormwater captured within a containment system	Preliminary Approval – DA2010/35	Water 1	Prior to any release, any storm water captured within the containment system must be free from contaminants or wastes that may cause environmental harm.	Bechtel /GLNG	Inspection/ Field Notes			Most recent DEHP Water Quality Sampling Manual		Stormwater Discharge Events			X	Letter/ Report	Event Based	Gladstone Port Authority (GPC)	Release of contaminants to the receiving environment from storm water in a containment system	Review and assess stormwater management procedures and amend as necessary.
Acid Sulfate Soils	C	GLNG	Acid Sulfate Soils encountered during construction	Preliminary Approval – DA2010/35	Water 3	Should Acid Sulfate soils be identified during construction, they are to be managed in accordance with the GLNG ASS Management Plan (ASSMP).	Bechtel /GLNG	Inspection			State Planning Policy 2/02 Development involving Acid Sulfate Soils Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland 1998.		Shoreline Works/Site wide			X	Letter/ Report	Event Based	Gladstone Port Authority (GPC)	Acid Sulfate soils not managed in accordance with the ASSMP	Stop works until works are in line with ASSMP
Waste	C	GLNG	Waste	Preliminary Approval – DA2010/35	Waste 1	All disposal of waste generated in carrying out the authority must be to a proper and appropriate facility that accepts that waste. Regulated waste, if removed from the site, must only be reprocessed, recycled, stored, incinerated or disposed at a licensed regulated waste facility.	Bechtel /GLNG	Inspection					Sitewide		Regular		Letter/ Report	Event Based	Gladstone Port Authority (GPC)	No or insufficient waste records maintained Weekly inspections show poor waste handling practices Weekly inspections show unauthorised disposal of waste on site or mainland facilities	Maintain waste disposal records Re train operators, reassess process methodology and fix faulty equipment. Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
Air	C	GLNG	Dust and particulate matter	Preliminary Approval – DA2010/35	Air 1	Activities on site are not to generate dust in such a manner as is likely to have an impact on Gladstone Ports Corporations monitoring equipment in the area or cause nuisance to neighbouring activities. Should such an event occur, or complaints are received about dust, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as practicable in accordance with General	Bechtel /GLNG		X		(i) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet	Various dust monitoring locations at Fisherman's Landing			Monthly		Letter/ Report	Complaint	Gladstone Port Authority (GPC)	Dust complaint or GPC monitoring equipment impacted	Locate source, change work practice, apply water or other dust suppressant measures

Appendix A - Environmental Monitoring Matrix

CEMP Monitoring Plan Summary (March 2014)

Category	Phase: C = Construction O = Operations	Permit Holder	Media to Monitor	Driver			Responsible Party	Type of Monitoring			Methodology Reference	Monitoring Locations		Frequency			Reporting			Corrective Actions	
									Quantitative												
				Regulatory Permit	Permit Condition	Due Diligence Note: refer to permit for tables		Qualitative	Grab Sample	On-line		Point	General	Baseline	Routine Based	Event Based	Format	Frequency	To Whom	Trigger	Corrective Action
						Condition 1.					-Gravimetric method'; or (ii) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. Project Dust Monitoring Procedure										
Noise	C	GLNG	Noise	Preliminary Approval – DA2010/35	Noise 1	Activities on site are not to generate noise in such a manner as is likely to have an impact or cause nuisance to neighbouring activities or residents. Should such an event occur, or complaints are received about noise, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as possible in accordance with General Condition 1.	Bechtel /GLNG	Inspection	X		DEHP Noise Measurement Manual		Site boundary			X	Letter Report	Complaint	Gladstone Port Authority (GPC)	Complaint received	Locate source and Modify activity
Stormwater	C	GLNG	Stormwater captured within a containment system	Operational Works – DA2010/35	Water 29	Prior to any release, any storm water captured within the containment system must be free from contaminants or wastes that may cause environmental harm.	Bechtel /GLNG	Inspection/ Field Notes			Most recent DEHP Water Quality Sampling Manual		On site stormwater containment system			X	Letter/ Report	Event Based	Gladstone Port Authority (GPC)	Release of contaminants to the receiving environment from storm water in a containment system	Review and assess stormwater management procedures and amend as necessary.
Acid Sulfate Soils	C	GLNG	Acid Sulfate Soils encountered during construction	Operational Works – DA2010/35	Water 31	Should Acid Sulfate soils be identified during construction, they are to be managed in accordance with the GLNG ASS Management Plan (ASSMP).	Bechtel /GLNG	Inspection			State Planning Policy 2/02 Development involving Acid Sulfate Soils Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland 1998.		Shoreline Works/Site wide			X	Letter/ Report	Event Based	Gladstone Port Authority (GPC)	Acid Sulfate soils not managed in accordance with the ASSMP	Stop works until works are in line with ASSMP
Waste	C	GLNG	Waste	Operational Works – DA2010/35	Waste 32	All disposal of waste generated in carrying out the authority must be to a proper and appropriate facility that accepts that waste. Regulated waste, if removed from the site, must only be reprocessed, recycled, stored, incinerated or disposed at a licensed regulated waste facility.	Bechtel /GLNG	Inspection/ Records					Sitewide		Regular		Letter/ Report	Event Based	Gladstone Port Authority (GPC)	No or insufficient waste records maintained Weekly inspections show poor waste handling practices Weekly inspections show unauthorised disposal of waste on site or mainland facilities	Maintain waste disposal records Re train operators, reassess process methodology and fix faulty equipment. Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
Air	C	GLNG	Dust and particulate matter	Operational Works – DA2010/35	Air 33	Activities on site are not to generate dust in such a manner as is likely to have an impact on Gladstone Ports Corporations monitoring equipment in the area or cause nuisance to neighbouring activities. Should such an event occur, or complaints are received about dust, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as practicable in accordance with General Condition 16.	Bechtel /GLNG		X		(i) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or (ii) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. Project Dust Monitoring Procedure	Various dust monitoring locations at Fisherman's Landing			Monthly		Letter/ Report	Complaint	Gladstone Port Authority (GPC)	Dust complaint received or GPC monitoring equipment impacted	Locate source, change work practice, apply water or other dust suppressant measures
Noise	C	GLNG	Noise at sensitive receptors	Operational Works – DA2010/35	Noise 34	Activities on site are not to generate noise in such a manner as is likely to have an impact or cause nuisance to neighbouring activities or residents. Should such an event occur, or complaints are received about noise, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as possible in accordance with General Condition 16.	Bechtel /GLNG	Inspection	X		DEHP Noise Measurement Manual		Site boundary			X	Letter Report	Complaint	Gladstone Port Authority (GPC)	Complaint received	Locate source and Modify activity
Air	C	Bechtel	Dust and particulate matter	Environmental Authority – EPPR00883313	B1	The release of dust and/or particulate matter resulting from the activities authorised by this development approval must not cause an environmental nuisance at any nuisance sensitive place.	Bechtel /GLNG		X		(i) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or (ii) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. Project Dust Monitoring Procedure	Various dust monitoring locations at Fisherman's Landing			Monthly		Letter/ Report	Complaint Annual	Env Authority Env Authority	Dust complaint received	Locate source, change work practice, apply water or other dust suppressant measures
Stormwater	C	Bechtel	Stormwater released from the site	Environmental Authority – EPPR00883313	C4	Contaminants other than settled/treated stormwater runoff waters must not be directly or indirectly released from the site(s) to surface waters or the bed or banks of any watercourse.	Bechtel	Field Notes			Most recent DEHP Water Quality Sampling Manual		Stormwater discharges from site			X	Letter/ Report	Event based Annual	Env Authority Env Authority	Release of contaminants to the receiving environment from storm water in a containment system	Review and assess stormwater management procedures and amend as necessary.
Stormwater	C	Bechtel	Controlled release of stormwater from containment structures to waters	Environmental Authority – EPPR00883313	C5, C6	The controlled release of stormwater from containment structures to waters must be in compliance with the release limits listed in Schedule C, Table 1, from the contaminant release points described in the Stormwater Management Plan. The release of contaminants to waters must not: - Produce a slick, discolouration or ambient waters or visible evidence of oil or grease nor contain visible floating oil, grease, scum, litter or other objectionable matter; nor - Have any other properties nor contain any other contaminants in concentrations that are likely to cause environmental harm.	Bechtel		X		Most recent DEHP Water Quality Sampling Manual		Stormwater discharges from containment structures			X	Letter/ Report	Event based Annual	Env Authority Env Authority	Release of water through containment structure outside of the specified limits	Review and assess stormwater management procedures and amend as necessary.
Chemicals and Fuels	C	Bechtel	Chemical and fuel storage	Environmental Authority – EPPR00883313	D1	All chemicals and fuels, including any spillage thereof, must be contained within an on-site containment system and controlled in a manner that prevents environmental harm.	Bechtel	Inspection					Sitewide		Regular		Letter/ Report	Event based	Env Authority	Chemical or fuels not in a containment system or release of chemical or fuels that does or could cause	Put chemicals and fuels in containment and modify maintenance practices if necessary.

Appendix A - Environmental Monitoring Matrix

CEMP Monitoring Plan Summary (March 2014)

Category	Phase: C = Construction O = Operations	Permit Holder	Media to Monitor	Driver			Responsible Party	Type of Monitoring			Methodology Reference	Monitoring Locations		Frequency			Reporting			Corrective Actions	
									Quantitative												
				Regulatory Permit	Permit Condition	Due Diligence Note: refer to permit for tables		Qualitative	Grab Sample	On-line		Point	General	Baseline	Routine Based	Event Based	Format	Frequency	To Whom	Trigger	Corrective Action
																				environmental harm	
Noise	C	Bechtel	Noise at sensitive receptors	Environmental Authority – EPPR00883313	E1	Noise from the activity must not cause environmental nuisance at any nuisance sensitive place.	Bechtel		X		DEHP Noise Measurement Manual		Site boundary			X	Letter Report	Complaint Annual	Env Authority Env Authority	Complaint received	Locate source and Modify activity
Waste	C	Bechtel	Waste	Environmental Authority – EPPR00883313	F2,F3	Waste generated in the carrying out the activities must be stored, handled and transferred in a proper and efficient manner. Waste must not be released to the environment, stored, transferred or disposed contrary to any condition of this development approval. Regulated waste, if removed from the site, must only be reprocessed, recycled, stored, incinerated or disposed at a licensed regulated waste facility.	Bechtel	Record Keeping/Inspections					Sitewide		Regular		Letter/ Report	Event based	Env Authority	No or insufficient waste records maintained Weekly inspections show poor waste handling practices Weekly inspections show unauthorised disposal of waste on site or mainland facilities	Maintain waste disposal records Re train operators, reassess process methodology and fix faulty equipment. Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
Stormwater	C	GLNG	Stormwater captured within a containment system	MCU – ERA 50 – DA2010/40	Water 19	Prior to any release, any storm water captured within the containment system must be free from contaminants or wastes that may cause environmental harm.	Bechtel /GLNG	Field Notes			Most recent DEHP Water Quality Sampling Manual		Stormwater discharges from containment systems			X	Letter/ Report	Event Based	Gladstone Port Authority (GPC)	Release of contaminants to the receiving environment from storm water in a containment system	Review and assess stormwater management procedures and amend as necessary.
Acid Sulfate Soils	C	GLNG	Acid Sulfate Soils encountered during construction	MCU – ERA 50 – DA2010/40	Water 21	Should Acid Sulfate soils be identified during construction, they are to be managed in accordance with the GLNG ASS Management Plan (ASSMP).	Bechtel /GLNG	Inspections/Records			State Planning Policy 2/02 Development involving Acid Sulfate Soils Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland 1998.		Shoreline Works/Site wide			X	Letter/ Report	Event Based	Gladstone Port Authority (GPC)	Acid Sulfate soils not managed in accordance with the ASSMP	Stop works until works are in line with ASSMP
Waste	C	GLNG	Waste	MCU – ERA 50 – DA2010/40	Waste 22	All disposal of waste generated in carrying out the authority must be to a proper and appropriate facility that accepts that waste. Regulated waste, if removed from the site, must only be reprocessed, recycled, stored, incinerated or disposed at a licensed regulated waste facility.	Bechtel /GLNG	Inspections/Records					Sitewide		Regular		Letter/ Report	Event Based	Gladstone Port Authority (GPC)	No or insufficient waste records maintained Weekly inspections show poor waste handling practices Weekly inspections show unauthorised disposal of waste on site or mainland facilities	Maintain waste disposal records Re train operators, reassess process methodology and fix faulty equipment. Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
Air	C	GLNG	Dust and particulate matter	MCU – ERA 50 – DA2010/40	Air 23	Activities on site are not to generate dust in such a manner as is likely to have an impact on Gladstone Ports Corporations monitoring equipment in the area or cause nuisance to neighbouring activities. Should such an event occur, or complaints are received about dust, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as practicable in accordance with General Condition 5.	Bechtel /GLNG		X		(i) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or (ii) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. Project Dust Monitoring Procedure	Various dust monitoring locations at Fisherman's Landing			Monthly		Letter/ Report	Complaint	Gladstone Port Authority (GPC)	Dust complaint or GPC monitoring equipment impacted	Locate source, change work practice, apply water or other dust suppressant measures
Noise	C	GLNG	Noise	MCU – ERA 50 – DA2010/40	Noise 24	Activities on site are not to generate noise in such a manner as is likely to have an impact or cause nuisance to neighbouring activities or residents. Should such an event occur, or complaints are received about noise, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as possible in accordance with General Condition 5.	Bechtel /GLNG		X		DEHP Noise Measurement Manual		Site boundary			X	Letter Report	Complaint	Gladstone Port Authority (GPC)	Complaint received	Locate source and Modify activity
Air	C	Bechtel	Dust and particulate matter	Material Change of Use for Environmentally Relevant Activities – SPCE01521911	B1	The release of dust and/or particulate matter resulting from the activities authorised by this development approval must not cause an environmental nuisance at any nuisance sensitive place.	Bechtel		X		(i) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or (ii) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. Project Dust Monitoring Procedure	Various dust monitoring locations at Fisherman's Landing			Monthly		Letter/ Report	Complaint	Env Authority	Dust complaint received	Locate source, change work practice, apply water or other dust suppressant measures
Stormwater	C	Bechtel	Stormwater released from the site	Material Change of Use for Environmentally Relevant Activities – SPCE01521911	C4	Contaminants other than settled/treated stormwater runoff waters must not be directly or indirectly released from the site(s) to surface waters or the bed or banks of any watercourse.	Bechtel	Field Notes			Most recent DEHP Water Quality Sampling Manual		Stormwater discharges from site			X	Letter/ Report	Event based	Env Authority	Release of contaminants to the receiving environment from storm water in a containment system	Review and assess stormwater management procedures and amend as necessary.
Stormwater	C	Bechtel	Controlled release of stormwater from containment structures to waters	Material Change of Use for Environmentally Relevant Activities – SPCE01521911	C5, C6	The controlled release of stormwater from containment structures to waters must be in compliance with the release limits listed in Schedule C, Table 1, from the contaminant release points described in the Stormwater Management Plan. The release of contaminants to waters must not: - Produce a slick, discolouration or ambient	Bechtel		X		Most recent DEHP Water Quality Sampling Manual		Stormwater discharges from containment systems			X	Letter/ Report	Event based	Env Authority	Release of water through containment structure outside of the specified limits	Review and assess stormwater management procedures and amend as necessary.

Appendix A - Environmental Monitoring Matrix

CEMP Monitoring Plan Summary (March 2014)

Category	Phase: C = Construction O = Operations	Permit Holder	Media to Monitor	Driver			Responsible Party	Type of Monitoring			Methodology Reference	Monitoring Locations		Frequency			Reporting			Corrective Actions	
									Quantitative												
				Regulatory Permit	Permit Condition	Due Diligence Note: refer to permit for tables		Qualitative	Grab Sample	On-line		Point	General	Baseline	Routine Based	Event Based	Format	Frequency	To Whom	Trigger	Corrective Action
						waters or visible evidence of oil or grease nor contain visible floating oil, grease, scum, litter or other objectionable matter; nor Have any other properties nor contain any other contaminants in concentrations that are likely to cause environmental harm.															
Chemicals and Fuels	C	Bechtel	Chemical and fuel storage	Material Change of Use for Environmentally Relevant Activities – SPCE01521911	D1	All chemicals and fuels, including any spillage thereof, must be contained within an on-site containment system and controlled in a manner that prevents environmental harm.	Bechtel	Inspection				Sitewide		Regular		Letter/ Report	Event based	Env Authority	Chemical or fuels not in a containment system or release of chemical or fuels that does or could cause environmental harm	Put chemicals and fuels in containment and modify maintenance practices if necessary.
Noise	C	Bechtel	Noise at sensitive receptors	Material Change of Use for Environmentally Relevant Activities – SPCE01521911	E1	Noise from the activity must not cause environmental nuisance at any nuisance sensitive place.	Bechtel		X		DEHP Noise Measurement Manual		Site boundary			X	Letter Report	Complaint	Env Authority	Complaint received	Locate source and Modify activity
Waste	C	Bechtel	Waste	Material Change of Use for Environmentally Relevant Activities – SPCE01521911	F2,F3	Waste generated in the carrying out the activities must be stored, handled and transferred in a proper and efficient manner. Waste must not be released to the environment, stored, transferred or disposed contrary to any condition of this development approval. Regulated waste, if removed from the site, must only be reprocessed, recycled, stored, incinerated or disposed at a licensed regulated waste facility.	Bechtel	Inspection/ Record Keeping				Sitewide		Regular		Letter/ Report	Event based	Env Authority	No or insufficient waste records maintained Weekly inspections show poor waste handling practices Weekly inspections show unauthorised disposal of waste on site or mainland facilities	Maintain waste disposal records Re train operators, reassess process methodology and fix faulty equipment. Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
MAINLAND SITE – RG TANNA																					
Stormwater	C	GLNG	Stormwater captured within a containment system	MCU – ERA 50 – DA2010/37	Water 18	Prior to any release, any storm water captured within the containment system must be free from contaminants or wastes that may cause environmental harm.	Bechtel /GLNG	Field Notes			Most recent DEHP Water Quality Sampling Manual		Stormwater discharges from containment systems			X	Letter/ Report	Event Based	Gladstone Port Authority (GPC)	Release of contaminants to the receiving environment from storm water in a containment system	Review and assess stormwater management procedures and amend as necessary.
Acid Sulfate Soils	C	GLNG	Acid Sulfate Soils encountered during construction	MCU – ERA 50 – DA2010/37	Water 20	Should Acid Sulfate soils be identified during construction, they are to be managed in accordance with the GLNG ASS Management Plan (ASSMP).	Bechtel /GLNG	Inspection/ Records			State Planning Policy 2/02 Development involving Acid Sulfate Soils Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland 1998.		Shoreline Works/Site wide			X	Letter/ Report	Event Based	Gladstone Port Authority (GPC)	Acid Sulfate soils not managed in accordance with the ASSMP	Stop works until works are in line with ASSMP
Waste	C	GLNG	Waste	MCU – ERA 50 – DA2010/37	Waste 21	All disposal of waste generated in carrying out the authority must be to a proper and appropriate facility that accepts that waste. Regulated waste, if removed from the site, must only be reprocessed, recycled, stored, incinerated or disposed at a licensed regulated waste facility.	Bechtel /GLNG	Inspection/ Records					Sitewide		Regular		Letter/ Report	Event Based	Gladstone Port Authority (GPC)	No or insufficient waste records maintained Weekly inspections show poor waste handling practices Weekly inspections show unauthorised disposal of waste on site or mainland facilities	Maintain waste disposal records Re train operators, reassess process methodology and fix faulty equipment. Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
Air	C	GLNG	Dust and particulate matter	MCU – ERA 50 – DA2010/37	Air 22	Activities on site are not to generate dust in such a manner as is likely to have an impact on Gladstone Ports Corporations monitoring equipment in the area or cause nuisance to neighbouring activities. Should such an event occur, or complaints are received about dust, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as practicable in accordance with General Condition 5.	Bechtel /GLNG		X		(i) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or (ii) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. Project Dust Monitoring Procedure	Various dust monitoring locations at RG Tanna			Monthly		Letter/ Report	Complaint	Gladstone Port Authority (GPC)	Dust complaint or GPC monitoring equipment impacted	Locate source, change work practice, apply water or other dust suppressant measures
Noise	C	GLNG	Noise	MCU – ERA 50 – DA2010/37	Noise 23	Activities on site are not to generate noise in such a manner as is likely to have an impact or cause nuisance to neighbouring activities or residents. Should such an event occur, or complaints are received about noise, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as possible in accordance with General Condition 5.	Bechtel /GLNG		X		DEHP Noise Measurement Manual		Site boundary			X	Letter Report	Complaint	Gladstone Port Authority (GPC)	Complaint received	Locate source and Modify activity
Air	C	Bechtel	Dust and particulate matter	Material Change of Use for Environmentally Relevant Activities – SPCE01347610	B1,B2, B3	The release of dust and/or particulate matter resulting from the activities authorised by this development approval must not cause an environmental nuisance at any nuisance sensitive place. The registered operator must conduct a dust monitoring program, developed in consultation with the administering authority, for the parameters and at the frequency specified in Schedule B, Table 1, at locations acceptable to the administering authority. The dust deposition monitoring program must use Australian Standard, AS 3580, 10.1, *2003; Determination of Particulates - Deposited Malter -Gravimetric Method* and levels must not exceed the following;	Bechtel /GLNG		X		(i) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or (ii) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. Project Dust Monitoring	Various dust monitoring locations at RG Tanna			Monthly	X	Letter/ Report	Complaint Annual	Env Authority	Dust complaint receive Results of program are outside dust limits	Locate source, change work practice, apply water or other dust suppressant measures

Appendix A - Environmental Monitoring Matrix

CEMP Monitoring Plan Summary (March 2014)

Category	Phase: C = Construction O = Operations	Permit Holder	Media to Monitor	Driver			Responsible Party	Type of Monitoring			Methodology Reference	Monitoring Locations		Frequency			Reporting			Corrective Actions	
									Quantitative												
				Regulatory Permit	Permit Condition	Due Diligence Note: refer to permit for tables		Qualitative	Grab Sample	On-line		Point	General	Baseline	Routine Based	Event Based	Format	Frequency	To Whom	Trigger	Corrective Action
						• Less than four (4) grams per square metre per month (total insoluble solids) at site boundaries nearest the closest residential premises at the points; • Less than three (3) grams per square metre per month (total insoluble solids) at any nuisance sensitive place. When requested by the administering authority, dust deposition monitoring must be undertaken to investigate any complaint of environmental nuisance caused by dust, and the data and analysed results notified to the administering authority within 28 days of completion of the monitoring. Monitoring must be carried out at a place(s) relevant to the potentially affected nuisance sensitive place and at upwind control sites.					Procedure										
Stormwater	C	Bechtel	Stormwater released from the site	Material Change of Use for Environmentally Relevant Activities – SPCE01347610	C4	Contaminants other than settled/treated stormwater runoff waters must not be directly or indirectly released from the site(s) to surface waters or the bed or banks of any watercourse.	Bechtel	Field Notes			Most recent DEHP Water Quality Sampling Manual		Stormwater discharges from site			X	Letter/ Report	Event based Annual	Env Authority	Release of contaminants to the receiving environment from storm water in a containment system	Review and assess stormwater management procedures and amend as necessary.
Stormwater	C	Bechtel	Controlled release of stormwater from containment structures to waters	Material Change of Use for Environmentally Relevant Activities – SPCE01347610	C5, C7	The controlled release of stormwater from containment structures to waters must be in compliance with the release limits listed in Schedule C, Table 1, from the contaminant release points described in the Stormwater Management Plan. The release of contaminants to waters must not: - Produce a slick, discolouration or ambient waters or visible evidence of oil or grease nor contain visible floating oil, grease, scum, litter or other objectionable matter; nor Have any other properties nor contain any other contaminants in concentrations that are likely to cause environmental harm.	Bechtel		X		Most recent DEHP Water Quality Sampling Manual		Stormwater discharges from containment structures			X	Letter/ Report	Event based Annual	Env Authority	Release of water through containment structure outside of the specified limits	Review and assess stormwater management procedures and amend as necessary.
Chemicals and Fuels	C	Bechtel	Chemical and fuel storage	Material Change of Use for Environmentally Relevant Activities – SPCE01347610	D1	All chemicals and fuels, including any spillage thereof, must be contained within an on-site containment system and controlled in a manner that prevents environmental harm.	Bechtel	Inspection					Sitewide		Regular		Letter/ Report	Event based	Env Authority	Chemical or fuels not in a containment system or release of chemical or fuels that does or could cause environmental harm	Put chemicals and fuels in containment and modify maintenance practices if necessary.
Noise	C	Bechtel	Noise at sensitive receptors	Material Change of Use for Environmentally Relevant Activities – SPCE01347610	E1	All noise from activities must not exceed the levels specified in Schedule E, Table 1 – *Noise Limits* at any nuisance sensitive place or commercial place.	Bechtel		X		DEHP Noise Measurement Manual		Site boundary			X	Letter Report	Complaint Annual	Env Authority	Complaint received	Locate source and Modify activity
Waste	C	Bechtel	Waste	Material Change of Use for Environmentally Relevant Activities – SPCE01347610	F2,F3	Waste generated in the carrying out the activities must be stored, handled and transferred in a proper and efficient manner. Waste must not be released to the environment, stored, transferred or disposed contrary to any condition of this development approval. Regulated waste, if removed from the site, must only be reprocessed, recycled, stored, incinerated or disposed at a licensed regulated waste facility.	Bechtel	Inspection/ Record Keeping					Sitewide		Regular		Letter/ Report	Event based	Env Authority	No or insufficient waste records maintained Weekly inspections show poor waste handling practices Weekly inspections show unauthorised disposal of waste on site or mainland facilities	Maintain waste disposal records Re train operators, reassess process methodology and fix faulty equipment. Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
Stormwater	C	GLNG	Stormwater captured within a containment system	Development Permit – DA2010/33	Water 25	Prior to any release, any storm water captured within the containment system must be free from contaminants or wastes that may cause environmental harm.	Bechtel /GLNG	Field Notes			Most recent DEHP Water Quality Sampling Manual		Stormwater discharges from containment systems			X	Letter/ Report	Event Based	Gladstone Port Authority (GPC)	Release of contaminants to the receiving environment from storm water in a containment system	Review and assess stormwater management procedures and amend as necessary.
Acid Sulfate Soils	C	GLNG	Acid Sulfate Soils encountered during construction	Development Permit – DA2010/33	Water 28	Should Acid Sulfate soils be identified during construction, they are to be managed in accordance with the GLNG ASS Management Plan (ASSMP).	Bechtel /GLNG	Inspection			State Planning Policy 2/02 Development involving Acid Sulfate Soils Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland 1998.		Shoreline Works/Site wide			X	Letter/ Report	Event Based	Gladstone Port Authority (GPC)	Acid Sulfate soils not managed in accordance with the ASSMP	Stop works until works are in line with ASSMP
Waste	C	GLNG	Waste	Development Permit – DA2010/33	Waste 29	All disposal of waste generated in carrying out the authority must be to a proper and appropriate facility that accepts that waste. Regulated waste, if removed from the site, must only be reprocessed, recycled, stored, incinerated or disposed at a licensed regulated waste facility.	Bechtel /GLNG	Inspections/Records					Sitewide		Regular		Letter/ Report	Event Based	Gladstone Port Authority (GPC)	No or insufficient waste records maintained Weekly inspections show poor waste handling practices Weekly inspections show unauthorised disposal of waste on site or mainland facilities	Maintain waste disposal records Re train operators, reassess process methodology and fix faulty equipment. Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
Air	C	GLNG	Dust and particulate matter	Development Permit – DA2010/33	Air 30	Activities on site are not to generate dust in such a manner as is likely to have an impact on Gladstone Ports Corporations monitoring equipment in the area or cause nuisance to neighbouring activities. Should such an event occur, or complaints are received about dust, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as practicable in accordance with General Condition 5.	Bechtel /GLNG		X		(i) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or (ii) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality	Various dust monitoring locations at RG Tanna				Monthly		Letter/ Report	Complaint	Gladstone Port Authority (GPC)	Dust complaint or GPC monitoring equipment impacted	Locate source, change work practice, apply water or other dust suppressant measures

Appendix A - Environmental Monitoring Matrix

CEMP Monitoring Plan Summary (March 2014)

Category	Phase: C = Construction O = Operations	Permit Holder	Media to Monitor	Driver			Responsible Party	Type of Monitoring			Methodology Reference	Monitoring Locations		Frequency			Reporting			Corrective Actions	
									Quantitative												
				Regulatory Permit	Permit Condition	Due Diligence Note: refer to permit for tables		Qualitative	Grab Sample	On-line		Point	General	Baseline	Routine Based	Event Based	Format	Frequency	To Whom	Trigger	Corrective Action
											Sampling Manual' as published from time to time by the administering authority. Project Dust Monitoring Procedure										
Noise	C	GLNG	Noise	Development Permit – DA2010/33	Noise 31	Activities on site are not to generate noise in such a manner as is likely to have an impact or cause nuisance to neighbouring activities or residents. Should such an event occur, or complaints are received about noise, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as possible in accordance with General Condition 5.	Bechtel /GLNG		X		DEHP Noise Measurement Manual		Site boundary			X	Letter Report	Complaint	Gladstone Port Authority (GPC)	Complaint received	Locate source and Modify activity
Waste	C	GLNG	Waste	Operational Works that is Tidal Works – DA2010/32	Waste 29	All disposal of waste generated in carrying out the authority must be to a proper and appropriate facility that accepts that waste. Regulated waste, if removed from the site, must only be reprocessed, recycled, stored, incinerated or disposed at a licensed regulated waste facility.	Bechtel /GLNG	Inspection/ Records					Sitewide		Regular		Letter/ Report	Event Based	Gladstone Port Authority (GPC)	No or insufficient waste records maintained Weekly inspections show poor waste handling practices Weekly inspections show unauthorised disposal of waste on site or mainland facilities	Maintain waste disposal records Re train operators, reassess process methodology and fix faulty equipment. Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
Air	C	GLNG	Dust and particulate matter	Operational Works that is Tidal Works – DA2010/32	Air 30	Activities on site are not to generate dust in such a manner as is likely to have an impact on Gladstone Ports Corporations monitoring equipment in the area or cause nuisance to neighbouring activities. Should such an event occur, or complaints are received about dust, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as practicable in accordance with General Condition 5.	Bechtel /GLNG		X		(i) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or (ii) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. Project Dust Monitoring Procedure	Various dust monitoring locations at RG Tanna			Monthly		Letter/ Report	Complaint	Gladstone Port Authority (GPC)	Dust complaint or GPC monitoring equipment impacted	Locate source, change work practice, apply water or other dust suppressant measures
Noise	C	GLNG	Noise	Operational Works that is Tidal Works – DA2010/32	Noise 31	Activities on site are not to generate noise in such a manner as is likely to have an impact or cause nuisance to neighbouring activities or residents. Should such an event occur, or complaints are received about noise, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as possible in accordance with General Condition 5.	Bechtel /GLNG		X		DEHP Noise Measurement Manual		Site boundary			X	Letter Report	Complaint	Gladstone Port Authority (GPC)	Complaint received	Locate source and Modify activity
Waste	C	GLNG	Waste	Operational Works – Tidal Works – SPCC01561211	Wastes 11	All wastes shall be collected and disposed of at an appropriate licensed lawful facility	Bechtel /GLNG	Inspection/ Records					Sitewide		Regular		Letter/ Report	Event Based	Env Authority	No or insufficient waste records maintained Weekly inspections show poor waste handling practices Weekly inspections show unauthorised disposal of waste on site or mainland facilities	Maintain waste disposal records Re train operators, reassess process methodology and fix faulty equipment. Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
Acid Sulfate Soils	C	GLNG	Acid Sulfate Soils	Operational Works – Tidal Works – SPCC01561211	Acid Sulfate Soils 12	If acid sulfate soils are found to be present in areas subject to excavation, then the works must be managed to prevent release of acidic drain water to any natural waters in accordance with procedures outlined in the current version of the Queensland Acid Sulphate Soils Technical Manual Soil Management Guidelines	Bechtel /GLNG	Inspection/ Records			State Planning Policy 2/02 Development involving Acid Sulfate Soils Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland 1998.		Shoreline Works/Site wide			X	Letter/ Report	Event Based	Env Authority	Acid Sulfate soils not managed in accordance with the ASSMP	Stop works until works are in line with ASSMP
MAINLAND SITE – PORT CENTRAL																					
Stormwater	C	GLNG	Stormwater captured within a containment system	Development Permit – DA2010/34 (Permissible Change DA2012-13)	Water 35	Prior to any release, any storm water captured within the containment system must be free from contaminants or wastes that may cause environmental harm.	Bechtel /GLNG	Field Notes			Most recent DEHP Water Quality Sampling Manual		Stormwater discharges from containment structures			X	Letter/ Report	Event Based	Gladstone Port Authority (GPC)	Release of contaminants to the receiving environment from storm water in a containment system	Review and assess stormwater management procedures and amend as necessary.
Acid Sulfate Soils	C	GLNG	Acid Sulfate Soils encountered during construction	Development Permit – DA2010/34 (Permissible Change DA2012-13)	Water 38	Should Acid Sulfate soils be identified during construction, they are to be managed in accordance with the GLNG ASS Management Plan (ASSMP).	Bechtel /GLNG	Inspection/ Records			State Planning Policy 2/02 Development involving Acid Sulfate Soils Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland 1998.		Shoreline Works/Site wide			X	Letter/ Report	Event Based	Gladstone Port Authority (GPC)	Acid Sulfate soils not managed in accordance with the ASSMP	Stop works until works are in line with ASSMP
Waste	C	GLNG	Waste	Development Permit – DA2010/34 (Permissible Change DA2012-13)	Waste 39	All disposal of waste generated in carrying out the authority must be to a proper and appropriate facility that accepts that waste. Regulated waste, if removed from the site, must only be reprocessed, recycled, stored, incinerated or disposed at a licensed regulated waste facility.	Bechtel /GLNG	Inspection/ Records					Sitewide		Regular		Letter/ Report	Event Based	Gladstone Port Authority (GPC)	No or insufficient waste records maintained Weekly inspections show poor waste handling practices Weekly inspections show unauthorised disposal of waste on site or mainland	Maintain waste disposal records Re train operators, reassess process methodology and fix faulty equipment. Review methodology with operators, enforce correct disposal procedures and

Appendix A - Environmental Monitoring Matrix

CEMP Monitoring Plan Summary (March 2014)

Category	Phase: C = Construction O = Operations	Permit Holder	Media to Monitor	Driver			Responsible Party	Type of Monitoring			Methodology Reference	Monitoring Locations		Frequency			Reporting			Corrective Actions	
				Regulatory Permit	Permit Condition	Due Diligence Note: refer to permit for tables		Qualitative	Quantitative			Point	General	Baseline	Routine Based	Event Based	Format	Frequency	To Whom	Trigger	Corrective Action
									Grab Sample	On-line											
																				facilities	regularly conduct audits of disposal process.
Air	C	GLNG	Dust and particulate matter	Development Permit – DA2010/34 (Permissible Change DA2012-13)	Air 40	Activities on site are not to generate dust in such a manner as is likely to have an impact on Gladstone Ports Corporations monitoring equipment in the area or cause nuisance to neighbouring activities. Should such an event occur, or complaints are received about dust, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as practicable in accordance with General Condition 23.	Bechtel /GLNG		X		(i) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or (ii) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. Project Dust Monitoring Procedure	Various dust monitoring locations at Port Central			Monthly		Letter/ Report	Complaint	Gladstone Port Authority (GPC)	Dust complaint or GPC monitoring equipment impacted	Locate source, change work practice, apply water or other dust suppressant measures
Noise	C	GLNG	Noise	Development Permit – DA2010/34 (Permissible Change DA2012-13)	Noise 41	Activities on site are not to generate noise in such a manner as is likely to have an impact or cause nuisance to neighbouring activities or residents. Should such an event occur, or complaints are received about noise, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as possible in accordance with General Condition 23.	Bechtel /GLNG		X		DEHP Noise Measurement Manual		Site boundary			X	Letter Report	Complaint	Gladstone Port Authority (GPC)	Complaint received	Locate source and Modify activity
MAINLAND SITE – PORT CENTRAL AREA A																					
Waste	C	GLNG	Waste	Development Permit, Tidal Works – DA2010/31	Waste 34	All disposal of waste generated in carrying out the authority must be to a proper and appropriate facility that accepts that waste. Regulated waste, if removed from the site, must only be reprocessed, recycled, stored, incinerated or disposed at a licensed regulated waste facility.	Bechtel /GLNG	Inpsection/ Records					Sitewide		Regular		Letter/ Report	Event Based	Gladstone Port Authority (GPC)	No or insufficient waste records maintained Weekly inspections show poor waste handling practices Weekly inspections show unauthorised disposal of waste on site or mainland facilities	Maintain waste disposal records Re train operators, reassess process methodology and fix faulty equipment. Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
Air	C	GLNG	Dust and particulate matter	Development Permit, Tidal Works – DA2010/31	Air 35	Activities on site are not to generate dust in such a manner as is likely to have an impact on Gladstone Ports Corporations monitoring equipment in the area or cause nuisance to neighbouring activities. Should such an event occur, or complaints are received about dust, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as practicable in accordance with General Condition 1.	Bechtel /GLNG		X		(i) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or (ii) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. Project Dust Monitoring Procedure	Various dust monitoring locations at Port Central			Monthly		Letter/ Report	Complaint	Gladstone Port Authority (GPC)	Dust complaint or GPC monitoring equipment impacted	Locate source, change work practice, apply water or other dust suppressant measures
Noise	C	GLNG	Noise	Development Permit, Tidal Works – DA2010/31	Noise 36	Activities on site are not to generate noise in such a manner as is likely to have an impact or cause nuisance to neighbouring activities or residents. Should such an event occur, or complaints are received about noise, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as possible in accordance with General Condition 1.	Bechtel /GLNG	Inspection	X		DEHP Noise Measurement Manual		Site boundary			X	Letter Report	Complaint	Gladstone Port Authority (GPC)	Complaint received	Locate source and Modify activity
Waste	C	GLNG	Waste	Operational Works – Tidal Works – SPCC01376110	Wastes 12	All wastes shall be collected and disposed of at an appropriate licensed lawful facility	Bechtel /GLNG	Inspection/ Records					Sitewide		Regular		Letter/ Report	Event Based	Env Authority	No or insufficient waste records maintained Weekly inspections show poor waste handling practices Weekly inspections show unauthorised disposal of waste on site or mainland facilities	Maintain waste disposal records Re train operators, reassess process methodology and fix faulty equipment. Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
Acid Sulfate Soils	C	GLNG	Acid Sulfate Soils	Operational Works – Tidal Works – SPCC01376110	Acid Sulfate Soils 13	If acid sulfate soils are found to be present in areas subject to excavation, then the works must be managed to prevent release of acidic drain water to any natural waters in accordance with procedures outlined in the following documents: - State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulphate Soils; - Guidelines for Sampling and Analysis of Lowland Acid Sulphate Soils in Queensland 1998; and - Queensland Acid Sulfate Soil Technical Manual Soil Management Guidelines.	Bechtel /GLNG	Inspection/ Records			State Planning Policy 2/02 Development involving Acid Sulfate Soils Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland 1998.		Shoreline Works/Site wide			X	Letter/ Report	Event Based	Env Authority	Acid Sulfate soils not managed in accordance with the ASSMP	Stop works until works are in line with ASSMP
MAINLAND SITE – PORT CENTRAL AREA B																					
Waste	C	GLNG	Waste	Material Change of Use for Environmentally Relevant Activity 50 – Bulk Material Handling – DA2012/14	Waste 27,28	All disposal of waste generated in carrying out the authority must be to a proper and appropriate facility that accepts that waste. Regulated waste, if removed from the site, must only be reprocessed, recycled, stored, incinerated or disposed at a licensed regulated waste facility.	Bechtel /GLNG	Inspection/ Records					Sitewide		Regular		Letter/ Report	Event Based	Gladstone Port Authority (GPC)	No or insufficient waste records maintained Weekly inspections show poor waste handling	Maintain waste disposal records Re train operators, reassess process methodology

Appendix A - Environmental Monitoring Matrix

CEMP Monitoring Plan Summary (March 2014)

Category	Phase: C = Construction O = Operations	Permit Holder	Media to Monitor	Driver			Responsible Party	Type of Monitoring			Methodology Reference	Monitoring Locations		Frequency			Reporting			Corrective Actions	
									Quantitative												
				Regulatory Permit	Permit Condition	Due Diligence Note: refer to permit for tables		Qualitative	Grab Sample	On-line		Point	General	Baseline	Routine Based	Event Based	Format	Frequency	To Whom	Trigger	Corrective Action
																				practices Weekly inspections show unauthorised disposal of waste on site or mainland facilities	and fix faulty equipment. Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
Air	C	GLNG	Dust and particulate matter	Material Change of Use for Environmentally Relevant Activity 50 – Bulk Material Handling – DA2012/14	Dust 26	Activities on site are not to generate dust in such a manner as is likely to have an impact on Gladstone Ports Corporations monitoring equipment in the area or cause nuisance to neighbouring activities. Should such an event occur, or complaints are received about dust, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as practicable in accordance with General Condition 11.	Bechtel /GLNG		X		(i) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or (ii) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. Project Dust Monitoring Procedure	Various dust monitoring locations at Port Central			Monthly		Letter/ Report	Complai nt	Gladstone Port Authority (GPC)	Dust complaint or GPC monitoring equipment impacted	Locate source, change work practice, apply water or other dust suppressant measures
Noise	C	GLNG	Noise	Material Change of Use for Environmentally Relevant Activity 50 – Bulk Material Handling – DA2012/14	Noise 25	Activities on site are not to generate noise in such a manner as is likely to have an impact or cause nuisance to neighbouring activities or residents. Should such an event occur, or complaints are received about noise, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as possible in accordance with General Condition 11.	Bechtel /GLNG	Inspection	X		DEHP Noise Measurement Manual		Site boundary			X	Letter Report	Complai nt	Gladstone Port Authority (GPC)	Complaint received	Locate source and Modify activity
Water	C	GLNG	Groundwater	Material Change of Use for Environmentally Relevant Activity 50 – Bulk Material Handling – DA2012/14	Water 18	In the event of a groundwater sample exceeding the NEMP groundwater investigation level or dutch intervention guidelines target value, the proponent must supply a copy of the report to GPC within ten (10) days of the final report being submitted to any regulatory body.	GLNG		X							X	Letter/ Report	Event Based	Gladstone Port Authority (GPC)	Groundwater sample results are outside specified limits	Locate source and modify activity
Air	C	Bechtel	Dust and particulate matter	Material Change of Use for Environmentally Relevant Activities – SPCE04131412	B1,B2	The release of dust and/or particulate matter resulting from the activities authorised by this development approval must not cause an environmental nuisance at any nuisance sensitive place. Watering of unsealed roads shall be carried out so as to minimise the release of dust and particulate matter.	Bechtel /GLNG		X		(i) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or (ii) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. Project Dust Monitoring Procedure	Various dust monitoring locations at Port Central			Monthly	X	Letter/ Report	Complai nt Annual	Env Authority	Dust complaint receive	Locate source, change work practice, apply water or other dust suppressant measures
Stormwater	C	Bechtel	Stormwater released from the site	Material Change of Use for Environmentally Relevant Activities – SPCE04131412	C2	Contaminants other than settled/treated stormwater runoff waters must not be directly or indirectly released from the site(s) to surface waters or the bed or banks of any watercourse.	Bechtel	Field Notes			Most recent DEHP Water Quality Sampling Manual		Stormwater discharges off site			X	Letter/ Report	Event based Annual	Env Authority	Release of contaminants to the receiving environment from storm water in a containment system	Review and assess stormwater management procedures and amend as necessary.
Stormwater	C	Bechtel	Controlled release of stormwater from containment structures to waters	Material Change of Use for Environmentally Relevant Activities – SPCE04131412	C4 – C6	The controlled release of stormwater from containment structures to waters must be in compliance with the release limits listed in Schedule C, Table 1 – contaminant release limits to water. The release of contaminants to waters must not: - Produce a slick, discolouration or ambient waters or visible evidence of oil or grease nor contain visible floating oil, grease, scum, litter or other objectionable matter; nor - Have any other properties nor contain any other contaminants in concentrations that are likely to cause environmental harm. Prior to any release, any stormwater captured within the containment system must be free of contaminants or wastes that may cause environmental harm.	Bechtel		X		Most recent DEHP Water Quality Sampling Manual		Stormwater discharges from containment structures			X	Letter/ Report	Event based Annual	Env Authority	Release of water through containment structure outside of the specified limits	Review and assess stormwater management procedures and amend as necessary.
Chemicals and Fuels	C	Bechtel	Chemical and fuel storage	Material Change of Use for Environmentally Relevant Activities – SPCE04131412	D1	All chemicals and fuels, including any spillage thereof, must be contained within an on-site containment system and controlled in a manner that prevents environmental harm.	Bechtel	Inspection					Sitewide		Regular		Letter/ Report	Event based	Env Authority	Chemical or fuels not in a containment system or release of chemical or fuels that does or could cause environmental harm	Put chemicals and fuels in containment and modify maintenance practices if necessary.
Noise	C	Bechtel	Noise at sensitive receptors	Material Change of Use for Environmentally Relevant Activities – SPCE04131412	E1-E3	All noise from activities must not exceed the levels specified in Schedule E, Table 1 – *Noise Limits* at any nuisance sensitive place or commercial place. In the event of a complaint that, in the opinion of the authorised officer, is not frivolous, vexatious or based on mistaken belief, the holder will: - In the first instance investigate alternate procedures and, if possible, change procedures to reduce the noise that is the cause of the nuisance complaint; and - Liaise with the administering authority and /or complainant over remedial action. Where the above actions do not resolve the noise issue and when requested by the administering authority, noise monitoring will be undertaken to investigate any complaint of environmental noise nuisance and the results notified within 7 days to the administering authority. Monitoring must include: - LAmax, adj T; - LAN, T (where N equals statistical levels of 1,10 and 90); - The level of frequency of occurrence of impulsive or tonal noise; - Atmospheric conditions including temperature, relative humidity and wind speed and direction;	Bechtel	Inspection	X		DEHP Noise Measurement Manual		Site boundary			X	Letter Report	Complai nt Annual	Env Authority	Complaint received	Locate source and Modify activity

Appendix A - Environmental Monitoring Matrix

CEMP Monitoring Plan Summary (March 2014)

Category	Phase: C = Construction O = Operations	Permit Holder	Media to Monitor	Driver			Responsible Party	Type of Monitoring			Methodology Reference	Monitoring Locations		Frequency			Reporting			Corrective Actions	
									Quantitative												
				Regulatory Permit	Permit Condition	Due Diligence Note: refer to permit for tables		Qualitative	Grab Sample	On-line		Point	General	Baseline	Routine Based	Event Based	Format	Frequency	To Whom	Trigger	Corrective Action
						and - Effects due to extraneous factors such as traffic noise. The method of measurement and reporting of noise levels must comply with the latest edition of the DEHP Noise Measurement Manual															
Waste	C	Bechtel	Waste	Material Change of Use for Environmentally Relevant Activities – SPCE04131412	F1,F2	Waste generated in the carrying out the activities must be stored, handled and transferred in a proper and efficient manner. Waste must not be released to the environment, stored, transferred or disposed contrary to any condition of this development approval. Regulated waste, if removed from the site, must only be reprocessed, recycled, stored, incinerated or disposed at a licensed regulated waste facility.	Bechtel	Inspection/ Records						Sitewide		Regular		Letter/ Report	Event based	Env Authority	No or insufficient waste records maintained Weekly inspections show poor waste handling practices Weekly inspections show unauthorised disposal of waste on site or mainland facilities	Maintain waste disposal records Re train operators, reassess process methodology and fix faulty equipment. Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
MAINLAND SITE – PORT CENTRAL AREA D																					
Air	C	Bechtel	Dust and particulate matter	Material Change of Use for Environmentally Relevant Activities – SPCE04131412	B1-B3	The release of dust and/or particulate matter resulting from the activities authorised by this development approval must not cause an environmental nuisance at any nuisance sensitive place. All sealed traffic areas must be cleaned as necessary to minimise the release of dust and particulate matter to the atmosphere. When requested by the administering authority, dust deposition monitoring must be undertaken to investigate any complaint of environmental nuisance cause by dust, with data and analysed results notified to the administering authority within 28 days of completion of the monitoring. Monitoring must be carried out a place(s) relevant to the potentially affected nuisance sensitive place and at upwind control sites.	Bechtel /GLNG		X		(i) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or (ii) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. Project Dust Monitoring Procedure	Various dust monitoring locations at Port Central			Monthly	X	Letter/ Report	Complaint Annual	Env Authority	Dust complaint receive	Locate source, change work practice, apply water or other dust suppressant measures
Stormwater	C	Bechtel	Stormwater released from the site	Material Change of Use for Environmentally Relevant Activities – SPCE04131412	C1	Contaminants must not be directly or indirectly released from site to waters.	Bechtel	Field Notes			Most recent DEHP Water Quality Sampling Manual		Sitewide			X	Letter/ Report	Event based Annual	Env Authority	Release of contaminants to the receiving environment from storm water in a containment system	Review and assess stormwater management procedures and amend as necessary.
Stormwater	C	Bechtel	Controlled release of stormwater from containment structures to waters	Material Change of Use for Environmentally Relevant Activities – SPCE04131412	C2,C4	The release of stormwater from site to waters must only be from the location and in compliance with the release limits listed in Schedule C, Table 1. The release of contaminants to waters must not: - Produce a slick, discolouration or ambient waters or visible evidence of oil or grease nor contain visible floating oil, grease, scum, litter or other objectionable matter; nor - Have any other properties nor contain any other contaminants in concentrations that are likely to cause environmental harm.	Bechtel		X		Most recent DEHP Water Quality Sampling Manual		Stormwater discharges from site			X	Letter/ Report	Event based Annual	Env Authority	Release of water through containment structure outside of the specified limits	Review and assess stormwater management procedures and amend as necessary.
Chemicals and Fuels	C	Bechtel	Chemical and fuel storage	Material Change of Use for Environmentally Relevant Activities – SPCE04131412	D1	All chemicals and fuels, including any spillage thereof, must be contained within an on-site containment system and controlled in a manner that prevents environmental harm.	Bechtel	Inspection					Sitewide		Regular		Letter/ Report	Event based	Env Authority	Chemical or fuels not in a containment system or release of chemical or fuels that does or could cause environmental harm	Put chemicals and fuels in containment and modify maintenance practices if necessary.
Noise	C	Bechtel	Noise at sensitive receptors	Material Change of Use for Environmentally Relevant Activities – SPCE04131412	E1-E4	All noise from activities must not exceed the levels specified in Schedule E, Table 1 – *Noise Limits* at any nuisance sensitive place or commercial place. In the event of a complaint that, in the opinion of the authorised officer, is not frivolous, vexatious or based on mistaken belief, the holder will: - In the first instance investigate alternate procedures and, if possible, change procedures to reduce the noise that is the cause of the nuisance complaint; and - Liaise with the administering authority and /or complainant over remedial action. Where the above actions do not resolve the noise issue and when requested by the administering authority, noise monitoring will be undertaken to investigate any complaint of environmental noise nuisance and the results notified within 7 days to the administering authority. Monitoring must include: - LAmax, adj T; - LAN, T (where N equals statistical levels of 1,10 and 90); - The level of frequency of occurrence of impulsive or tonal noise; - Atmospheric conditions including temperature, relative humidity and wind speed and direction; and - Effects due to extraneous factors such as traffic noise. The method of measurement and reporting of noise levels must comply with the latest edition of the DEHP Noise Measurement Manual	Bechtel	Inspection	X		DEHP Noise Measurement Manual		Site boundary			X	Letter Report	Complaint Annual	Env Authority	Complaint received	Locate source and Modify activity
Waste	C	Bechtel	Waste	Material Change of Use for Environmentally Relevant Activities – SPCE04131412	F1,F2	Waste generated in the carrying out the activities must be stored, handled and transferred in a proper and efficient manner. Waste must not be released to the environment, stored, transferred or disposed contrary to any condition of this development approval. Regulated waste, if removed from the site, must only be reprocessed, recycled, stored, incinerated or disposed at a licensed regulated waste facility.	Bechtel	Inspection/ Records						Sitewide		Regular		Letter/ Report	Event based	Env Authority	No or insufficient waste records maintained Weekly inspections show poor waste handling practices	Maintain waste disposal records Re train operators, reassess process methodology and fix faulty

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CEMP Monitoring Plan Summary (March 2014)

Category	Phase: C = Construction O = Operations	Permit Holder	Media to Monitor	Driver			Responsible Party	Type of Monitoring			Methodology Reference	Monitoring Locations		Frequency			Reporting			Corrective Actions	
									Quantitative												
				Regulatory Permit	Permit Condition	Due Diligence Note: refer to permit for tables		Qualitative	Grab Sample	On-line		Point	General	Baseline	Routine Based	Event Based	Format	Frequency	To Whom	Trigger	Corrective Action
																				Weekly inspections show unauthorised disposal of waste on site or mainland facilities	equipment. Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
Waste	C	GLNG	Waste	Material Change of Use for Environmentally Relevant Activity 50 – Bulk Material Handling – DA2012/26	Waste 29/30	All disposal of waste generated in carrying out the authority must be to a proper and appropriate facility that accepts that waste. Regulated waste, if removed from the site, must only be reprocessed, recycled, stored, incinerated or disposed at a licensed regulated waste facility.	Bechtel /GLNG	Inspection/ Records					Sitewide		Regular		Letter/ Report	Event Based	Gladstone Port Authority (GPC)	No or insufficient waste records maintained Weekly inspections show poor waste handling practices Weekly inspections show unauthorised disposal of waste on site or mainland facilities	Maintain waste disposal records Re train operators, reassess process methodology and fix faulty equipment. Review methodology with operators, enforce correct disposal procedures and regularly conduct audits of disposal process.
Air	C	GLNG	Dust and particulate matter	Material Change of Use for Environmentally Relevant Activity 50 – Bulk Material Handling – DA2012/26	Dust 28	Activities on site are not to generate dust in such a manner as is likely to have an impact on Gladstone Ports Corporations monitoring equipment in the area or cause nuisance to neighbouring activities. Should such an event occur, or complaints are received about dust, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as practicable in accordance with General Condition 11.	Bechtel /GLNG		X		(i) Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet -Gravimetric method'; or (ii) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. Project Dust Monitoring Procedure	Various dust monitoring locations at RG Tanna			Monthly		Letter/ Report	Complaint	Gladstone Port Authority (GPC)	Dust complaint or GPC monitoring equipment impacted	Locate source, change work practice, apply water or other dust suppressant measures
Noise	C	GLNG	Noise	Material Change of Use for Environmentally Relevant Activity 50 – Bulk Material Handling – DA2012/26	Noise 27	Activities on site are not to generate noise in such a manner as is likely to have an impact or cause nuisance to neighbouring activities or residents. Should such an event occur, or complaints are received about noise, Gladstone Ports Corporations Environmental Superintendent is to be notified as soon as possible in accordance with General Condition 11.	Bechtel /GLNG	Inspection	X		DEHP Noise Measurement Manual		Site boundary			X	Letter Report	Complaint	Gladstone Port Authority (GPC)	Complaint received	Locate source and Modify activity
Water	C	GLNG	Groundwater	Material Change of Use for Environmentally Relevant Activity 50 – Bulk Material Handling – DA2012/26	Water 20	In the event of a groundwater sample exceeding the NEMP groundwater investigation level or dutch intervention guidelines target value, the proponent must supply a copy of the report to GPC within ten (10) days of the final report being submitted to any regulatory body.	GLNG		X				Sitewide			X	Letter/ Report	Event Based	Gladstone Port Authority (GPC)	Groundwater sample results are outside specified limits	Locate source and modify activity

GLNG

ENVIRONMENTAL TRAINING OUTLINE

(Attachment J to CEMP)

REV	DATE	REASON FOR REVISION	BY	CK'D	Site Mgr	APE	PM
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0	19-May-11	Issued for Use	RW	RRR	BF	CJK	BT / AP
D	09-Feb-11	Client comments incorporated; Reissued for Permit	RW	CJK	JJM	CJK	BT / AP
C	18-Jan-11	Incorporate EPBC Act approval; Issued for Permit	RW	CJK	JJM	CJK	BT / AP
B	11-Aug-10	Client comments incorporated; Issued for Permit	RW	CJK	JJM	CJK	BT / AP
A	26-Jul-10	Issue for Review	RW	MD	JM	CK	BT / AP

BECHTEL OG&C INC.		JOB NO. 25576	
BECHTEL	ENVIRONMENTAL TRAINING OUTLINE	DOCUMENT NO.	REVISION
		100-G01-GHX-00036	3
		GLNG Doc No. 3310-BTH-3-3.3-6836	

TABLE OF CONTENTS

1 INTRODUCTION

This Environmental Training Outline is Attachment J of the Construction Environmental Management Plan (CEMP) for the Gladstone LNG Plant Project and shall be read and interpreted in conjunction with the CEMP (ref. 25576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617), in particular section 1.1.

This Environmental Training Outline provides guidance for the topics that shall be included for New-Hire Orientation Environmental Awareness Training, Supervisor Environmental Awareness Training, and Hazardous Material Handling and Spill Response. Example Tool Box Topics, which may be used for environmental awareness by individual construction crews, are provided.

A Project Training Plan shall be developed prior to commencement of construction that shall contain details of each applicable training component. Project new-hire orientation shall be given to every worker prior to beginning work on the project site; visitors shall be given an abbreviated version of orientation training. Additional environmental training for manual and non-manual workers may be included in the Project Training Plan.

2 NEW-HIRE ORIENTATION

This outline is intended as a general guide for environmental issues to be addressed during new-hire training. Commonwealth and Queensland required training components shall be incorporated into all Environmental Awareness training that will be provided by the Bechtel Health, Safety & Environment department.

2.1 General Program Description

- ESH Management System
- Bechtel ESH Policy
- Community and social responsibility, site rules, code of conduct

2.2 General Site Requirements

- Know and obey all signed restrictions on-site;
- Know the site boundaries and exclusion zone areas where you must not go;
- Know approved transportation routes and vehicle parking directives;
- Do NOT enter into any protected habitat or nesting area;
- Conduct good site housekeeping at all work locations (e.g., Do NOT Litter);

- No open burning without prior approval;
- Recycle scrap wood, scrap metal, old lead/acid batteries, and other wastes as outlined in the project Waste Management Plan;
- Control dust;
- What to do in event of a bushfire; and
- If you have a question, ask your Supervisor who may consult with the ESH Department.

2.3 Regulated Material/Waste Handling

- Know all applicable signs and warning systems for hazardous substances;
- Common regulated wastes include: waste fuel, lubricants (oils), coolants, paints, solvents, acids, and caustics. Stress the segregation of waste types and what system is utilised on-site;
- Personal protective equipment (PPE) will always be used when working with regulated materials;
- Know the hazards before beginning work (i.e., read labels or MSDS). Prepare a Job Hazard Analysis (JHA) and/or Safety Task and Risk Reduction Talk (STARRT) card before beginning a task with regulated materials;
- For regulated materials, order and use only what you need for the work and leave in original container if possible;
- Never handle regulated material or waste near open flames or sparking machinery;
- Never smoke near storage areas for regulated materials/wastes;
- Always keep containers closed when not in use;
- All containers shall be properly labelled;
- Never dispose of hazardous material containers in bins unless containers are empty;
- Talk to supervisor about proper disposal methods immediately after generating waste;
- Take responsibility for seeing that waste is moved to appropriate storage or disposal area; and
- Provide double containment for liquid hazardous materials and all fuels;

2.4 Spill Reporting

- Immediately report all spills to your Supervisor or the Environmental Safety and Health Manager (ESHM);
- Be aware that hazardous spills include: fuels (diesel, gasoline) and oils (motor, hydraulic, lubricating), coolant, battery acid, chemicals and solvents; and
- Prevent further spillage, contain the spill and remediate the area, if it can be done safely.

2.5 Unanticipated Discoveries

- Encountering hazardous substances, artefacts, human remains, or unexploded ordnance;
- Stop work immediately and notify your Supervisor or the ESH department;
- Do not disturb the area or any artefacts;
- Isolate the area (signs, barricade) and let no one enter until the Environmental Manager approves;
- Supervisor will immediately notify the ESHM;
- ESHM will notify GLNG site representative;
- GLNG will handle pre-existing substances or artefacts; and
- GLNG will notify the Site Manager in writing when work can resume.

2.6 Sensitive Resources Awareness Training

- Waterways and stormwater system;
- Marine mammals and sea turtles, fishing, migratory birds, and other wildlife;
- Mangrove protection, water mouse, and shorebirds;
- Cultural resources awareness; and
- Acid Sulphate Soil, groundwater, and contaminated soil awareness.

2.7 Curtis Island Environmental Values

Prior to commencing work on Curtis Island, all personnel and visitors must also receive an induction covering the following points:

- Curtis Island Environmental Precinct Exclusion Zone;
- An overview and explanation of the environmental values of the Curtis Island World Heritage Area;
- Information on listed species and ecological communities and other native species that are found in the area, and the related responsibilities of the proponent, its employees and subcontractors;
- An explanation of the Rodd's Bay Dugong Protection Area, the Great Barrier Reef Marine Park zoning on the eastern side of Curtis Island, Rodd's Peninsula and the Capricorn Bunker group, the responsibilities of the proponent, its employees and subcontractors within and in relation to these areas. This explanation must include:
    - Provision of maps depicting the zones;
    - An explanation as to what can and cannot be done in the various zones; and
    - Information about how important the terrestrial and marine environments of the Capricorn Bunker group are to conserving biodiversity with the Great Barrier Reef Marine Park.
- Information that fosters a culture of environmental awareness of the values of the area and also raises awareness among all employees and sub-contractors of the compliance and enforcement programs of the Great Barrier Reef Marine park Authority and penalties that apply for offences.

3 SUPERVISOR AWARENESS TRAINING

3.1 Module 1 – Overview

- Objectives of Training
- General Program Description
- HSE Management System
- Bechtel HSE Policy
- Sustainable Development
- Environmental Contacts
- Environmental Tools
- Purpose of the Bechtel Environmental Awareness program
- Consequences
- Regulations
- Typical Plans
- Monitoring

3.2 Module 2 – General Controls

- Environmental Controls at the Jobsite
- Erosion & Sediment Control
- Air Quality
- Housekeeping
- Habitat Protection
- Spill Prevention & Response
- Erosion & Sediment Controls
    - Stockpile Protection
    - Revegetation & Stabilization
    - Dewatering
    - Concrete Batch Plants
    - Silt Fence/Straw Wattles/Stone Check Dams/Hay Bale Protection
- Opportunities for Improvement

- Air Quality
  - Dust Control
  - Open Burning
- Housekeeping
  - Policy
  - Examples of Poor Housekeeping
- Solid Waste Management
  - Waste Segregation
  - Labels
  - Recycling
  - Poor Waste Disposal

3.3 Module 3 – Advanced Controls

- Hazardous Waste Management
  - Examples of Hazardous Waste
  - Waste Minimization
  - Labels
  - Paint Waste
  - Aerosol Can Management
  - Container Management
  - Storage Areas
- Sensitive Resource Protection
  - Protected Species
  - Sensitive Environments
  - Examples of Resource Protection
  - Signs
  - Land Reclamation
  - Dredging
  - Migratory Bird Protection
  - Mangroves

- Unanticipated Finds
    - Fossils
    - Cultural
    - Archaeological (including human remains)
- Spill Management/Spill Prevention
    - Spill Kits
    - Fuel Storage
    - Container Leaks
    - Incompatible Wastes
    - Fuel Spills
    - Cost of Spills

4 SPILL RESPONSE

The spill response module will train participants in the implementation of the response elements of the project's Spill Prevention, Control & Countermeasures Plan (CEMP, Att. N) and Emergency Response Plan (CEMP, Att. G). Topics to be covered include:

- Introduction
    - Transport of equipment/material to/from the mainland and Curtis Island
    - Fuel, chemical and industrial waste storage
    - Workshops
    - Vehicle and equipment wash-down
    - Equipment and machinery repair
- Threshold levels of spilled quantities for government reporting
- Spill prevention procedure
    - pre-release planning
        - Correct storage
        - Secondary containment
        - Provision of spill kits

    - flammable, combustible and hazardous materials storage
        - Long/short term storage
        - Secondary containment
        - Release paths: land, water, air
- Spill response procedures
    - spill response
        - Spill to land
        - Spill to water
        - Contain; isolate; evacuate
        - Report
    - spill cleanup actions
        - Risk assessment
        - Responsibility
        - Clean up standards
- Spill notification & documentation
    - Notify Bechtel (principal contractor; Project Manager)
    - Notification to GLNG (by Bechtel)
    - Notification to Government (by GLNG)
    - Investigation and reporting
- Spill response equipment
    - Spill kits – types, content, locations
    - Additional materials
    - Additional equipment

5 HAZARDOUS MATERIALS

This training is intended for specialised crews handling hazardous materials or responding to fuel/chemical spills.

- Introduction
  - Preparation
  - Resources
- Hazardous Material Management
  - Examples of HazMat
  - Methods of Management
  - Storage Examples
  - Refuelling
- Waste Management
  - Examples of Waste
  - Regulated Wastes
  - Examples of Waste Storage
  - Incompatibles
  - Labels
- Spill Prevention & Response
  - Preventing Spills
  - Cost of Spills
  - Project Spills
  - Could this Happen?
  - Would You Be Prepared?
  - Impacts
  - Spill Management
  - Spill Kits
- Transporting Hazardous Materials
- Examples of HazMat
- Should you be Concerned?
- What to Do

6 PASS/ASS MANAGEMENT

This module is for earthworks and civil crews that may encounter actual or potential acid sulphate soils. It follows the ASS/PASS Management Plan (CEMP, Att. C).

- Purpose
- Introduction
  - definitions
  - regulatory guidance
  - safety
- Soil & water assessment
- Treating Actual/Potential ASS
  - Treating A/ASS as it is excavated
  - Treating P/ASS in dredge material
  - Treating A/ASS at a centralised treatment area
  - Placing fill on A/PASS
- Leachate control
- Monitoring
- Site closeout

7 BUSHFIRE MANAGEMENT

This module is for personnel who may encounter or be involved in dealing with bushfires on Curtis Island. It follows the Bushfire Management Plan (CEMP, Att. E).

- Introduction
- Bushfire scenarios
  - Lightning strike
  - Outside fire source
  - Construction activities
- Government bushfire resources
- Bushfire prevention actions
  - Prevention

  - Fire suppression
  - Firefighting crew
- Emergency notifications

8 ENVIRONMENTAL MONITORING

This module is for personnel who may be involved in environmental performance monitoring. It follows the Environmental Monitoring Plan (CEMP, Att. H).

- Introduction
  - Project background and EIS
  - Scope of monitoring
- Management objectives
- Sequencing of works
- Monitoring programs
  - Acid sulphate soils
  - Air quality
  - Chemical and dangerous goods
  - Clearing and grading
  - Cultural heritage
  - Emergency response
  - Fauna & flora
  - Incident and complaints
  - Land contamination
  - Mosquito control
  - Noise and vibration
  - Risk management
  - Social and community
  - Surface water
  - Waste

- Recording and reporting

- Audits and inspections

9 WATER MANAGEMENT

This module is for personnel who may be involved in managing stormwater, groundwater, or surface water on Curtis Island. It is based on the Stormwater, Erosion & Sediment Control Plan (EMP, Att. O), and the Surface Water and Groundwater Management Plan (CEMP, Att. P).

9.1 Stormwater, Erosion & Sediment Control

- Introduction
- Project Commitments
- Site Soils And Vegetation
- Erosion, Runoff And Sediment Control Measures
    - Sediment Basins
    - Sediment Control Measures
    - Reconstruction Of Slopes
    - Buffers Near Wetlands/Streams/Sensitive Areas
    - Silt Fences At Streams And Wetlands
    - Road Drainage And Inlet/Outlet Filters
    - Sequence Of Installing Erosion Control Measures
    - Dewatering
- Control Of Potential Stormwater Contamination
    - Non-Hazardous Construction Wastes
    - Sanitary Wastes
    - Hazardous Substances
    - Hazardous Material Storage Areas
    - Waste Storage For Disposal Areas
    - Vehicle Maintenance/Refuelling Areas
    - Process Area
    - Unanticipated Discoveries
    - Spill Response
- Inspections And Maintenance

- Inspection And Reporting Requirements
- Maintenance Requirements

9.2 Surface water and Groundwater

- Introduction
  - General Management Strategy
  - Environmental Impact Statement (EIS) Requirements
- Water management
  - Existing Water Resources
  - Surface Water
  - Groundwater
  - Water Sources And Uses
  - Dewatering
  - Concrete Washouts
  - Water Conservation
- Monitoring

10 WILDLIFE & HABITAT MANAGEMENT

This module is for personnel who may be involved in managing or responding to impacts to wildlife or habitat on Curtis Island. It applies primarily during the site clearing activities and is based on the Wildlife & Habitat Management Plan (CEMP, Att. T).

- Introduction
- Management Objectives And Strategies
  - Management Objectives
  - Environmental Impact Statement (EIS), Commonwealth requirements, and Coordinator General's Evaluation Report Requirements
  - Risk Assessment
  - Mitigation Measures For Flora And Fauna
- Field Procedures

  - Critical Habitat, Protected Areas And Species Of Concern
  - Procedures
    - Site Clearing
    - Offshore Wildlife Procedure
    - Water Mouse
    - Migratory birds and shorebirds
    - Wildlife Encounters
    - Management And Handling Of Dead Animals
    - Red Imported Fire Ant Plan
  - Rehabilitation And Revegetation
- Discovery Of Protected Plant Or Wildlife Species
- Education And Awareness Training
- Inspections And Monitoring Programs

11 WEED & PEST MANAGEMENT

This module is for personnel who may be involved in managing or responding to weed and/or animal pest issues on Curtis Island. It applies primarily during the site clearing activities and is based on the Weed/Pest Animal Management Plan (CEMP, Att. S).

- Introduction
- Potential Sources
- Control Methods
- Environmental Inspections And Audits
- Additional Documentation

12 MOSQUITO & MIDGE MANAGEMENT

This module is for personnel who may be involved in managing mosquitoes, biting midges, or other biting insects on Curtis Island. It is based on the Mosquito & Midge Management Plan (CEMP, Att. L).

- Introduction
- Coordination With Gladstone Regional Council
- Mosquito Control And Surveillance
    - Mosquito Surveillance
    - Mosquito And Midge Control

13 CULTURAL HERITAGE MANAGEMENT

This module is for personnel who may be involved in managing or responding to cultural heritage issues on Curtis Island. It applies primarily during the site clearing and grading activities and is based on the Cultural Heritage Management Plan prepared by GLNG.

- Cultural Heritage Identification
- Notification Process

14 SAMPLE TOOLBOX TOPICS

The following table provides a list of potential toolbox topics by subject, with brief comments on the content. Toolbox sessions shall be held weekly and shall cover a range of HSE topics, with at least one environmental topic every four weeks.

#	Subject	Comment
1	Dust Control	It's hot, dry, and windy today. Drive slowly on haul roads to minimize dust.
2	Dust Control	Help prevent blowing dust, especially from haul roads and stockpiles. Notify your foreman if dust is a problem so water can be applied.
3	Erosion Control	Keep an eye on the silt fences. If you see an area where the silt fence is broken, notify the foreman to get it fixed.
4	Erosion Control	There's mud on the site today. Make sure your vehicle doesn't track mud onto streets when driving on the mainland.
5	Good Housekeeping	Help keep the work site clean. Put your rubbish where it belongs - in the proper rubbish can; recycle waste materials.
6	Good Housekeeping	Help keep the streets clean. Make sure truckloads are covered and truck bodies are clean when they leave the site.
7	Recycling	Learn to recognize the site's recycle bins and use them.
8	Noise Control	Make sure the equipment you're using is working properly and doesn't make too much noise.
9	Noise Control	Scheduling work to minimize impacts to neighbours.
10	Noise Control	Drive slowly through residential areas. Minimize the noise your vehicle makes.
11	Community Relations	Be nice to the neighbours. If a person approaches you with questions or a complaint, be polite and tell him or her that you will notify GLNG.

#	Subject	Comment
12	Wetlands Protection	Stay out of waterways and wetland areas and help make sure the silt fences around these areas are maintained in good condition. Tell the construction supervisor if the silt fence or barrier tape is broken.
13	Water quality	Make sure debris and soil doesn't fall into watercourses or wetlands. Cleanup any spilled or eroded soil; keep loose earth and stockpiles away from shores and watercourses.
14	Cultural Resources	Help protect this area's heritage. Stay clear of or drive slowly when near historic structures so they aren't damaged.
15	Cultural Resources	Watch for historic artefacts during earthwork. If you see something, stop the excavation and notify the superintendent.
16	Stockpiles	Help make sure stockpiles are properly stabilized using water, compaction, plastic, or seeding. If not, notify the construction supervisor to get it fixed.
17	Natural Resources	Protect natural areas. Don't exceed any flagged or surveyed boundaries.
18	Spill Prevention	Make sure that spill kits are available on every work site; report and cleanup spills right away.
19	Waste Storage	Make sure that the generation of hazardous waste is minimized, and that it is stored in metal drums and properly labelled. Properly dispose of all waste and recycle batteries, tires, oil, and other materials.
20	Spill Cleanup	If you spill it, you clean it up – now.

GLNG

LANDSCAPING AND SITE REHABILITATION PLAN

(Attachment K of CEMP)

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3	05-Dec-13	Issued for Update	ER	PN	BF	HH	BT
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BECHTEL OG&C INC.		JOB NO. 25576	
BECHTEL	LANDSCAPING AND SITE REHABILITATION PLAN	DOCUMENT NO.	REVISION
		100-G01-GHX-00026	3
		GLNG Doc No. 3310-BTH-3-3.3-6826	

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1 INTRODUCTION

This Landscaping & Rehabilitation Plan is Attachment K of the Construction Environmental Management Plan (CEMP) for the Gladstone LNG Plant Project and shall be read and interpreted in conjunction with the CEMP (ref. 25576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617).

This Plan addresses landscaping and post-construction site rehabilitation, including soil management (see EIS Supplement Sec. 13.16.2 regarding landscaping, Commonwealth EPBC Approval No 2008/4057 Condition 24(i), Coordinator General's Report (CGR) Section 7.3 and CGR Appendix 4, Part 1, Condition 1(c) regarding site rehabilitation). This Plan is applicable to the construction and commissioning phases of the Project only. Soil management and site rehabilitation strategies during ongoing operations and decommissioning of the facility will be carried out by GLNG or their chosen contractor/s and are beyond the scope of this Plan.

2 SOIL MANAGEMENT

The Construction Environmental Management Plan (CEMP) describes collection and storage of topsoil during site earthworks. There is a requirement for topsoil stockpiles to not exceed 3 m height (EIS Appendix N3-Flora, Sec. 3.2.3); note, this applies to long-term storage and not transitory piles that may be created during collection and handling of topsoil. Topsoil will be stored (1) temporarily for immediate use after construction is complete to restore and stabilise areas used during construction, and (2) long-term storage for use when the facility is decommissioned. Stored topsoil will be stabilised with vegetation or other means until it is used. Sites designated for post-construction landscaping and rehabilitation shall be prepared by re-contouring (including stormwater runoff design), ripping, or otherwise as needed to prepare for topsoil placement.

2.1 Topsoil Return

Following construction, temporary soil stockpiles will be returned, or otherwise re-used (e.g., for site landscaping or rehabilitation) without delay. The following procedures will be employed during this process where applicable:

- Topsoil stockpiles will be replaced as required without mixing with other soil;
- Where applicable, replaced topsoil will be contoured so that the surface is reinstated to original levels and that isolated high or low points do not remain;
- All stored topsoil will be placed, so the final depth will depend upon the amount that was able to be salvaged during site clearing; and

- Replaced topsoil will be “topped up” with soil where settling has resulted in ponding or poor drainage.

2.2 Subsurface Soil

The Project will maximize opportunities for reuse of subsurface soil and verify that all subsurface soil that cannot be reused is categorized and appropriately handled, transported and disposed. Placement, design and management (stabilization, erosion protection, etc.) of on-site subsurface soil stockpiles, if any, shall be carried out as for topsoil stockpiles. Subsurface soil will not be used in place of topsoil for landscaping or rehabilitation.

3 LANDSCAPING

Landscaping includes post-construction contouring and plantings for aesthetic or screening purposes. Landscaping will be performed by GLNG and/or their designated contractors. Considerations for successful landscaping include:

- Light: exposed versus shaded areas;
- Water requirements: native species requiring little or no irrigation are preferred;
- Climate and microclimate: plantings will take advantage of site conditions, including nearness to the shoreline;
- Wind: injury from wind or salt-spray;
- Utilities: nearness of buried utilities may affect the size and rooting depth of selected plant species;
- Existing vegetation: landscape designs will consider areas of natural undisturbed vegetation, including buffers from bushfire or hazards from natural snags; and
- Wildlife: site plantings may benefit some wildlife species, but will not be intended to restore native habitats. Also, wildlife grazing or use of plants may have a negative effect on landscaping.

Prior to the end of construction a Land Stabilisation Plan will be developed with GLNG to determine landscaping features and plantings that will beautify the site and provide screening, where necessary or possible, for sound or aesthetic reasons. The Land Stabilisation Plan may be developed in association with a local landscape architect to take advantage of measures, such as plant species selection, that are successful in the Gladstone region.

4 SITE REHABILITATION

This section of the Plan applies to post-construction site rehabilitation for sites used during construction and not final decommissioning of the facility site. To the extent required by contract with GLNG, Bechtel and its subcontractors will rehabilitate areas affected by construction per the following principles:

- Areas are made physically safe for access;
- All temporary structures which could deteriorate and become unsafe over time are removed;
- Future use of the site is beneficial and sustainable for the public and/or natural resources; and
- Natural revegetation on erosion-resistant surfaces or beneficial use of areas is encouraged.

The aim of this Plan is to leave the site in a safe, stable and satisfactory condition, consistent with future land use and in keeping with agreements between GLNG, the Australian/Queensland Government, and the local authorities. The physical, chemical and ecological integrity of the rehabilitated sites will be such that it shall require no extraordinary maintenance and a minimum of precautionary monitoring.

4.1 Definition of Rehabilitation

Rehabilitation is the act of restoring land that has been disturbed by construction and earthworks to nearly its original or an otherwise determined state. This normally requires re-contouring for drainage, restoring topsoil, planting suitable vegetation, and restoring habitat elements such as hollow logs.

4.2 Rehabilitation Terms of Reference

The Terms of Reference or basis for site rehabilitation is explained in this section.

4.2.1 Baseline Condition of Areas

The baseline or pre-disturbance condition of areas affected by construction is described in the Project's EIS and its supporting documents. The EIS includes surveys of soil, vegetation, water bodies, wildlife, and human activity prior to the commencement of construction. The data and information provided by the EIS, augmented by any additional studies conducted during construction, will constitute the baseline condition of the areas regarding establishment of goals for rehabilitation and revegetation and determination of ultimate rehabilitation success.

The baseline climate is described in the EIS and rehabilitation plans will utilize this data regarding timing and amounts of rainfall. In general, the stormwater system will be appropriately sized and designed up to the design event equal to 42.1mm rainfall event over a 5-day period. During rainfall conditions over the design event all other reasonable and practicable measures will be undertaken to minimise erosion and sediment export.

4.2.2 The Nature of Construction Disturbance

Construction will have temporary effects on several areas that will be rehabilitated. Impacts may be short duration (an area is used for only a few days) and rehabilitation can then occur immediately after the impact ends; or impacts may continue for several years until rehabilitation can be performed at the end of construction. Major construction affects will be:

- Vegetation clearing and fragmentation;
- Land disturbance due to excavation and grading;
- Generation of dust;
- Stripping of topsoil;
- Construction of temporary buildings;
- Use of open areas for material storage;
- Construction of temporary roads and pathways;
- Disposal piles of soil or unsuitable fill;
- Temporary storage piles for topsoil and fill material;
- Establishment of new grades/contours by excavation and placement of fill;
- Crossing waterways;
- Contamination of soils by spills;
- Fencing the site to exclude wildlife and livestock; and
- Establishment of new stormwater drainage patterns.

4.2.3 Post-Construction Land Use

To correctly plan rehabilitation it is necessary to determine the post-construction land use for each area. The potential land uses are:

- Natural areas supporting native vegetation with an aim towards providing limited wildlife habitat;
- Landscaping and screening; and
- Stabilized areas for potential future construction.

Decisions regarding post-construction land use must be made by GLNG in consultation with the local authorities. Some areas used by construction, such as roads and certain buildings, may not be rehabilitated at the end of construction pending decisions about their future use. Bechtel responsibilities for rehabilitation will be specified in the project contract.

4.2.4 Area Safety

Safety of the public and workers at the operating facility is paramount for permanent rehabilitation of the site. Safety measures will include:

- Filling holes and trenches to avert falls or becoming trapped;
- "Topping up" of filled holes and trenches in cases of excessive settling;
- Removing buildings/structures that could deteriorate and become unsafe over time;
- Removing utility connections;
- Removing or covering unsafe surface features;
- Diverting stormwater in such a manner that unnatural flooding, ponding, or accelerated erosion is not a threat;
- Proper disposal of all hazardous materials; and
- Providing fencing or other barriers to limit access to unsafe areas.

4.2.5 Updating the Plan

This plan will be updated as necessary to meet the needs and requirements of the Project. Review of this plan by Bechtel will take into account the progress of construction, additional regulatory requirements, additional local requirements and lessons-learned during earlier rehabilitation and revegetation at the site.

Site assessments will include:

- An assessment of the results from areas previously rehabilitated;
- Retreatment or maintenance of previously rehabilitated areas will be planned if necessary;
- New areas requiring rehabilitation in the coming year will be determined (to the extent possible);
- A schedule for rehabilitation of all areas throughout the life of the Project will be reviewed to assist advance planning; and
- Specific areas treatments will be determined for the coming years, such as the types and amount of seeds/plants that will be needed.

An assessment and plan will be developed for procuring the necessary seed and materials for upcoming rehabilitation. Specific risk assessments may be performed for specific areas to keep the plan effective for the local conditions.

4.3 Implementation of the Plan

The rehabilitation and revegetation measures that will apply to the Project are described in this section.

4.3.1 Removal of Debris and Demolition of Structures

Temporary structures erected for use during construction include offices, temporary worker accommodation facility, worker mess halls, sanitary facilities, concrete batch plant, rock crushers and conveyors, warehouses, fabrication shops, maintenance shops, refuelling areas and other support buildings. No hazardous construction material, such as asbestos or lead paint, will be used to construct these structures.

All structures built for construction purposes will be retained or demolished per the project contract. Demolition waste shall be properly disposed per the project's Waste Management Plan (CEMP Attch. R 25576-100-G01-GHX-00037). Inert foundations, such as concrete pads or pedestals, may be left in place. Utility connections will be removed and secured.

4.3.2 Re-contour of Surfaces and Hydrology

Rehabilitation sites will be re-contoured for stability from accelerated erosion. In general, the goal is to restore natural hydrologic processes of runoff and infiltration. Re-contouring may include reshaping disturbed areas to match surrounding topography or contouring to protect existing structures from stormwater runoff or erosion. Final grading of disturbed areas, including preparation of overburden before application of the final layers of growth medium, should be along the contour as far as can be achieved in a safe and practical manner.

Some roads may be left in place per the current Project plan. Drainage ditches or culverts will be left in place and maintenance will become GLNG's responsibility at the time of turnover.

4.3.3 Revegetation

Revegetation will be completed for disturbed areas that are not anticipated for immediate future use or stabilized by other means (e.g., paving). The goal of revegetation is to stabilize the area, reinstate wildlife habitat, improve visual amenity and re-establish the vegetation carbon sink to lessen greenhouse gases.

Australian native species sourced from the South Eastern Queensland or Brigalow Belt bioregions will be used for revegetation. Care will be taken to prevent the

introduction of weeds and to control any declared weed species under the Land Protection Act as per the Weed and Plant Pathogen Control Plan (CEMP, Att. S 25576-100-G01-GHX-00038).

5 MONITORING

Rehabilitated areas will be monitored (up to the point of turnover to GLNG) to determine if:

- The area is stabilized and no accelerated soil erosion is occurring;
- Revegetated areas are growing per the design;
- Weeds are under control;
- Site use by people is in accordance with the design;
- Fire, disease, slumping, or other mishap is not causing the area to fail; and
- Water quality of nearby water bodies is protected.

5.1 Maintenance

After an area is rehabilitated and stabilized according to this plan, the area will become the responsibility of GLNG for maintenance or future use. Several factors can affect the success of rehabilitation including wildfire, wildlife, third-party actions, vandalism/trespass, or drought/flood. Bechtel will provide protection and maintenance of rehabilitated areas according to Project requirements. Long-term site protection and weed control is GLNG's responsibility.

5.2 Completion Assessment

Rehabilitation of construction areas may be considered complete when the following key performance indicators have been met:

- All construction material and waste with the exception of inert foundations and underground facilities have been removed from the site;
- The area is safe and public access routes have been re-established to the extent practicable;
- Stormwater channels and water features have been re-established and are functioning per the design; and
- Vegetated areas have native vegetation growth and are stable.

GLNG

MOSQUITO MANAGEMENT PLAN

(Attachment L of CEMP)

REV	DATE	REASON FOR REVISION	BY	CK'D	Site Mgr	APE	PM
3	05-Dec-13	Issued for Update	ER	PN	BF	HH	BT
2	12-Apr-13	Issued for Annual Review and Update	RJF	SMP	BF	RR	BT
1	01-Nov-11	Updated for Publication	RW	RR	BF	BT	AP
0	19-May-11	Issued for Use	RW	RRR	BF	CJK	BT / AP
C	12-Jan-11	GRC Comments Incorporate; Issued for Permit	RW	CJK	JJM	CJK	BT / AP
B	11-Aug-10	Client Comments Incorporated; Issued for Permit	RW	CJK	JJM	CJK	BT / AP
A	29-July-10	Issue for Review	RW	CJK	JJM	CJK	ABP

BECHTEL OG&C INC.		JOB NO. 25576	
BECHTEL	MOSQUITO MANAGEMENT PLAN	DOCUMENT NO.	REVISION
		100-G01-GHX-00040	3
		GLNG Doc No. 3310-BTH-3-3.3-6840	

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1 INTRODUCTION

This Mosquito Management Plan is Attachment L of the Construction Environmental Management Plan (CEMP) for the Gladstone LNG Plant Project and shall be read and interpreted in conjunction with the CEMP (ref. 25576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617).

This Mosquito Management Plan has been prepared to aid control of mosquitoes and other insect pests during construction and commissioning to meet the requirements of the GLNG Environmental Impact Statement (EIS Supplement Section 13.16.4 and Coordinator General's Report Appendix 4, Part 1, Condition 2). Mosquito control during construction will be performed in cooperation with other mosquito control programs within the Gladstone Regional Council.

1.1 Coordination with Gladstone Regional Council

Larvicide or adulticide chemicals may be used for mosquito control, and the type of chemical will be selected following consultation with the Gladstone Regional Council and following the Mosquito Management Code of Practice for Queensland – 2002. All chemicals will be approved and added to the site manifest via site procedures before being brought onto the work site.

Project representatives will attend industry Mosquito Management Forums conducted by the Gladstone Regional Council and keep the Council informed about pest control activities at Project work sites.

2 MOSQUITO CONTROL AND SURVEILLANCE

Mosquito control and surveillance will generally follow guidelines established by the State of Queensland (eg. Mosquito Management Code of Practice for Queensland – 2002, Guidelines to Minimise Mosquito and Biting Midge Problems in New Developments, Queensland Health, 2002, Gladstone Regional Council Mosquito Management Plan). A primary goal of those guidelines is control of diseases spread by mosquitoes, particularly dengue fever. As part of the mosquito control program, regular mosquito surveillances are conducted to identify mosquito species, determine relative mosquito numbers, and eliminate mosquitoes by direct (biological and chemical control) and indirect methods (e.g., wet area modification, proper storage of materials, and training of workers).

Details of the surveillance program will be determined in cooperation with a local Pest Control subcontractor and in coordination with the Gladstone Regional Council's surveillance program for the larger area. In general, surveillance at the

Curtis Island site will be ongoing and concentrate on areas where personnel are working or living.

Insecticides (adulticides and larvicides applied by or under the direction of a licensed Pest Management Technician) and repellents may be used to supplement breeding site elimination. The Project will monitor health alerts, including dengue fever reports, issued by the State of Queensland and respond to regional mosquito control efforts.

2.1 Mosquito Surveillance

Mosquito surveillance involves inspecting areas for mosquito breeding, including standing water or small cavities where water may be trapped, such as stored tires or pipes. Mosquito traps may also be used to trap adult mosquitoes to establish their species and density. Large numbers of mosquito traps can be used in a surveillance network to locate hotspots of mosquito activity in cooperation with the Gladstone Regional Council surveillance methodology. The surveillance program shall include database maintenance, larval and adult mosquito surveillance (identification of species and numbers estimates) and general observations of site water management.

2.2 Mosquito and Midge Control

The methods used in mosquito eradication involve removal or treatment of containers or standing water that can hold larvae and pupae, possible placement of ‘lure and kill’ mosquito traps, and exterior and interior spraying/fogging to kill adult mosquitoes/insects, taking into account potential impacts on the surrounding environment and human health and safety considerations. Annihilation trapping, whereby the target area is flooded with a high density of lure and kill traps, has proven successful in some cases in Queensland. Surveillance surveys will determine what species of mosquitoes are present and control methods will be managed according to the specific mosquito threat.

Only persons under the direction of a licensed Pest Management Technician may apply chemicals for mosquito control. The mosquito and biting midge control chemicals are selected for their low-toxicity to humans and wildlife. All surface sprays applied inside premises should be water-based and non-staining and have a very low (if any) level of odour. There are several types of internal sprays, external sprays and external surface sprays that may be used, including but not limited to:

Internal Sprays	
Demand interior spray (Active ingredient: lambda-cyhalothrin 25g/L) (Concentration: 0.8125g/L)	Demand is used as an indoor surface spray and as a spray for potential and actual mosquito breeding containers.
Cislin interior spray (Concentration: 0.075g/L)	Cislin is used as an indoor surface spray and as a spray for potential and actual mosquito breeding containers.
Outdoor Sprays	
Prolink container treatment (Active ingredient: s-methoprene 4%).	Prolink is a chemical in pellet form which is placed in potential and actual mosquito breeding containers including roof gutters. Prolink briquettes are registered for use in rainwater tanks.
Biflex Aqua mosquito traps and interior spray (Active ingredient: bifenthrin 80g/L) (Concentration: 0.075g/L)	Biflex Aqua is a chemical which is placed on fabric strips in mosquito traps and used in indoor surface sprays and in sprays for potential and actual mosquito breeding containers.
Outdoor Surface Sprays and Container Treatment	
Note: Where possible, all containers will be prevented from holding standing water to prevent mosquito and insect propagation	
Mortein Surface Spray or Baygon Surface Spray	These products are used to spray potential and actual mosquito breeding containers.
Biflex Aqua (Active ingredient: bifenthrin 80g/L) (Concentration: 0.075g/L)	Biflex Aqua is a chemical which is placed on fabric strips in mosquito traps and used in indoor surface sprays and in sprays for potential and actual mosquito breeding containers.
Bifenthrin (Bistar 80SC)	Effective for biting midge control when used around buildings, fences and vegetation.
Larvicides	
s-methoprene	A chemical that prevents insect larvae from developing into adults.
Bacillus thuringiensis serovar israelensis (Bti)	*Bacillus thuringiensis serovar israelensis* (Bti) is a group of bacteria used as biological control agents for larvae stages of mosquitoes and certain other flies.

The control program will not totally eliminate mosquitoes and other insect pests from the job site because many breeding sites exist outside the boundaries of the Project. Suitable screens shall be installed on windows of buildings to prevent insects entering inhabited areas. Workers can use insect repellents as necessary on themselves or in their work areas.

The extent of insect control will be determined by an on-going assessment of worker tolerance to the nuisance insects that are present as well as the findings of insect surveillance surveys.

2.3 Water Management

Existing man-made ponds on the Curtis Island site will be drained by breeching their berms to allow natural runoff of stormwater. In construction areas, standing water shall be eliminated to the extent possible by the Project's stormwater system whereby water is drained from the site in a controlled manner. Stormwater sediment basins will contain standing water, potentially for many weeks during the wet season, and it will be necessary to treat these basins with insect controls. Any portion of the stormwater system that is found to be ponding water will be maintained to allow drainage.

Areas where standing water may unavoidably occur for long periods, such as a hydrotest water pond, may be treated with larvicide or another method of mosquito control.

Proper storage of containers and equipment that might trap stormwater will be practised site wide. The Project induction training will inform workers about insect threats and controls that will be practised, including proper storage of containers or materials that could trap stormwater.

3 RECORD KEEPING

Records of surveillance survey results and treatment applications will be maintained. The control program will be adapted as necessary per the site-specific data and in cooperation with the greater regional effort.

GLNG

NOISE / VIBRATION, VISUAL / AESTHETICS & LIGHTING PLAN

(Attachment M to CEMP)

REV	DATE	REASON FOR REVISION	BY	CK'D	Site Mgr	APE	PM
3	05-Dec-13	Issued for Update	ER	PN	BF	HH	BT
2	12-Apr-13	Issued for Annual Review and Update	RJF	SMP	BF	RR	BT
1	01-Nov-11	Updated for Publication	RW	RR	BF	BT	AP
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D	11-Jan-11	Updated for EPBC Act approval; reissued for Permit	RW	CJK	JJM	CJK	BT / AP
C	22-Sep-10	Revised section 3; reissued for Permit	RW	CJK	JJM	CJK	BT / AP
B	11-Aug-10	Client comments incorporated; Issue for Permit	RW	CJK	JJM	CJK	BT / AP
A	22-Jul-10	Issue for Review	RW	MD	JJM	CJK	ABT

BECHTEL OG&C INC.		JOB NO. 25576	
BECHTEL	NOISE / VIBRATION, VISUAL / AESTHETICS & LIGHTING PLAN	DOCUMENT NO.	REVISION
		100-G01-GHX-00029	3
		GLNG Doc No. 3310-BTH-3-3.3-6829	

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1 INTRODUCTION

This Noise/Vibration, Visual/Aesthetics & Lighting Plan is Attachment M of the Construction Environmental Management Plan (CEMP) for the Gladstone LNG Plant Project and shall be read and interpreted in conjunction with the CEMP (ref. 25576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617).

The purpose of this Plan is to address the actual and potential noise/vibration, visual/aesthetics and lighting impacts associated with construction and commissioning activities of the GLNG Plant Project. This Plan provides guidance for the management and mitigation of potentially adverse impacts during the construction and commissioning stage of the Project.

The management objectives of this Plan are:

- Minimize environmental impacts generated by construction and commissioning activities;
- Comply with requirements set forth in the GLNG Environmental Impact Statement (EIS) Section 13.16.11, Coordinator General's Report (CGR), EPBC Approval No. 2008/4057, and Environmental Authority (EA) EPPG00712213.

The guidelines used in this Plan give due consideration to site-specific environmental and social conditions. This Plan is applicable to the construction and commissioning phases of the Project only.

The amount of noise/vibration, visual/aesthetic impact, and lighting generated during construction and commissioning will depend upon the type of activity being undertaken and the proximity to sensitive receivers. Methods will aim to minimize noise and vibration generated at all stages of construction and commissioning.

Per the project EIS, prior to noise-related activities which are above the general construction noise level, Bechtel will notify GLNG and GLNG will warn and consult with potentially affected community members and the Gladstone Regional Council.

2 NOISE / VIBRATION

The following management measures will be applied for noise/vibration control.

2.1 Project Requirements

The following management measures will be put in place:

- Management measures shall be adopted to minimise impacts to fauna from noise, vibration and lighting;
- Construction work during evening and night-time periods (6.30pm to 6.30am) and on Sundays/Public Holidays shall be undertaken in accordance with "best practice" noise management and AS 2436-1981 "*Guide to Noise Control on Construction, Maintenance and Demolition Sites"*;
- Use of the quietest plant and equipment that can economically undertake the work wherever possible;
- Regular maintenance of equipment in order to keep it in good working order;
- Construction work will occur, wherever possible, within the daytime period;
- Adjacent landholders/residents shall be notified prior to any atypical noise events outside of daylight hours;
- Operators of construction equipment will be made aware of the potential noise problems and of techniques to minimise noise emission through a continuous process of operator education;
- Utilise existing community consultation framework to provide access to information for the community and maintain positive relations with residents;
- Best available work practices shall be employed on-site to minimise occupational noise levels;
- High efficiency mufflers will be fitted to appropriate construction equipment;
- Reversing alarms within construction areas cannot be avoided for safety reasons. Consideration will be given to sourcing so-called "quiet" white-noise alarms whose annoying character diminishes quickly with distance and self-adjusting alarms which adjust emission levels relative to the local background noise level;
- Large rocks shall be placed in dump trucks not dropped;
- Nearby residents will be made aware of the times and duration of the major construction activities. Making residents aware of likely future occurrence of noise significantly reduces annoyance and allows people to make arrangements accordingly; and

- Monitoring:
    - Construction and commissioning equipment shall be inspected regularly to maintain optimal working conditions; and
    - Throughout construction and commissioning, the contractor's environmental representative shall undertake regular environmental inspections.

This Plan has been developed in accordance with relevant Project permits and approvals and governing legislative requirements including, but not limited to, the conditions identified in the Coordinator General's Report Schedule D – Noise Management and the Environmental Authority.

2.2 Sources

2.2.1 Construction

Typically all construction equipment will generate noise and additionally, construction activities involving vibratory rollers, rockbreakers, and pile driving and blasting are expected to generate significant ground-borne vibrations. There is no human habitation immediately adjacent to the GLNG Plant Project site; however, potential sources of noise that may affect residents on islands in the Port of Gladstone and on the mainland are of concern. The effect of noise generating activities on fauna within the Project site shall also be considered. Potential sources of noise and vibration on Curtis Island and along Project travel routes include the following:

- Road works;
- Earth moving, excavation and general construction activities;
- Pile driving;
- Cranes;
- Construction traffic;
- Boat transportation, including loading/unloading of material from barges;
- Mobile equipment, including power generators;
- Pneumatic testing;
- Blasting & rock removal; and
- Temporary Workers Accommodation Facility (TWAF) activities.

2.2.2 Commissioning

During commissioning there will be instances of intermittent and variable noise events which will occur over several months. Primarily flaring will be the main source of noise; however some noise will also be generated from the following:

- Pipe blowing;
- Venting during purging; and
- Depressurising after tightness testing.

2.3 Noise and Vibration Impacts

Noise levels from construction and commissioning activities will vary depending on distance from the work, type of equipment in operation, climatic conditions and topographical shielding.

Noise levels from commissioning, specifically noise generated from flaring during the commissioning stage, are expected to be intermittent and stabilise once normal operating conditions are reached following the ongoing operations of the LNG Plant. The frequency of these activities will be minimised where possible. Where practical these activities will be undertaken in daylight hours.

Vibration impacts from construction activities may primarily result from blasting and rock removal during early works and pile driving activities during marine works. Impacts from these activities have been mitigated through ensuring Project permit and approval conditions were upheld during these works. The later stages of construction and commissioning are not anticipated to cause significant vibration impacts.

2.4 General Work Hours

Normal working hours for construction activities are:

- 6:30 am to 5:00 pm Monday to Friday
- 6:30 am to 3:00 pm Saturday
- No regularly scheduled work Sunday and public holidays

In general, works which may be undertaken outside the normal working hours include the following:

- The delivery of materials which are required to be delivered outside of regular hours for safety or logistical reasons;

- Night works, conducted in such a way to minimise noise and vibration impact through the assessment of necessary activities, considering best environmental management and public notification if deemed appropriate;
- Emergency works to avoid loss of lives, property and/or to prevent environmental harm;
- Large concrete pours;
- Bulk earthworks operations (requiring completion to achieve stability and install erosion controls);
- Commissioning activities including but not limited to flaring activities and system start-up;
- Any other works which do not cause significant noise or vibration.

The Bechtel Site Manager will be responsible for approving works outside normal hours and will advise the Bechtel Environmental Manager.

2.5 Noise & Vibration Mitigation & Monitoring Program

Noise and vibration impact is assessed both during regular site inspections and also on a complaints basis. If it is identified that noise and vibration impact is a nuisance to sensitive receptors controls will be implemented where practical. limit noise/vibration levels and control nuisance that could affect sensitive receptors during construction and commissioning. The tolerance of construction and commissioning noise is expected to vary as a function of activity, proximity to sensitive receptors, land use, and line-of-sight between construction and receptors. Mitigation measures will be tailored during planning for each new phase of facility construction to match site-specific conditions.

Note: Occupational noise monitoring and mitigation measures for Project personnel (e.g., construction workers and operators) are outside the scope of this Plan.

The following management measures may be implemented during construction and commissioning in order to meet the objectives of this plan:

- Notify affected persons of the intended work and its duration where high intensity noise or vibration from construction and commissioning activities may have adverse impacts;
- Install broadband reverse alarms on machinery and heavy equipment;
- Select construction equipment based on good industry practice;
- Limit machinery and vehicle movements to defined work areas and designated roads;

- Maintain construction vehicles and equipment in order to limit noise emissions;
- Maintain noise suppression devices on construction vehicles and equipment;
- Schedule short-term high noise activities to reduce noise nuisance and intrusion, where practicable;
- Fit pneumatic tools operated on the mainland with an air exhaust port silencer if necessary;
- Use blasting mats and weighted blankets where appropriate; and
- Monitor wildlife in the vicinity of pile driving and employ soft start or other means to lessen impacts.

Noise monitoring may be conducted in response to complaints. Values set forth in AS 2436-1981 for construction noise emission levels for various types of construction equipment will be used to identify locations for noise monitoring, and to determine the type of mitigation measures needed for noise abatement.

Bechtel and subcontractors will promptly respond to all citizen and community complaints about any nuisance noise/vibration conditions. To the extent feasible, specific mitigation measures and construction methods will be adjusted to address local concerns.

3 VISUAL / AESTHETICS

The Project site on Curtis Island is relatively remote. Visual/aesthetic impacts during construction and commissioning include the movements of boats/vehicles, visibility of equipment, such as cranes, on the island skyline as viewed from the mainland or Port of Gladstone, lighting, colour scheme of the LNG Facility and buildings, and tree clearing including stabilisation of disturbed areas. Mainland laydown and parking areas are located in developed industrial zones.

The Project will ensure that all permit and approval conditions are adhered to in regards to visual/aesthetic impacts during construction and commissioning of the LNG Plant. This includes the conditions defined in the Coordinator-General's Report and the Environmental Authority.

These conditions include:

Constructing the LNG Facility within the site footprint;

- Applying a colour scheme to the LNG Facility and buildings, other than the LNG storage tanks and any necessary corrosion-protected structures and pipe insulation, from the palette of predominant colours found in the locality

(Curtis Island) except where to do so would be in contravention of health and safety legislative requirements; and

- Ensuring site works minimise tree clearing, with stabilisation and rehabilitation works on disturbed areas fully implemented within twelve months of completing each component of the LNG Facility (the worker accommodation facility and associated infrastructure; LNG storage tanks, and LNG trains and ancillary equipment and infrastructure).

Construction and commissioning impacts on the visual/aesthetic resource are short-term. During construction the Project will maintain as low a profile as possible. The following measures shall be implemented during construction:

- Trees and screening vegetation will be left intact to the extent possible to screen the Project site from the Port of Gladstone;
- Disposal sites, construction signs, material storage, and other items of work necessary for construction that will create a visual impact will be identified and kept as discreet as possible;
- Bright coloured covers or tarps will not be placed in highly visible areas;
- Exterior finish on buildings will use readily available industrial colours, selected where feasible to minimise visual intrusion by aligning with the predominant colours in the locality to the extent reasonable.

4 LIGHTING

Lighting of the construction site will be necessary, including warning and security lights in the Port of Gladstone and inland work/security lighting. The Project aims to mitigate any adverse impacts on the environment and surrounding communities resulting from lighting which may occur during construction.

During commissioning light will potentially be generated at night through flaring activities. Flaring activities will only be undertaken as necessary during the commissioning period.

The Queensland coastline hosts numerous nesting grounds for sea turtles. As such, the Project is committed to minimising any significant disturbance to these animals and their habitat. People living on islands or on boats in the Port of Gladstone, and on the mainland, may also be affected by Project construction lighting.

4.1 Project Requirements

The visual impact of the construction and commissioning of the LNG Facility will minimise light spill and direct views of lights outside the LNG Facility boundary except where to do so would be in contravention of health and safety legislative requirements. In addition, lighting disturbance to marine turtles be minimised by:

a) Physically shielding lights and directing the lights onto work areas;

b) Keeping light heights as low as practicable;

c) Using long wave length lights instead of short wavelength lights unless required for the safe operation of the LNG Facility;

d) Minimising reflective surfaces; and

e) Fitting motion detectors and light timers where practicable.

4.2 Lighting Mitigation

The following measures will be implemented during construction and commissioning to control impacts from lighting:

- All staff and subcontractors will be made aware of the issue of lighting associated with construction works and directed to minimise their impact on local communities or the environment as far as practicable;
- The amount of lighting will be kept to the minimum necessary for construction and to meet health and safety requirements;
- Lights on the MOF will be directed away from the Port of Gladstone to the extent possible;
- Light will be screened/hooded to the extent possible so they are restricted to the immediate work area;
- Regular inspections will be conducted to assess the amount and impact of lighting and the lighting adjusted if necessary;
- Complaints by citizens or local authorities regarding lighting will be addressed to the extent practicable.

5 MONITORING

Refer to the CEMP, Attachment H, Environmental Monitoring Plan.

GLNG

SPILL PREVENTION, CONTROL, AND COUNTERMEASURES PLAN

(Attachment N of CEMP)

REV	DATE	REASON FOR REVISION	BY	CK'D	Site Mgr	APE	PM
4	05-Dec-13	Issued for Update	ER	PN	BF	HH	BT
3	12-Apr-13	Issued for Annual Review and Update	RJF	SMP	BF	RR	BT
2	01-Nov-11	Updated for Publication	RW	RR	BF	BT	AP
1	24-Aug-11	Updated issued for use	RF	RW	JJM	RR	BT
0	13-July-11	GPC/MSQ comments incorporated; issued for Use	RW	RF	JJM	CJK	BT / AP
C	09-Feb-11	Client comments incorporated; Reissued for Permit	RW	CJK	JJM	CJK	BT / AP
B	11-Aug-10	Client Comments Incorporated; Issued for Permit	RW	CJK	JJM		BT / AP
A	22-July-10	Issue for Review	RW	MD	JJM	CJK	ABP

BECHTEL OG&C INC.	JOB NO. 25576	
SPILL PREVENTION, CONTROL, AND COUNTERMEASURES PLAN	DOCUMENT NO.	REVISION
	100-G01-GHX-00032	4
	GLNG Doc No. 3310-BTH-3-3.3-6832	

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1 INTRODUCTION

This Spill Prevention, Control, And Countermeasures Plan is Attachment N of the Construction Environmental Management Plan (CEMP) for the Gladstone LNG Plant Project and shall be read and interpreted in conjunction with the CEMP (ref. 25576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617).

Bechtel and its subcontractors will use this Plan during construction and commissioning to prevent spills to the environment, to identify and respond to incidents involving such releases, and to demonstrate compliance with applicable environmental management practices for:

- Transport of equipment/material to and from the mainland and Curtis Island;
- Hazardous material storage areas;
- Workshop areas;
- Vehicle and equipment wash-down areas; and
- Other areas where high risk activities are taking place.

For the purpose of this document a spill is defined as an unauthorised release of contaminants identified in project permits and approvals. This includes releases of hydrocarbons or other hazardous material to the ground, stormwater or the receiving environment by other means.

All spills classified as reportable under Project permit/approval conditions must be reported in accordance with permit/approval timeframes to the required regulatory agencies.

Spills which may occur onsite which are not classified as reportable under Project permits/approvals are recorded on the Project minor spill log.

A spill of any quantity to the marine environment must be **immediately** reported to the Gladstone Regional Harbour Master (+61 7 4973 1208 or channel 13 VHF Radio,) and reported to the EHP.

The Project construction site Emergency Preparedness and Response Plan (EPRP) contains details regarding emergency response actions for fires, explosions, spills, and other emergency situations. The EPRP addresses the emergency communication system, off-site communication links, fire control equipment, spill control/decontamination equipment, and fire water system details. The EPRP also establishes procedures and responsibilities in the event of an incident requiring emergency response.

Key contacts for reporting spills as of January 2014 are:

Spill Reporting		
Contact	**Role**	**Number**
Gladstone Harbour Master	All marine spills	07 4973 1208
First Strike Response (GPC)	All marine spills	0409 629 413 07 4976 1398
Environment Superintendent (GPC)	All spills >200L or likely to cause harm on GPC property	0408 018 778 07 4976 1258
EHP Pollution Hotline	All marine spills All spills >200L or likely to cause harm on land	1300 130 372
Gladstone EHP	All marine spills All spills >200L or likely to cause harm on land	07 4971 6500
Environmental Manager ESH Manager	All marine spills All spills >20L on land	0481 236 475 0411 302 050 07 4844 0372
GLNG HSE Manager GLNG Sr Environmental Advisor	All marine spills All spills >200L or likely to cause harm on land	0427 128 724 0488 306 477

2 SPILL PREVENTION PROCEDURE

2.1 Fuel and Chemical Transport Notification

Shipments of fuel and chemicals will be planned for the upcoming three (3)week period. Specific information on significant loads including type of material and quantity to be transported, method of transport, and date of transport will be provided to MSQ and GPC per their request.

2.2 Pre-Release Planning

There are specific Project activities that have the potential for the occurrence of spill-related incidents during construction and commissioning operations.

Bechtel will place spill kits in/near the following areas in accordance with relevant Australian Standards:

- Vessels/boats;
- Fuel delivery and handling areas;
- Hazardous materials storage areas;
- Warehouses;
- Waste Management Areas (WMA) (i.e., fuel, chemical and industrial waste);
- Workshop areas;
- Vehicle and equipment wash-down areas;
- Equipment and machinery repair areas; and
- Areas where high risk activities are being undertaken and there is a potential for a spill to occur.

The greatest potential for spills will be at chemical storage tanks/containers, hazardous material loading/unloading areas, and spills from equipment (e.g., hydraulic leaks, fuel spills). If bulk deliveries of hazardous materials are to be received on-site, then adequate preparation will be made. This will include training, provision of appropriate PPE, and temporary evacuations of personnel working near the delivery area, if needed. See the Environmental Training Outline (CEMP, ATT. J) and Section 6 of the CEMP for information regarding spill response training.

2.3 Hazardous Materials Storage and Transport

Hazardous materials and fuels will be transported and stored in accordance with the relevant legislation conditions identified in the project permits and approvals including, but not limited to; the Ports Australia Non-Cargo Liquid Transfer Practices (2008), AS 1940 (Storage and handling of flammable and combustible liquids), AS 3780 (Storage and handling of corrosive substances), and AS 4452 (Storage and handling of toxic substances) and to prevent the seepage of any contaminants into the groundwater. Further, to prevent accidental spills from reaching the environment, all temporary hazardous material storage areas shall be located at least 30 m away from surface waters and buffer areas or provided with protection to prevent a spill into the drainage system.

It is appropriate to provide temporary secondary containment when hazardous materials are being decanted to smaller containers or the likelihood for a release exists. The temporary secondary containment can be constructed of a bunded concrete slab with curbs, a soil berm with a plastic liner, or a manufactured secondary containment system. The type of containment system used depends upon the material that might spill and the type of work activity that will occur inside or near the containment.

In addition, the Project will maintain an adequate number of spill kits around the site as determined by Bechtel based on current scope and risk. Permanent LNG plant hazardous material storage areas will not be used for storing hazardous materials until they are commissioned.

3 SPILL RESPONSE PROCEDURES

Preventing spills to both land and water will be a primary objective during both construction and commissioning stages of the Project. Spill prevention controls will be thoroughly communicated to all site personnel through the project training program and procedures will be strictly enforced. Bechtel will respond to and cleanup spills generated by Bechtel direct-hire personnel in most instances, however a subcontractor with spill response capabilities and appropriate experience may also provide assistance. Subcontractors will respond to and cleanup spills that they cause and Bechtel will confirm cleanup was satisfactory. Subcontractors must properly dispose of the cleanup waste generated from a spill or release in accordance with the construction Waste Management Plan (CEMP R). Bechtel subcontractors and Bechtel direct-hire personnel shall report spills to the Bechtel Environmental Manager who will then report both subcontractor and Bechtel spills to GLNG. GLNG are responsible for regulator notification.

3.1 Spill Response

Each spill incident involves a unique environment and a unique set of circumstances. Therefore, individual plans of action are developed and implemented as the spill response team leader evaluates the spill conditions. A risk based approach will be taken for spill events to assess the type of spill response and site decontamination that will be necessary to remove actual or potential risk to human health and/or the environment. Contaminated site risk assessments shall be undertaken as required by personnel who have the appropriate qualifications and experience. The risk assessment will take into consideration proximity to sensitive habitats and wildlife.

This Plan is written with the recognition that there are limitations to responding to a spill in a marine environment. The Project has incorporated spill prevention measures into high risk activities, such as marine transportation, that include isolation of materials, multiple layers of containment, and special care in handling. The ability to respond effectively depends on how prepared a project is and whether spill response equipment is properly staged nearby. Under extreme climate conditions in a marine environment, the safest response is to monitor the oil spill and allow the oil or chemical to disperse or dissipate. This is the least acceptable response and every effort to prevent the spill in the first place is where the most effort will be made. In the event of a chemical, fuel or oil spill in the marine

environment the Gladstone Regional Harbour Master (+61 7 4973 1208) will be immediately notified.

Subcontractors who will transport dangerous materials, refuel vessels or equipment over/near water, or perform construction over water (MOF, jetty, etc.) will prepare detailed spill response and/or bunkering plans for their scope of work. These subcontractor plans shall be reviewed and approved by Bechtel prior to implementation.

The Gladstone Harbour First Strike Spill Response Team provides assistance in the event of a marine spills which are not able to be contained using Project resources.

3.2 Spill Cleanup Actions

Bechtel subcontractors must clean up spills they create. Bechtel is responsible for cleaning up spills that Bechtel direct hire personnel cause in most instances, however a subcontractor with spill response capabilities and appropriate experience may also provide assistance. All spills will be documented in an Environmental Incident Log.

Upon discovering a spill which has the potential to cause harm to the environment or Project personnel, all non-essential personnel will be immediately removed from the impacted area and the area made safe. The Bechtel Environmental Manager will be notified immediately of spills greater than 20L or any spill in the marine environment or in flowing water that may reach seaport Curtis. Spills less than 20L or that are not in water may be routinely cleaned and reported to the Bechtel environmental department. All spills which are not reportable in accordance with permit/approval conditions shall be recorded on the minor spill log.

Personnel discovering the spill should eliminate all sources of ignition from the immediate spill area if the spill is flammable. If it is safe to do so, the source of the spill/leak will be stopped and the spilled material should be contained within as small an area as possible by installing bunds or absorbents. If it is raining, personnel may place plastic sheeting or other protection over the spill, if possible, to prevent mixing/washing by stormwater.

Bechtel environmental staff, with input from GLNG, will coordinate and direct any emergency response effort based on their risk assessment (see 3.1). If a subcontractor is responsible, then the subcontractor may coordinate the cleanup if approved by Bechtel environmental staff and by using a risk based approach at all times.

Appropriate personnel and response equipment will be mobilized and the spill will be cleaned up under the guidance of Bechtel environmental staff. Clean-up waste will be properly contained and disposed of by a registered operator to an appropriately licensed facility. Clean-up of spills in water may be under the direction of the Gladstone Harbour Master and First Strike Oil Spill Response if required, and Project personnel will contribute to that effort as requested.

4 SPILL NOTIFICATION & DOCUMENTATION

Upon discovery, the Bechtel Environmental Manager shall be immediately notified of all spills and releases greater than 20L or any spill in the sea or in flowing water that may reach the marine environment. The Bechtel Environmental Manager will subsequently notify the Site Manager and/or Commissioning and Start-Up Manager of significant and/or reportable incidents. GLNG will be notified of spills and/or environmental incidents that are reportable to regulatory authorities immediately after becoming aware of the incident. A spill of fuel/oil in any quantity to the marine environment in the vicinity of Gladstone or Curtis Island must be immediately reported to the Gladstone Regional Harbour Master (+61 7 4973 1208). Every attempt to stop and contain a release should be made, but only if it is safe to do so. After a release has occurred, the Site Manager/Commissioning and Start-Up Manager, Bechtel Environmental Manager, and GLNG will determine if additional reporting to Australian regulatory agencies is required. Subcontractors will supply their individual spill logs to Bechtel at the end of each month. GLNG may examine the project Environmental Incident Log at any time.

In the event of a reportable spill in accordance with Project permit/approval conditions or where environmental harm has been caused notification to the regulatory agencies shall be performed by GLNG.

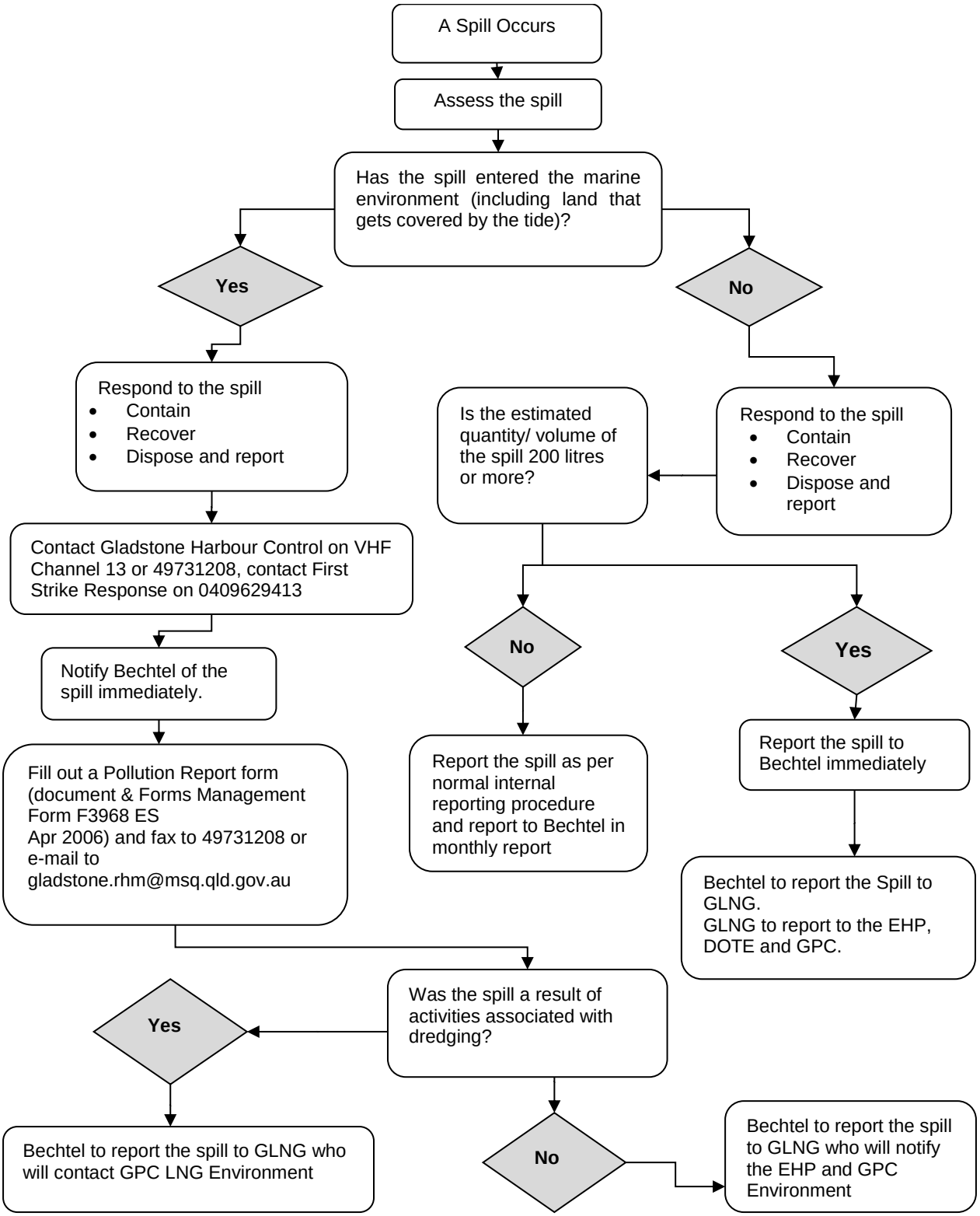
In addition, the Bechtel Environmental Manager or designee shall:

- Record the spill in the Project's Environmental Incident Log. The Environmental Incident Log will be available for review at all times during the Project;
- Ensure actions required by the Environmental Incident Management Procedure are undertaken and notifications are provided within the required timeframes as identified in Project permits/approvals.;
- Initiate an incident investigation and determine the root cause and any additional causal factors that contributed to the incident as required;

- Evaluate the cause and attempt to identify behavioural changes or procedural changes that contributed to the incident. Present proposed changes and/or modifications to the Site Manager and evaluated for potential implementation; and
- Implement any approved preventative/corrective actions or additional administrative controls necessary to prevent recurrence.

A flow chart outlining the various stages of reporting is detailed in the figure below.

Spill Reporting Flow Chart



5 SPILL RESPONSE EQUIPMENT

Adequate spill response equipment will be maintained on-site for all Bechtel caused spills and to backup subcontractor's spill response equipment. Subcontractors are responsible for providing their own spill response equipment and supplies.

Spill cleanup materials are locally available in Queensland from a number of suppliers. In addition, the Project may purchase materials required to assemble its own custom spill kits.

Spill containment booms capable of containing a spill from a vessel or from the land side and a means to attach the boom to the berthing areas will be provided for emergency response.

6 AUDITING

Spill prevention and response will be audited by Bechtel corporate auditors to verify spill response is timely and effective, waste has been properly disposed, the spill log is maintained, and required reporting has occurred.

This spill plan will be updated as necessary depending upon the phase of construction.

GLNG

STORMWATER MANAGEMENT AND EROSION AND SEDIMENT CONTROL PLAN

(Attachment O to CEMP)

REV	DATE	REASON FOR REVISION	BY	CK'D	Site Mgr	APE	PM
5	05-Dec-13	Issued for update	ER	PN	BF	HH	BT
4	05-Aug-13	Issued for update	ER	SMP	BF		
3	12-Apr-13	Issued for Annual Review and Update	RJF	SMP	BF	RR	BT
2	24-May-12	Updated – Issued for Use	RF	SS	BF	BT	
1	1-Nov-11	Updated for Publication	RW	RR	BF	BT	AP
0	15-July-11	Issued for Use	RW	RR	BF	CJK	BT / AP
B	11-Aug-10	Client comments incorporated; Issue for Permit	RW	CJK	JJM	CJK	BT / AP
A	21-Jun-10	Issue for Review	RW	MD	JM		BT / AP

BECHTEL OG&C INC.		JOB NO. 25576	
BECHTEL	STORMWATER MANAGEMENT AND EROSION AND SEDIMENT CONTROL PLAN	DOCUMENT NO.	REVISION
		100-G01-GHX-00033	5
		GLNG Doc No. 3310-BTH-3-3.3-6833	

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1 INTRODUCTION

This Stormwater Management and Erosion and Sediment Control Plan is Attachment O of the Construction Environmental Management Plan (CEMP) for the Gladstone LNG Project and shall be read and interpreted in conjunction with the CEMP (ref. 2550125576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617), in particular section 1.1.

This document is the GLNG Plant Project Stormwater Management and Erosion and Sediment Control Plan and is designed to eliminate and/or mitigate the pollution impact of stormwater from construction activities and protect undisturbed soil and stored top soil for future land use. This plan also applies during the commissioning period.

Stormwater management has three (3) components usually referred to simply as 'erosion control': Erosion control whereby cut/fill surfaces are protected from accelerated erosion by maintaining vegetative or other cover; runoff control whereby storm runoff is directed to ditches, pipes, or other managed systems; and sediment control whereby measures, such as silt fence and sediment basins, prevent heavily silt-laden water from leaving the project site. The Project's stormwater management system has been engineered to utilize a variety of erosion control, runoff control, and sediment control structures/management practices, and follows the Australasian Best Practice Erosion and Sediment Control guidelines (International Erosion Control Association Australasia, 2008, 3 volumes, 710 pp).

This Plan explains the general principles that shall be followed and responsibilities for maintaining the Project's stormwater system and also follows the Queensland Urban Drainage Manual, Volume 1, Second Edition 2007 (Department of Natural Resources & Water, Institute of Public Works Engineering Australia, Queensland Division Engineering Australia, Queensland Division Ltd. and Brisbane City Council, 430pp. http://www.dews.qld.gov.au/__data/assets/pdf_file/0009/78129/qudm.pdf

1.1 Environmental Authority Conditions

The Stormwater Management/Erosion and Sediment Control Plan for Curtis Island meets the requirements of the Environmental Authority (EA) (Department of Environment and Heritage Protection (EHP) Permit Number EPPG00712213 . The EA requires a Stormwater Management Plan to be prepared and implemented. The Stormwater Management Plan shall address the:

(a) Prevention of incident stormwater water and storm water run-off from contacting wastes or contaminants;

(b) Diversion of upstream run-off away from areas where it may be contaminated by bulk products being loaded or unloaded, waste, contaminates or other materials; and

(c) Collection, treatment and disposal of all contaminated storm water run-off.

The Stormwater Management Plan for Curtis Island will be provided in three (3) stages as outlined below. This plan serves as guidance for GLNG Plant project Stage 1, 2 and 3 Stormwater Management Plans.

1.2 Stage 1, 2 and 3 Scope of Work

Stage 1 – Early Works: The work included site civil works and preparation of the site undertaken by site subcontractor to enable the Contractor (Bechtel) and other subcontractors to fully develop the LNG plant areas and construct temporary and permanent facilities. During Stage 1 – Early Works clearing of forest and understory vegetation was undertaken, all weather tracks were established, initial diversion of natural channels were established, cut and fill earthworks performed for general levelling of site to rough grade levels. This stage also included establishing cut-off drains/perimeter diversion drains, developing site roads, establishing internal drainage channels and establishing major drainage and sediment control features .Refer to Attachment A for the detailed Stormwater Management Plan for Stage 1 – Early Works (ref. 25577-100-V13-CG00-00047; GLNG doc. 3310-BTH-3-3.3-95790-47)

Stage 2 – Construction Works: This stage includes construction of the bulk of the LNG facility after major site vegetation clearing and civil works are completed, including the final grading of site, installation of hard surface areas (including paved roads, concrete pads and building roofs), completion of final site surface drainage systems and the construction of the LNG facility, tanks and jetty. This period includes both and construction and commissioning activities. The Stage 2 stormwater system, including ditches, drains, and sediment basins will be in place and discharging all site stormwater via designated discharge points. Site batters, stockpiles (e.g. topsoil) and other areas will be vegetated/ stabilised where required for stability/erosion control. The shoreline will be nearly completely rock armoured and all natural stormwater flow onto the site will be intercepted and conveyed around the site via a perimeter ditch. The sedimentation basins will be routinely inspected and maintained, and the discharge points monitored as required. Refer to Attachment B for the detailed Stormwater Management Plan for Stage 2 – Construction (ref. 25577-100-G01-GHX-00044; GLNG doc. 3310-BTH-3-3.3-6844)

Stage 3 – Operation Works: Operation Works encompasses the ongoing operation of the LNG plant following the commissioning period once the Temporary Workers Accommodation Facility (TWAF), construction equipment and facilities, temporary buildings and structures have been removed. Stormwater, Erosion and Sediment

Control for Stage 3 – Operation Works will be described in the Operational Environmental Management Plan (OEMP).

2 PROJECT COMMITMENTS

The following bulleted items that apply to the GLNG Plant Project describe what the project Erosion and Sediment Control Plan should address according to the Coordinator General's Evaluation Report for the EIS (Appendix 4, Part 3, Schedule B – Water):

- diverting stormwater run-off around areas disturbed by petroleum activities or where contaminants or wastes are stored or handled that may contribute to Stormwater contamination;
- stormwater captured within the internal drainage systems is collected; and treated, reused, or released in accordance with Project requirements;
- roofing, if practicable, or minimising the size of areas where contaminants or wastes are stored or handled;
- stabilising the disturbed area as soon as practicable after the completion of works;
- using alternate materials and or processes (such as dry absorbents) to clean up spills that will minimise the generation of contaminated waters;
- erosion and sediment control structures are placed to minimise erosion of disturbed areas and prevent the contamination of any waters;
- regular inspections of the Stormwater management systems to identify required maintenance;
- provision for adequate access to maintain all erosion and sediment control measures especially during the wet season months from December to March; and
- identification of preventative/corrective actions that would be required to ensure compliance with the Project conditions.

3 SITE SOILS AND VEGETATION

Detailed soil and vegetation descriptions are contained in the Project's Environmental Impact Statement (EIS). In general, the islands soils are characterized in Table 1-1 of 1in the EIS reproduced below.

Vegetation cover is generally high (>50%) and dominated by forest types. Plant species diversity is moderate and abundant rainfall and warm temperatures promote

plant growth throughout most of the year. The site was previously logged many decades ago and has been grazed by livestock (cattle, horses, feral pigs) for many decades. There are areas of active erosion along ephemeral channels throughout the site and bare salt pans between the shoreline and the bordering mangrove forest.

In general, though not deep, the soils are potentially highly erosive because of the high annual rainfall, steepness of portions of the site, and potential for heavy downpours.

There is potential to disturb soil near previous livestock handling areas where unanticipated discoveries of soil contamination may be found. If contaminated soil is encountered the Unanticipated Discoveries Procedure shall be followed. Erosion control of disturbed soil in areas found to contain contaminated soils shall be evaluated on a case-by-case basis as directed by the project environmental lead.

Table 1-1 Description and Classification of Soil Types

Soil Group	Summary Soil Description	Soil Classification			
		Aust. Soil Group (1)	P.P.F. (2)	U.S.C. (3)	A.S.S. (4)
4	Shallow to deep (>0.5 m) mainly uniform or weakly gradational, very stony and gravelly loams to clay loam soil profiles.	Shallow Loams Gravelly Loams Lateritic Red – Yellow Earths	Um2.12 K-Um2.12 Um4.11	CL/GC-CL/GC GC-CL/GC	Brown Kandosol; Gravelly Lithic; Leptic Rudosols
5	Medium to deep (0.5-1.2 m) dark brown gravelly loam to gravelly clay loam surface soils, locally with a pale or bleached gravelly loam or clay loam sub-surface (A2) horizon over red-brown, brown or yellow-brown acidic medium to heavy clays or gravelly clays subsoils.	Red, Yellow & Brown Podzolic Soils ; Grey & Brown Soloths	Dr2.31 K-Dr3.21 Db3.51 K-Db3.51 Db1.41 K-Dy3.21 Dy3.32	GC-CL/GC/CH CL-ML/GC/CH or CL-CH ML/GM/CL-CH	Ferric Red-Brown Chromosols; Sodic Yellow & Brown Kurosols
6	Thin dark grey-brown acidic clay loamy surface duplex soils with diffusely mottled grey-brown and yellowish brown slightly acidic medium to heavy clay sub-soils over alkaline clay deep subsoils	Brown Solodic Soils	Db2.23	CL/CH/CL-CH	Subnatric Brown Sodosols
7	Three soil type variants identified include: *Type 7.1*: Shallow to medium deep (<0.5-0.8 m) uniform red-brown clay soils and gradational gravelly loam over yellow-brown to yellowish-red gravelly clay subsoils; *Type 7.2*: Medium deep (0.5-1.0 m) uniform silty clay over acidic structured heavy clay subsoils underlain by massive alkaline heavy clay deeper subsoils; *Type 7.3*: Medium to deep (0.5-1.5 m) uniform silty clay surface soils over brown or red-brown weakly structured acidic medium to heavy clay subsoils, and gradational clay loam to gravelly loam surface soils over gravelly light clay subsurface horizons transitioning to medium to heavy or heavy acidic to strongly acidic clay or gravelly clay subsoils	Uniform Gravelly Clays Alluvial Soils Grey, Brown or Red (Non-Cracking) Clay Soils	Uf6.61 Gn4.81 Gn4.14 Uf6.31 Uf6.61 Uf6.12 Gn4.12 Gn4.11 Gn2.11	CL-CH/CH GM-GC/GC/ CL-CH or GC-CL/GC/ CL-CH CL/CH/CH CL/CL-CH CL/GC-CL/CH CL/GC-CL/CH GC-CL/CL-CH CL/CL/GC-CL	Acidic Sodic Red Dermosols; Melanic Red & Brown Dermosol Sodic Brown Dermosol Acidic-Sodic Red Dermosol; Ferric Brown Dermosol; Ferric red Dermosol
9	Deep to very deep, very soft, uniform, gradational or weak duplex soil profiles, with organic silty clay to silty clay loam surface soils and seasonally or permanently saturated subsoils, typically gleyed saline clays, clayey silt, silty sand or sandy mud	Humic Gleys Solonchaks	Uf6.41 Dg2.11	CL-ML/OL-OH	Supratidal Hydrosols; Redoxic Hydrosols

Notes: - (1) - Common Soil Group Name (Stace et.al. 1968); (2) - Principal Profile Form (Northcote 1974);
(3) - Australian Engineering Soil Classification (AS 1726-1993); (4) - Australian Soil Classification (Isbell, 1996).

4 EROSION, RUNOFF AND SEDIMENT CONTROL MEASURES

The measures that shall be implemented for stormwater management are described in this section. Refer to drawings in the CEMP Attachment A for details.

4.1 Sediment Basins

Sediment control basins are operational during both the construction and commissioning stages. CEMP Attachment A, includes the location plans, details and basin size data. Basin design and management is per the following:

- The site has been divided into different stormwater management catchments according to land use / topography;
- Site drainage ditches are designed for a 25 year ARI storm;
- Run-off from undisturbed "clean" areas that will have characteristics similar to natural runoff will be diverted around the LNG plant and discharged to the Bay through a vegetated / rocked ditch with riprap aprons at the discharge point;
- Stormwater drainage from plant areas that may contain sediments will flow through sedimentation basins designed to remove sediments;
- During the early works and construction Type D sediment basins (according to the design guidelines of the Australasian Best Practice Erosion and Sediment Control (International Erosion Control Association Australasia (IECA), 2008, 3 volumes, 710 pp) have been installed. This allows for the capture, treatment and discharge of stormwater generated from the site during a rainfall event which does not exceed the design criteria.
  In case of rainfall beyond the design criteria an emergency spillway will allow discharge to the harbour. Even when the basin is full of water, sediment-laden stormwater runoff continues to be directed through the basin for continued settlement of coarse-grained particles contained in the flow.
  If required Type D basins will be converted to Type C basins (as described in the IECA guidelines) prior to Stage 3 – Operation Works.

4.2 Sediment Control Measures

Details and drawings of other erosion and sediment control measures to be utilized are provided in CEMP Attachment A for:

- Description of rip-rap aprons at the outlet to a sediment basins/traps;
- Description of gravel check dams in the drainage ditches;
- Description of the placement of silt fencing and other sediment catchments on site;
- Description of inlet protection measures; and
- Description of construction laydown/parking and site access roads.

Fugitive dust generated during construction and commissioning either directly by construction activities or by wind erosion effects on areas where soil disturbance has occurred or on stockpiles of soil/construction materials can have detrimental effects on sensitive resources, workers and the public. Additional mitigation measures to be implemented for the control of sources of construction fugitive dust are provided in the Air Quality & Dust Management Plan.

In selected instances flocculent chemical may be added to stormwater to aid settling of suspended sediment. Flocculent may be used in ditches, tanks, sediment basins, or other situations where removal of suspended sediment is necessary. The site Environmental Manager shall determine when, where, and how much flocculent to utilize. A record of flocculent used on-site will be maintained.

4.3 Reconstruction of Slopes

Steep slopes will require stabilization during construction, particularly slopes for sediment basins, soil disposal areas, new roadside ditches or channels, and areas with potentially wet soils. Terracing, geotextile, or geo-matting shall be used where required, in combination with riprap at drainage points, and with seeding and mulching, wherever possible. Surface roughening techniques, such as walking a hillside with tracked equipment, may also be employed to minimize erosion potential for slope faces.

4.4 Buffers near Wetlands/Streams/Sensitive Areas

Buffer strips of vegetation will be left intact, wherever possible, between construction works and wetland and/or stream boundaries to help protect water quality. Where possible, a 10m wide vegetated buffer will be left in place during clearing to allow a natural filter between exposed soils and wetland areas. Buffers shall also be established where possible in known sensitive areas.

4.5 Silt fences at Stream and Wetlands

Silt fences shall be installed where needed between construction areas and existing waterbodies (however not necessarily along the entire shoreline of the Port of Gladstone) to provide protection against sediment loss where required. Silt fences shall be installed as per design details to intercept and detain the flow of sediment-laden runoff. The condition and functionality of these silt fences shall be monitored as part of the regular and storm follow-up inspections. Maintenance shall include repairing/replacing damaged silt fence and removal of sediment if necessary.

4.6 Road Drainage and Inlet/Outlet Filters

Drainage ditches shall be constructed where required to allow the efficient drainage of adjacent construction areas. Inlet and outlet filters shall be installed to protect storm drains from clogging and/or obstructions, and to maintain runoff water quality consistent with existing conditions. Outfall locations shall be protected with erosion control matting or rock rip-rap to prevent scouring.

4.7 Sequence of Installing Erosion Control Measures

Erosion control measures shall be installed prior to clearing and grubbing operations, wherever possible. Where access to an area is required prior to installation, erosion control measures shall be installed concurrently with clearing operations. Control measures shall be installed within 48 hours of clearing operations (as applicable) on a given area.

Once clearing and grubbing, and sediment control devices are installed (i.e., silt fences, inlet/outlet protectors), ditches and channels with accompanying sediment basins shall be constructed, followed by appropriate slope stabilization controls, placement of rock rip-rap in selected areas, and seeding of slopes and stockpiles, where required.

4.8 Dewatering

Measures, such as scour protection will be implemented so that dewatering of construction excavations does not result in erosion and sedimentation of site stormwater.

5 CONTROL OF OTHER POTENTIAL SOURCES OF STORMWATER CONTAMINATION

The following sections describe the control measures to be used on the Project site to prevent and/or minimize the contamination of stormwater from other potential sources of pollution on-site. Details regarding the siting criteria, size, design, maintenance and operation of the non-hazardous and hazardous waste storage areas are provided in the project Waste Management Plan and the project Spill Prevention, Control, and Countermeasures Plan.

5.1 Non-Hazardous Construction Wastes

Non-hazardous construction wastes shall be stored primarily within commercial waste containers (e.g. roll off boxes, bins). These containers will be located in various areas around the jobsite where work activities are concentrated. The containers shall not be located within established stormwater drainage pathways, nor will wastes be allowed to collect outside of the containers. These containers shall be periodically emptied for off-site disposal by a licensed contractor.

Visual inspection of waste containers and their contents will occur during regular site environmental inspections to monitor compliance with these conditions, as well as with the more detailed waste management practices as described in the project Waste Management Plan.

5.2 Sanitary Wastes

During early construction, sanitary wastes were collected using approved portable toilets and disposed of offsite at an approved waste handling facility. Once the temporary Sanitary Treatment Plant was installed, all sanitary waste has been treated prior to discharge to Gladstone Harbour via a seawater outfall.

The sanitary facilities are regularly inspected and monitored to assure that there are no issues that could potentially result in human or environmental contact with the wastes.

During and after decommissioning of the temporary Sanitary Treatment Plant sanitary wastes shall be disposed of offsite at an approved waste handling facility.

5.3 Hazardous Materials

Common hazardous materials that are typically used or generated as waste during construction and commissioning include:

- Gasoline/diesel fuel and oils (including hydraulic oils);
- Oil filters;
- Solvents and thinners;
- Batteries;
- Caustics (e.g., battery acid);
- Paints (toxic or flammable);
- Resins and glues;
- Construction and commissioning chemicals (where these contain toxic or flammable components);
- Welding fuel gases, e.g., acetylene, LPG;
- Welding ignition sources;
- Tyres;
- Potash;
- Amine solution;

Users of hazardous materials shall receive training in the proper measures to use to avoid spills, leaks, or other discharges to the ground. Management practices shall be applied, as appropriate, to eliminate or reduce the potential for generation of hazardous waste. Spill response equipment shall be provided in an adjacent area appropriate to the type of construction activities being performed.

5.4 Hazardous Material Storage Areas

On-site storage areas for hazardous materials shall be designed and maintained to prevent and/or minimize any contact with stormwater. These areas are to be located away from stormwater drainage pathways and off-site watercourses, in order to minimize the potential for stormwater pollution. Containers of hazardous materials shall be kept closed at all times, except when filling or dispensing product.

Designated storage areas shall be bunded or designed and installed with an underlying impermeable surface (e.g., concrete, plastic lining) surrounded by curbing, dikes or other means to contain small spills and prevent their release into the environment. Storage areas should be covered where possible to protect them from the elements and to minimize collection of stormwater in the secondary

containment areas. Small amounts of stormwater that might collect within these secondary containment areas shall be visually examined by a project environmental management team member, and if found to be clean, discharged to the ground. Alternatively, small containers of hazardous materials may be stored in metal cabinets and/or cargo containers provided the cabinets/containers meet ventilation and fire protection requirements of the materials being stored.

5.5 Waste Storage for Disposal Areas

Bechtel and its subcontractors shall utilize a controlled Waste Storage Area (WSA) for the temporary storage of containerized hazardous wastes, including used oil and engine coolant destined for off-site disposal. Containers of hazardous wastes, used oil, and coolant shall be kept closed at all times except when filling.

Subcontractors may use Satellite Accumulation Areas (SAA), immediately adjacent to their primary work locations, to allow limited storage (time and amount) of hazardous wastes generated during their work activities. These SAA's shall be included in the regular inspections in order to monitor the manner, time, and amounts of applicable wastes being stored.

Both the WSA and any SAA's may be covered and have an underlying impermeable surface, surrounded by secondary containment, to prevent the mixing of wastes with stormwater and to prevent the direct release of liquid wastes to the environment. The proper management of these areas is described in the previously referenced Waste Management Plan (CEMP, Att. R).

5.6 Vehicle Maintenance/Refuelling Areas

Except for emergency situations, on-site vehicle maintenance shall be performed in designated areas (e.g. vehicle/equipment maintenance shop or temporary containment for large and/or stationary equipment) that shall be located away from stormwater drainage pathways and off-site watercourses, in order to minimize the potential for stormwater pollution. A roving maintenance truck(s) shall be used to perform routine refuelling and maintenance activities (e.g. oil, lubricant and coolant changes, filter changes) on vehicles and equipment at the location of the associated construction activity.

Vehicle washing shall only be conducted in a designated area and shall not use soap/detergent. Water shall not be discharged to the stormwater system unless it passes through an oily water collection system, such as booms or absorbents. Vehicle refuelling from stationary storage tanks may take place in a designated refuelling location using approved tanks and valves; all stormwater collected in the fuel area shall be removed to an approved disposal site by truck or to the stormwater system after passing through booms or absorbents.

Used or spent fluids resulting from vehicle maintenance activities shall be collected in sealed, marked containers and transferred to approved storage areas prior to recycling or off-site disposal at a licensed facility. Authorized personnel responsible for performing this type of maintenance shall be provided with readily available access to spill clean-up materials.

The maintenance truck shall be equipped with a spill kit (e.g. absorbents). Lubricants and coolants shall be collected in closed containers to minimize the potential for spills. The truck operator shall be required to be trained in conducting refuelling and maintenance activities in accordance with standard spill prevention practices. These activities shall be performed in a manner that does not pose a significant risk to environmentally sensitive areas.

5.7 Process Area

The process area contains the bulk of plant equipment for processing the liquefied natural gas. Stormwater management in this area to avoid contamination is important during commissioning and operations. Process areas where accidental chemical/fuels/hazardous material spills may occur will be bunded.
Refilling of equipment will be supervised and if a spill does occur, spill response will be initiated immediately and the area remediated and not flushed to the sumps.

The bunds are designed for a 10 year return period and 8 hour rainfall duration, stormwater collected in the bunded areas that is contaminant free will be manually released into the stormwater drainage system. Contaminated stormwater will be pumped to the Oily Water Treatment Plant which is designed to remove oil, grease and suspended solids. Run-off from the process slab on which the majority of the LNG process equipment is installed is impounded in a dedicated sump, PASCS (first flush only) equipped with a skimmer that pumps potentially contaminated water/oil mixture to the Oily Water Treatment Plant. Excess stormwater that is contaminant free flows to the sedimentation basins. The process area sump shall be emptied after storm events.

Provisions are also made to pump clean Stormwater from the Process Area Sump to diffuser WW1 if the water is suitable for direct discharge as determined by plant operators. This is a manual process whereby the operator, after inspection of all the sumps, manually opens the valves until the sumps are empty of rainwater and then manually closes valves as per the SOP.

Storm water runoff from the Amine Storage containment area drains to the Waste Water Sump (WWS). The WWS is pumped to the Wastewater Tank.

5.8 Unanticipated Discoveries

If any contaminated soils are discovered during construction, work shall immediately stop in the vicinity of the find and the Unanticipated Discoveries Procedure (CEMP, Att. Q) shall apply.

5.9 Spill Response

Spill response equipment and materials (e.g. shovels, absorbent pads, booms, metal drums) shall be available in sufficient quantities and of appropriate type to address spills of hazardous materials and wastes. This equipment and material shall be stored near locations where hazardous materials are used and stored.

All site personnel shall be informed during mandatory new-hire site inductions that in the event hazardous materials are spilled, they are to immediately contact their supervisor and/or the project Environmental Manager to initiate proper clean-up response activities. See the Spill Prevention, Control and Countermeasures Plan (CEMP, Att. N) for an outline of response procedures, spill reporting quantities, and specific site actions required in the event of a hazardous substance spill.

6 INSPECTIONS AND MAINTENANCE

The following inspection and maintenance items shall be addressed during construction.

6.1 Inspection and Reporting Requirements

Regular site inspections will be undertaken on a routine basis when active construction activities are taking place. Observations made during inspections, along with data captured during environmental monitoring events, is used to identify required preventative and/or corrective actions. An example is date captured during project stormwater sampling and analysis. This information is used as:

- The means of documenting compliance with the Stormwater Management and Erosion and Sediment Control Plan and/or related permit conditions; and
- The rationale for modifying the Stormwater Management and Erosion and Sediment Control Plan so that the necessary changes to control measures and/or procedures can be developed and implemented in order to avoid findings of non-compliance in the future.

If an environmental incident, monitoring exceedence or potential non-compliance is identified notification is provided to the relevant persons in a timely manner in accordance with Project requirements.

Once a preventative / corrective action is identified the closeout of the action is tracked to ensure actions are closed out in a timely manner to minimise the likelihood of recurrence.

6.2 Maintenance Requirements

The erosion control devices shall be maintained on a regular basis as directed by the Project Site Manager and Environmental Manager. Maintenance may include replacing structures that are not functioning properly and will be identified through regular site inspections and the development of corrective actions.

Attachment A: Stormwater Management Plan (Stage 1 – Early Works)

Contract# 25577-540-HC3-CG00-00001
Bechtel# 25577-100-V13-CG00-00047
GLNG Base# 3310-BTH-3-3.3-95790-47

Stormwater Management Plan (Stage 1 – Early Works)

GLNG Project Site Civil Works

Bechtel

Client Contract No.: 25576-100-HC3-CG00-00001

Macmahon Project No.: C618

Macmahon Business Unit: Construction

Macmahon Division: Queensland

Quality Information

The latest version of this plan will be available on the Macmahon Document Library for all Project personnel. Distribution of the plan will be by 'hard copy' or electronically using document control software process. Superseded copies of the document should either be destroyed or marked as superseded.

When amendments occur, the entire document and its appendices will be reissued with a corresponding revision number. Document annexures may be treated separately although these would require individual document control. The Document History Table should be completed electronically.

Document History Table

Date	Revision Details	Typist/ Author	Reviewer	Approver	Client Approval
25-March-11	Draft Erosion and Sediment Control Plan submission to Bechtel. The plan incorporates comments by R. Woodward (Bechtel).	M. Rae	J. Moore	T. Cao	-
1-April-11	Updated to a Stormwater Management Plan and distributed for comment.	M. Rae	N. van Schagen / J. Moore	T.Cao	-
8-April-11	Updated per Bechtel review 5-April-11 and Macmahon review.	-	J. Moore	T. Cao	-
27-April-11	Updated per GLNG and DERM review 16-April-11.	M. Rae	J. Moore	T. Cao	-
9-May-11	Updated per GLNG and DERM comments dated 28-April-11.	J. Moore	R. Woodward (Bechtel)	T. Cao	-
30-May-11	Updated per GLNG and DERM comments dated 27-May-11.	J. Moore	R. Woodward (Bechtel)	-	-
1-July-11	Table 5 updated with new EA conditions.	R Ferguson (Bechtel)	J. Moore	-	-
15-July-11	Table 5 and Appendix 8 updated with new EA conditions. Removal of Section 8.2 Modelling of Stormwater Management System. Minor referencing updates e.g. appendix numbering.	J. Moore	J. Moore	-	-

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APPENDICES

ACRONYMS

ANZECC	Australian and New Zealand Environment and Conservation Council
ARI	Average Reccurance Interval
Buffer zone	A significant area of healthy long grass down-slope of the disturbed area. The required width of the buffer zone (in the direction of flow) should be at least 2 metres for up to a 5% slope, 4 metres for up to a 10% slope, and 6 metres for up to a 15% slope etc. The buffer must not contain any drainage channels, swales or spoon drains that may concentrate flow.
CEC	Cation Exchange Capacity
Cement residue	Cement washed from concrete or cement surfaces or from equipment.
Clay-based soil	Soil that contains at least 10% clay.
Clayey soil	Soil that contains at least 20% clay. These are fine grained soils that usually feel very smooth and sticky when wet, are very difficult to shovel and break-up when compacted, readily form a clod when compressed in the hand, and are usually poorly drained soils.
Clean water	Waters that either have not been 'contaminated' by the uptake of sediments or contaminants due to construction activities; or that have been treated by the nominated control measures to a level of acceptable discharge.
DERM	Department of Environment and Resource Management
DPM	Deputy Project Manager
Dispersive soils	Structurally unstable soils, which readily disperse into their constituent particles (clay, silt, sand) when placed in water. Highly dispersive soils are normally highly erodible and are likely to give problems relating to tunnel erosion.
MNES	Matters of National Environmental Significance
EMP	Environmental Management Plan
EMS	Environmental Management System
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESC	Erosion and Sediment Control. ESC measures means those measures or devices used to manage soil erosion and/or sediment run-off.
ESP	Exchangeable Sodium Percentage
Filter cloth	Filter cloth is a non-woven geotextile fabric primarily used to separate soils or rock of different texture or grain size. It may also be used to filter sediment from water.
Highly erodible material	Highly erodible material means material that can readily wash from a stockpile or building site, or can discolour stormwater during regular storm events.
MOF	Materials Offloading Facility
PEMR	Project Environmental Management Representative
QEC	Quality & Environment Coordinator
QEM	Quality & Environment Manager
Sandy soil	A soil that contains at least 50% sand. These are coarse grained soils that are

	easy to shovel and break-up when compacted. It is very difficult to form a clod when sandy soils are compressed in the hand.
Sediment barrier	A control device (such as a filter medium of aggregate or fabric, or a buffer zone) used to filter, trap or settle sediment from stormwater runoff. Usually placed along the property boundary immediately down-slope of the soil disturbance. Where conditions allow, the barrier should be placed along a line of constant elevation to avoid the barrier concentrating stormwater run-off.
Sediment control measures	Devices used to filter, trap or settle sediment from stormwater or waste water.
Sediment control zone	Area of a work site located up-slope of an effective sediment barrier.
Sediment deposits	Gravel, sand, silt, clay, soil or mud deposited in an area from where it did not originate, or on a surface that it is significantly different in content from the deposited material.
Sediment fence	A purpose-made, woven or non-woven, geotextile fabric constructed as a vertical fence using support posts spaced at a distance no greater than 2 metres. Sediment fences must not be formed from shade cloth or filter cloth.
Sediment run-off	The movement by water of gravel, sand, silt, clay, soil or mud.
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
Sheet flow	Water flowing at a thin, near uniform depth that is much smaller than the width of flow.
Short-term stockpile	A stockpile that is located on-site or off-site for less than 24 hours.
Soil erosion	The process whereby wind, water and physical action detach soil particles and cause them to be transported.
Steep site	A site where the predominant ground slope is greater than 10% (i.e. 10H:1V) when measured perpendicular to the contour.
Stormwater	Rainfall that runs off hard surfaces such as compacted soil, roofs and car parks or off ground that has become saturated.
Stormwater inlet	An inlet to a stormwater pipe, including grated (field) inlets installed level with, or near the ground.
Temporary erosion and sediment controls	Control measures specifically intended for the management of risk associated with construction and related activities, within the duration of the construction period and defect liability period.
TWAF	Temporary Worker Accommodation Facility
Waste water	Water run-off from water-cooled cutting equipment, run-off from the washing of tools, surfaces or equipment, and water containing cement residue.
Waters	Any water body whether natural or constructed, including creeks, rivers, ponds, lakes and wetlands.
Windbreaks	Devices used to reduce the velocity of wind passing over exposed soil.

1 INTRODUCTION

1.1 Purpose of the Stormwater Management Plan

The Stormwater Management Plan (SMP) is focused on the management of soil and water for Stage 1 – Early Works of the GLNG Project on Curtis Island. This sub-plan forms part of the project environmental management system which comprises an overarching Macmahon Environmental Compliance Plan (ECP) and a number of sub-plans which give more detailed environmental management specifications for the key issues for the project. This sub-plan should be read in conjunction with the ECP for the GLNG Project.

The purpose of the SMP is to minimise soil erosion and the impact of sediment laden run-off on the natural environment. The SMP provides details of sediment and erosion control principles and stormwater management principles. Site application of these controls will occur on an on-going basis and will be updated as the site works progress. The main objectives of the SMP are to:

- meet the requirements relating to stormwater management set out in Environmental Authority (Permit Number PEN101623910) issued by the Department of Environment and Resource Management (DERM);
- to ensure that the management is conducted and implemented in accordance with this Stormwater Management Plan developed in accordance with the Environmental Authority, SEWPaC Approval (EPBC No 2008/4057) as well as other requirements;
- present overall soil and water management principles and guidelines for the Stage 1, early Works, phase of the Project;
- identify erosion, sedimentation and water quality issues potentially arising from the Project;
- describe how the practical measures and best management practices will be implemented;
- provide for capture and treatment of sediment laden runoff; and
- outline an effective monitoring, auditing and reporting framework to assess the effectiveness of the controls implemented.

1.2 Scope of the Stormwater Management Plan

This SMP has been developed to be consistent with a number of the principles presented in the Construction Environmental Management Plan (CEMP) prepared by Bechtel and the Stormwater Management and Erosion and Sediment Control Plan (CEMP, Attachment O). In addition, it has been designed to be compatible with the legal and other requirements described in Section 2 of this plan; GLNG Environmental Impact Statement Supplement (SEIS); GLNG Environmental Impact Statement (EIS);The Australian Government, Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) Approval EPBC No. 2008/4057; and, the Environmental Authority (DERM Permit Number PEN101623910). The SMP (Stage 1 – Early Works) addresses condition BC13(a) of the Environmental Authority only.

1.3 Project Description

The proposed LNG facility is located within the Gladstone State Development Area, Queensland, Australia, at the southwest end of Curtis Island, which is situated approximately 5 km north of the city of Gladstone. The LNG facility is proposed to be developed in two stages (called trains), the first of which will have a capacity of approximately 3 - 4 Mtpa.

The LNG facility site permit comprises a total area of approximately 145 ha. The LNG facility will include a Product Loading Facility (PLF), including a jetty, for loading LNG onto tanker ships and a Materials Offloading Facility (MOF) for handling shipments of construction material. There is a heavy haul road for transferring plant, equipment and personnel from the MOF to the construction

site. A Temporary Worker Accommodation Facility (TWAF) will be provided on the site for much of the construction workforce.

Three mainland marine facilities will be utilised for the Project. Fisherman's Landing will be an equipment debarkation point for the first nine (9) months to a year of the Project while RG Tanna and Port Central are developed. The existing facility at Fisherman's Landing, includes an existing fully fenced two (2) hectare hardstand area and an existing barge load out facility. The RG Tanna and Port Central locations and facilities will be used for staging operations and managing of the handling of raw materials.

Construction stages have been divided into the following stages:

- **Stage 1 – Early Works**: The scope of work includes site civil works and preparation of the site to allow Bechtel and other subcontractors to fully develop the LNG plant areas and construct temporary and permanent facilities. Extensive cut/fill earthworks will be performed and the topography of most of the site will be extensively altered by raising the elevation to protect the site from seaward events (e.g., storm surge, tsunami). This stage includes construction of 7 stormwater discharge points over the course of approximately 18 months that will release stormwater from installed ditches and sediment basins during the bulk of construction of the facility (Stage 2 – Construction Works); some of the 7 discharge points will continue to function during Stage 3 Operation Works. Because of the extensive earthworks the 7 final discharge points cannot be installed until civil works creates the final landform in which the discharge points can function.

  Prior to the 7 final discharge points being installed 23 interim discharge points, consisting mostly of natural existing channels, will be managed for stormwater discharge. Erosion and runoff controls will be installed in the watersheds of these discharge points during early works to control sedimentation. As civil works are completed, i.e., areas are brought to final cut/fill elevations, stormwater will be diverted to the final 7 stormwater discharge points. **Appendix 9** contains drawings and information, including planned dates when water diversions are planned for temporary to ultimate discharge points. Because the extent of civil work water from some watersheds may be split and diverted into more than one ultimate discharge points, so the ultimate discharge point for the majority of runoff from an area is the one indicated in **Appendix 9**.

  Stage 2 – Construction Works: This stage includes construction of the bulk of the LNG facility after major site vegetation clearing and civil works are completed, including extensive piping, electrical, and concrete work. The Stage 2 stormwater system, including ditches, drains, and sediment basins will be in place and discharging all site stormwater via 7 designated discharge points. Site batters, stockpiles (e.g., topsoil) and other areas will be vegetated/stabilised. The shoreline will be nearly completely rock armoured and all natural stormwater flow onto the site will be intercepted and conveyed around the site via a perimeter ditch. The stormwater system will be routinely inspected and maintained, and the 7 discharge points routinely monitored. The start of Stage 2 is defined by completion of major site civil works and commencement of use of the 7 stormwater discharge points.

- **Stage 3 – Operation Works**: Operation Works begins following commissioning and start-up of the facility and successful production of LNG. Extensive secondary-containment and berms isolate potential contaminates from stormwater. The stormwater system will continue in use with routine monitoring/maintenance. The 7 stormwater discharge points will continue in use; however, portions of the site are GPC land (e.g., MOF and some of the roads) and may be returned to GPC control once operation begins. Areas disturbed by construction that do not have permanent works will be restored or stabilised and construction equipment and excess material will be removed from site.

1.4 Construction Activities (Stage 1 – Early Works)

Construction activities include, but are not limited to:

- receiving, processing, handling, storing, maintaining and sorting materials;
- installation temporary roads for Jobsite access during work activities;
- construction of all necessary concrete slabs and all other temporary underground utilities, hardstand pavements, etc required for temporary facilities;
- construction of a pioneer access road along the proposed Module Haul Road route including construction of major culvert crossings;
- clearing and grubbing activities including removal of all tree stumps and roots;
- stripping designated areas of all top soil for storage;
- identifying, processing, treating and disposing Acid Sulphate Soil (ASS) materials;
- mass and detailed excavation, general and select filling, final trimming and final grading;
- ripping activities for mass, detailed and trench excavation activities in fresh to highly weathered rock areas as required;
- construction of cast in situ or precast reinforced concrete slabs, headwalls, aprons and wing walls for reinforced concrete box culverts where specified on the Drawings;
- construction of drainage ditches, sedimentation ponds and hydrotest pond and installation of 7 stormwater discharge points;
- construction of the Module Haul Road and Construction Heavy Haul Road;
- construction of the MOF Laydown Area including Module Haul Road ramp, Quarantine area, MOF access roads and associated laydown areas; and
- construction of permanent plant roads.

2 LEGAL AND OTHER REQUIREMENTS

Construction activities must be planned and implemented in accordance with all relevant legal and regulatory requirements. Appropriate mitigation measures to control environmental hazards which include compliance with all relevant environmental legal requirements as well other requirements including standards and best-practice guidelines should be adopted. The Macmahon procedure **Legal and Other Requirements Procedure (G-395)** describes how relevant legislation is identified, accessed and controlled.

The applicable legislation and standards the project will adhere by are listed below:

- ANZECC/ ARMCANZ (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC Guidelines);
- Australian Government, Department of Sustainability, Environment, Water, Population and Communities (2010); Approval, Development of a Natural Gas Liquefaction Park associated with the Gladstone LNG Project – EPBC No 2008/4057;
- Bechtel (2010). Stormwater Management & Erosion & Sediment Control Plan (GLNG Document Number: 3310-BTH-3.3.3.6833) (Bechtel Document Number: -100-G01-GHX-00033);
- Best Practice Erosion and Sediment Control, International Erosion Control Association (ICEA) Australasia (2008).
- *Coastal Protection and Management Act 1995*;
- Department of Environment and Resource Management (2009). Queensland Water Quality Guidelines (2009);
- *Environment Protection Act 1994*;
- *Environment Protection and Biodiversity Conservation Act 1999*;
- Environmental Authority (Permit Number PEN101623910) issued by the Department of Environment and Resource Management (DERM)[1];
- *Environmental Protection (Water) Policy 2008* (EPP Water);
- *Environmental Protection Regulation 2008*;
- Queensland Government (2006). Queensland Water Quality Guideline;
- Queensland Government (2010). Coordinator-General's evaluation report for an environmental impact statement, Gladstone Liquefied Natural Gas, GLNG Project Under Part 4 of the *State Development and Public Works Organisation Act 1971*, May 2010;
- The Australian Government, Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) Approval EPBC No. 2008/4057;
- URS (2009). GLNG Environmental Impact Statement Supplement; and
- URS (2009). GLNG Environmental Impact Statement.

See **Appendix 8**: EA PEN101623910/ EPBC No 2008/4057 and SMP Cross-Reference Checklists for a synopsis of applicable permit conditions.

[1] Under Section 310M of the *Environmental Protection Act 1994* the permit is issued to Santos GLNG Pty Ltd; PAPL (Downstream) Pty Limited; and Total GLNG Australia.

3 OBJECTIVES AND PERFORMANCE CRITERIA

The following performance criteria and objectives apply to erosion and sediment management for the Site Civil Works:

- no detrimental impacts on water quality and the environment occur during the construction phase and water discharged from the site complies with relevant DERM Environmental Authority conditions (100% of discharges are reported and corrected);
- all nominated monitoring and inspection activities are undertaken and corrective actions are undertaken (100% of nominated inspections are undertaken; 100% of corrective actions are identified and undertaken within proposed dates);
- the erosion and sediment related conditions of the Environmental Authority (Permit Number PEN101623910) issued by DERM are audited as well as all legal requirements are undertaken or implemented (no major non-conformances related to stormwater management are raised in internal and external audits);
- erosion and sediment management is undertaken according to the principles of Best Practice Erosion and Sediment Control by International Erosion Control Association (IECA) Australasia (2008).

The benchmarks contained in **Table 5** (Section 8.1) of this report shall be used as targets during construction.

4 RESPONSIBILITIES

Construction activities will be implemented in a manner that achieves a result consistent with legislative and approval requirements as well as client requirements for reliability, safety and protection of the environment. The Environmental Compliance Plan (Macmahon) describes environmental responsibilities associated with the management of construction activities associated with the Site Civil Works Subcontract. The sections below describe roles and responsibilities specifically related to erosion and sediment control for Stage 1.

4.1 GLNG

GLNG is the operator of the Project and is responsible for liaising with the relevant Government authorities, as required, and supporting the implementation of this Plan.

4.2 Bechtel

Bechtel is the Principal Contractor for the construction scope. Bechtel and its subcontractors, including Macmahon, are responsible for the implementation of the Bechtel CEMP. All relevant environmental issues will be directed to the Bechtel Health, Safety and Environmental Manager (HSEM).

Site Manager (SM)

- Communicate stormwater, soil erosion, and sedimentation minimisation strategies with relevant stakeholders and GLNG; and
- Immediately notify the Bechtel HSEM if significant adverse matters pertaining to stormwater, soil erosion and sedimentation arise.

Environmental Staff

- Conduct at-least weekly and post storm-event, inspections of erosion/sediment control devices to verify maintenance of their effectiveness in preventing and minimising stormwater pollution; discussing these inspections with the Site Manager who will make available the necessary manpower and material resources to repair/replace any defective control devices identified in the inspection; and documenting, and maintaining the documentation of, these inspections which will form the basis of the annual compliance certification made by the SM (see **Appendix 7** Erosion and Sediment Checklist);
- Monitor intermittent non-stormwater discharges (e.g., from dewatering of trenches and excavations);
- Conduct at-least weekly site environmental inspections noting the condition of those areas on site which have the potential to result in contamination of stormwater (e.g., construction waste storage areas, vehicle maintenance areas and hazardous substance/waste storage areas); and discussing the results of these inspections with the SM who will oversee the performance of any necessary corrective actions;
- Act as the site Spill Coordinator to direct clean-up activities of hazardous substances to prevent/minimise their impact on stormwater;
- Act as the primary point of contact for the Project regarding stormwater, soil erosion and sedimentation matters;
- Utilise “stop-work” authority with regards to construction activities that are in breach of the standards specified by this Plan;
- Provide the Project team with technical and regulatory compliance support regarding this Plan;
- Review and evaluate contractor mitigation methods and provides recommendations for improvements, as needed;

- Coordinate with Project Management, Environmental staff and other functions on compliance issues, which may include notices of violation, potential fines, or other penalties;
- Refer complaints to GLNG and initiates the complaints handling procedure where appropriate;
- Communicate the need for corrective actions to the SM and Field Subcontracts Manager , as needed;
- Interact with contractors and visiting agency and authority representatives, as directed by the SM, for environmental compliance issues; and
- Provide comments on lower tier contractors' plans as required.

4.3 Macmahon

Macmahon is a subcontractor to Bechtel under a Site Civil Works subcontract which relates to Stage 1.The responsibility and authority pertaining to environmental performance of key Macmahon personnel is described below. These responsibilities are categorised in relation to relevant positions.

Project Manager

The Project Manager is responsible for the implementation and operation of environmental practices relating to the scope of work. The Project Manager reports to the Divisional Manager and is responsible to:

- provide necessary resources and personnel for the execution of this Plan;
- communicate stormwater, soil erosion, and sedimentation minimisation strategies with relevant stakeholders and Bechtel; and
- immediately notify the Bechtel HSEM if significant adverse matters pertaining to stormwater, soil erosion and sedimentation arise.

Project Environmental Management Representative

The PEMR is responsible for:

- provide training and promote awareness of stormwater, soil erosion and sedimentation mitigation strategies with staff;
- implement provisions of this plan relevant to the scope of work, including interim control plans as applicable to the sequence and scope of work;
- ensuring this plan associated procedures are implemented to meet the requirements for the project;
- promote construction stormwater, soil erosion and sedimentation mitigation best practice and procedure/equipment innovation;
- assigning project staff to perform verification duties;
- ensuring non-conformances and environmental incidents are identified, reported and suitable corrective actions are determined and completed;
- reviewing inspection reports and ensuring any actions required are executed;
- ensuring subcontractors fulfil their environmental obligations;
- attending meetings to discuss environmental issues; and
- undertake environmental monitoring and auditing.

Business Unit Quality & Environment Manager / Coordinator

The Business Unit Quality & Environment Manager / Coordinator (QEM / QEC) is responsible for:

- developing procedures specific to address applicable legal and other requirements;
- providing advice for project training and awareness programs; and

- informing Divisional Managers, Project Managers and Project Environmental Management Representatives of any changes to legal and other requirements.

Project and Site Engineers

Site and Project Engineers are responsible to the Project Manager for the environmental performance of the site(s) or construction activities for which they are in charge, including:

- incorporating environmental requirements into method statements;
- ensuring that instructions are issued and adequate information provided to employees which relate to environmental risks on site;
- ensuring that works are carried out in accordance with this plan, sub-plans and method statements, including the implementation of all environmental controls;
- preparing JSEAs for site works;
- identifying any additional or changed environmental risks to those defined in this plan;
- identifying resource requirements for implementation of this plan and related documents;
- ensuring that complaints relating to their sites or activities are investigated and resolved;
- implementing sub-plans and appropriate environmental protection measures;
- maintaining all necessary records and reports;
- taking action in the event of an emergency and allocating the required resources to minimise environmental and other impacts; and
- reporting any activity that has resulted, or has the potential to result, in an environmental incident to the Construction Manager or Environmental Manager.

Erosion and Sediment Control (ESC)Crew(s)

Personnel and equipment will be required to install and maintain controls and implement the requirements of this plan during the construction stage. ESC crews will be responsible for implementing and maintaining erosion and sediment control measures such as sediment basins, sediment fences, temporary batter chutes and geotextile lining of drains on a day to day basis and especially preceding and following wet weather events.

4.4 Division of Responsibilities

GLNG (Operator); Bechtel (Principal Contractor) and Macmahon (Subcontractor) have responsibilities relating to the implementation of this Stormwater Management Plan (Stage 1 – Early Works). In some circumstances responsibilities overlap between organisations. Bechtel as the Principal Contractor are the primary point of contact for the Project regarding stormwater, soil erosion and sedimentation matters. **Table 1** shows a division of responsibilities relating to stormwater.

Table 1: Division of Stormwater Related Environmental Responsibilities (Stage 1 – Early Works)

Duration	Macmahon	Bechtel	GLNG
Liaising with the relevant Government authorities	3	2	1
Stormwater related monitoring	1	1	1
Stormwater related inspections	1	1	-
Training	1	1	-
Undertaking corrective actions relating to inspections and monitoring	1	2	-
Undertaking Monitoring Measures, Trigger Values and Corrective Actions	1	1	-

Notes: 1 = Primary; 2 = Secondary; 3 Reasonable support provided)

5 ENVIRONMENTAL VALUES

The receiving-waters of the GLNG Project construction is Port Curtis. As stated in the GLNG Project Environmental Impact Statement (EIS) (URS, 2009) the water quality within Port Curtis is relatively high, although variable across the area and strongly correlated with the tidal state and seasons.

5.1 Climate and Rainfall

The Gladstone region has a sub-tropical climate with a mean annual rainfall of approximately 880mm at the Gladstone Radar (station number 039123) (Bureau of Meteorology; data accessed March 2011). The heaviest rainfall occurs during summer (November to March) in the tropical monsoon season. **Table 2**Gladstone Rainfall Intensity-Frequency-Duration Table describes the rainfall intensity in mm/hr for various durations and average occurrence internal.

Table 2: Gladstone Rainfall Intensity-Frequency-Duration Table (mm/hr)

	Average Recurrence Interval						
Duration	**1 Year**	**2 years**	**5 years**	**10 years**	**20 years**	**50 years**	**100 years**
5 mins	110	143	184	209	244	290	326
6 mins	103	134	173	197	229	273	308
10 mins	85.2	110	142	162	188	224	252
20 mins	63.4	81.9	105	118	137	163	183
30 mins	52.0	67.1	85.6	96.8	112	133	149
1 hr	35.3	45.7	58.5	66.4	77.0	91.5	103
2 hrs	22.8	29.6	38.4	44.0	51.3	61.4	69.4
3 hrs	17.3	22.6	29.7	34.2	40.1	48.3	54.8
6 hrs	10.8	14.2	19.1	22.2	26.3	32.0	36.6
12 hrs	6.78	9.01	12.4	14.7	17.6	21.8	25.1
24 hrs	4.34	5.84	8.32	10.0	12.2	15.3	17.9
48 hrs	2.74	3.74	5.56	6.84	8.50	10.9	13.0
72 hrs	2.02	2.78	4.24	5.29	6.66	8.67	10.4

Source: adapted from BOM; Extracted 21 March 2011 from the Rainfall IFD Data System.

5.2 Topography

The topography of the LNG facility study area shown in Figure 8.3.1 of the EIS (URS, 2009) comprises low rounded hilly, intermediate steep hilly and steep high hilly lands developed on Upper Carboniferous to Lower Devonian Wandilla Formation sedimentary rock types and meta-sediments comprising mudstone, lithic sandstone, quartz greywacke, siltstone, chert, slate and local schist. The hilly crestal areas vary from approximately RL 20 – 45m Australian Height Datum (AHD) in the low hilly lands, to approximately RL 50 – 75m AHD in the intermediate steep hilly areas, and up to approximately RL 120 – 175+m AHD in the high steep hilly lands. Hill and ridge slopes are mainly irregular planar to shallow concave on the lower slopes and vary from around 15% on the lower hilly areas, increasing to 20 - 35% ii the steep hilly areas and approximately 25 - 45%+ in the higher hilly lands. The hilly areas are separated by gently to moderately inclined (5 - 15%) lower hill slopes and undulating lowlands with overall slopes mostly within a range of 3 - 7%, which collectively form broad valley floors. Near flat to gently undulating alluvial plains with slopes mostly <2% occur in the valley bottoms. In most cases these alluvial valley flats extend towards the coast and merge with estuarine supra-tidal flats which are mostly fringed by tidal mangrove flats along the coast line.

The GLNG Project site is located on three sub-catchments; each sub-catchment will have its own sedimentation pond to capture runoff as indicated in **Appendix 1**.

5.3 Site Conditions and Soils

Vegetation ranges from open woodland, with individual eucalyptus and iron bark trees up to approximately 30 m in height, to closed medium density undergrowth of eucalyptus saplings and acacia ranging in height from 1-3 m. The dominant tree species are *Eucalyptus citriodora* woodland (Lemon-scented Gum), *Eucalyptus tereticornis* (Red Gum), and *Eucalyptus crebra* (Narrow-leaved Ironbark).There is a high cover of herbaceous understory species in upland areas including grasses and perennial herbs.

The EIS provides detailed descriptions of the soil characteristics within the project area reproduced below as **Table 3**.As stated in the EIS based on interpretation of the aerial photography (May 1999 - 1:40,000 scale) and from field observations, the current incidence of accelerated soil erosion including sheet, rill or gully erosion appears to be low within the LNG facility study area. The limited erosion that is occurring is largely confined to local, narrow, shallowly incised gullies in the mid to lower slopes of the low hilly and higher hilly lands.

Table 3: Soil Groups Identified within the LNG facility Site

Soil Group	Summary Soil Description	Soil Classification			
		AUST. Soil Group (1)	P.P.F. (2)	U.S.C. (3)	A.S.S. (4)
4	Shallow to deep (>0.5m) mainly uniform or weakly gradational, very stony and gravelly loams to clay loam soil profiles.	Shallow Loams Gravelly Loams Lateritic Red – Yellow Earths	Um2.12 K-Um2.12 Um4.11	CL/GC-CL/GC GC-CL/GC	Brown Kandosol; Gravelly Lithic; Leptic Rudosols
5	Medium to deep (0.50-1.2m) dark brown gravelly loam to gravelly clay loam surface soils, locally with a pale or bleached gravelly loam or clay loam sub-surface (A2) horizon over red-brown, brown or yellow-brown acidic medium to heavy clays or gravelly clays subsoils.	Red, Yellow & Brown Podzolic Soils; Grey & Brown Soloths	Dr2.31 K-Dr3.21 Db3.51 K-Db3.51 Db1.41 K-Dy3.21 Dy3.32	GC-CL/GC/CH CL-ML/GC/CH or CL-CH ML/GM/CL-CH	Ferric Red-Brown Chromosols; Sodic Yellow & Brown Kurosols
6	Thin dark grey-brown acidic clay loamy surface duplex soils with diffusely mottled grey-brown and yellowish brown slightly acidic medium to heavy clay sub-soils over alkaline clay deep subsoils	Brown Solodic Soils	Db2.23	CL/CH/CL-CH	Subnatric Brown Sodosols
7	Three soil type variants identified include:				
	Type 7.1: Shallow to medium deep (<0.5-0.8m) uniform red-brown clay soils and gradational gravelly loam over yellow-brown to yellowish-red gravelly clay subsoils;	Uniform Gravelly Clays	Uf6.61 Gn4.81 Gn4.14	CL-CH/CH GM-GC/GC/CL-CH or GC-CL/GC/CL-CH	Acidic Sodic Red Dermosols; Melanic Red & Brown Dermosol
	Type 7.2: Medium deep (0.5-1.0m) uniform silty clay over acidic structured heavy clay subsoils underlain by massive alkaline heavy clay deeper subsoils;	Alluvial Soils	Uf6.31	CL/CH/CH	Sodic Brown Dermosol
	Type 7.3: Medium to deep (0.5-1.5m) uniform silty clay surface soils over brown or red-brown weakly structured acidic medium to heavy clay subsoils, and gradational clay loam to gravelly loam surface soils over gravelly light clay subsurface horizons transitioning to medium to heavy or heavy acidic to strongly acidic clay or gravelly clay subsoils.	Grey, Brown or Red (Non-Cracking) Clay Soils	Uf6.61 Uf6.12 Gn4.12 Gn4.11 Gn2.11	CL/CL-CH CL/GC-CL/CH CL/GC-CL/CH GC-CL/CL-CH CL/CL/GC-CL	Acidic-Sodic Red Dermosol; Ferric Brown Dermosol; Ferric Red Dermosol

Soil Group	Summary Soil Description	Soil Classification			
		AUST. Soil Group (1)	P.P.F. (2)	U.S.C. (3)	A.S.S. (4)
9	Deep to very deep, very soft, uniform, gradational or weak duplex soil profiles, with organic silty clay to silty clay loam surface soils and seasonal or permanently saturated subsoils, typically gleyed saline clays, clayey silt, silty sand or sandy mud.	Humic Gleys Solonchaks	Uf6.41 Dg2.11	CL-ML/OL-OH	Supratidal Hydrosols; Redoxic Hydrosols

Notes: (1) – Common Soil Group Name (Stace et al. 1968); (2) – Principal Profile Form (Northcote 1974); (3) – Australian Engineering Soil Classification (AS 1726-1993); (4) – Australian Soil Classification (Isbell, 1996).

5.4 Existing Water Quality

The surface water channels within the GLNG Project area would be generally classified as drainage features and no DERM recognised watercourses are present. The drainage features are ephemeral and are dry outside rain events. Most existing channels are actively eroding with some incised to over 3m deep.

5.5 Existing Flood Characteristics

The construction catchment is approximately 3.8km^2. The catchment stretches from the hills to the east at approximately 124m AHD in elevation, to the salt marsh of the China Bay coast. At higher elevations the site is densely vegetation bushland, whilst at lower elevations the vegetation generally becomes sparser though vegetative cover remains near 100%. Within the site catchment all drainage features are ephemeral in nature and have small catchments.

5.6 Acid Sulfate Soils

Acid sulfate soils (ASS) are known to occur on the fringe of China Bay. Pre-construction geotechnical surveys determined that it is unlikely ASS will be encountered during site earthworks because limited excavation, chiefly involving installation of outlets of the permanent stormwater system at the edge of the site, will occur and the work is largely confined to upland areas. Handling and treatment of acid sulfate soils will be conducted in accordance with the Acid Sulfate Soils Management Plan (CEMP, Attachment C), GLNG Project, prepared by Bechtel.

5.7 Higher Risk Erosion Areas

The steep hilly and higher hilly lands (terrain units Cw8/7.1 and Cw7/4-7) have been rated as having medium to high erosion potential if subject to disturbance and/or clearing of vegetation, primarily due to the overall steepness of the hill slopes. Although the overall slopes are less steep, terrain units Cw6/5 and Cw5/5-7 are also rated medium to high, mainly due to the sodic and dispersive nature of the sub-soils if they become exposed and remain unprotected. In addition, terrain unit Cw5/5-7 is rated medium to high due to the topographic position in the landscape, whereby these areas may be subject to considerable surface water run-on from the adjacent higher hill slopes. Erosion potential in terrain units Cw3/5-7 and Cw4/4-7 has been rated low to moderate due to the overall, relatively gentle surface slopes and the gravelly nature of the surficial soils which permits rapid surface water infiltration.

In the lower-lying and generally flatter coastal lands and the alluvial valley floors, terrain unit Qe0/9 has low to moderate erosion potential due to the permanently saturated, fine-textured and cohesive nature of the surficial soils. Terrain units Qel/7-9 and Qe2/7.3 are moderately susceptible to wind erosion due to the bare or sparse surface cover and the silty nature of the surface soils. Terrain unit Qa2/6-7 has been rated medium to high due to the hard-setting properties of the surface soil horizons, the sodic and dispersive properties of the subsoil layers and the potential for periodic flood flows and local scouring effects.

Approximately 165.9 ha (94.2%) of the land in the facility site disturbance footprint area has been rated as having moderate to high (M-H) erosion potential where the land is subject to clearing and

earthworks for site development purposes. A further 2.3 ha (1.3%) has been rated moderate (M) and 7.9 ha (4.5%) has been rated as having low to moderate (L-M) erosion potential.

5.8 Salinity, Sodicity and Dispersiveness

Reference to the description and assessment of terrain units in Appendix L3 of the EIS and Table 4.1, SEIS, Attachment F1, indicates terrain units with moderate and moderate to high levels of salinity, sodicity and/or dispersive properties, particularly in the deeper clay subsoil and substrate materials, occur over more than 123.9 ha (70.4%) of the facility site disturbance footprint development area.

5.9 Sodic and Dispersive Soils

Sodicity is the level of exchangeable sodium in the soil and is determined using the exchangeable sodium percentage (ESP), which is the amount of exchangeable sodium expressed as a percentage of the cation exchange capacity (CEC). Sodic soils on exposure tend to exhibit the following general problems:

- severe surface crusting;
- likely dispersion on wetting;
- very low infiltration and hydraulic conductivity;
- very hard dense sub-soils;
- susceptibility to structural degradation;
- high susceptibility to severe gully erosion if exposed and unprotected; and
- high susceptibility to tunnel erosion.

Moderate to high levels of soil sodicity have been associated with soils occurring over an area of 2.5ha (1.5%) of the disturbance footprint area, mainly in small pockets around the seaward margins in terrain units Qe0/9, Qe1/7-9 and Qe2-7.3. Terrain units Qa2/6-7, Cw5/5-7 and Cw6/5, located in the central sector of the disturbed footprint area, have been associated with moderate soil sodicity and occupy an area of 121.4ha (68.9%).

Soils with medium to high levels of ESP generally tend to pre-dispose the material to dispersion. As a result the soil may become subject to rill or gully erosion if disturbed or exposed and left unprotected. However, in some situations where highly acidic soils occur (pH <5.5), this appears to counteract the dispersive effects of soil sodicity, with indicative dispersion testing indicating the majority of these sodic and strongly acidic materials being non-dispersive.

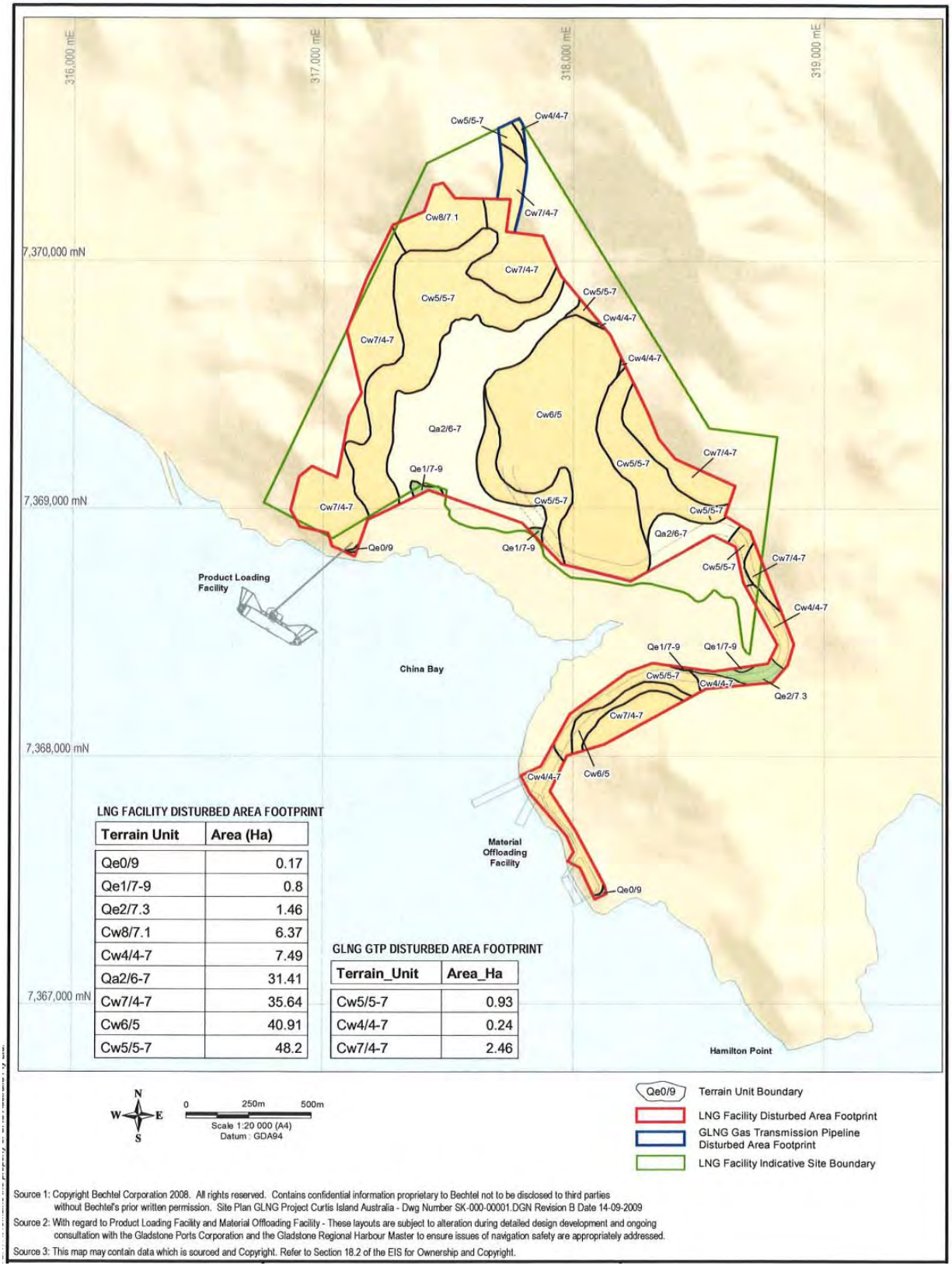

Figure 1: GLNG Terrain Units

Source: Gladstone LNG Project Environmental Impact Statement Supplement', Terrain Units for LNG Facility Disturbed Area Footprint (Part 3, Attachment F1, Figure 2).

6 ENVIRONMENTAL ASPECTS & POTENTIAL IMPACTS

6.1 Construction Phases (Stages)

Stage 1 – Early Works has been issued as a subcontract from Bechtel to Macmahon (Subcontract No. 25576-100-HC3-CG00-00001). Stage 1 – Early Works includes nine (9) major phases (sub-stages) which includes site civil works and preparation of the site to allow Bechtel and other sub-contractors to fully develop the LNG plant areas and construct temporary and permanent facilities. Construction phase are shown in **Appendix 2**: Construction Phases (Sub-Staging Plan) (Stage 1 – Early Works). The Construction Phases may be concurrent.

6.2 Environmental Aspects and Potential Impacts

Potential impacts have been identified in Section 8 of the GLNG Environmental Impact Statement (URS, 2009) and in particular Section 8.3 Land and Section 8.5 Surface Water. Key impacts including activities with potential to have an adverse impact on Matter of National Environmental Significance (MNES) proposed to be undertaken during the construction of LNG facilities, relating to Stage 1 – Early Works are summarised in the sections below.

6.2.1 Acid Sulfate Soil

During works, significant impacts may originate from any works less than five metres above sea level, particularly in low-lying coastal areas: excavation; dewatering; and stockpiling.

Potential adverse impacts from acid sulfate soils may include: incorrect segregation of either Non-Acid Forming (NAF) or Potential Acid Forming (PAF) waste material; changed pH levels and damage to estuarine fisheries; contamination of surface and ground water resources by acids, arsenic, heavy metals and other contaminants; reduced ecosystem function and related effects of flora and fauna; loss of visual amenity from rust coloured stains, scums and slimes from iron precipitates; human health risks associated with arsenic, aluminium and other heavy metals contamination in surface and groundwater.

6.2.2 Earthworks and Erosion and Sediment Transportation

A range of construction activates may lead water quality issues including: earthworks undertaken immediately prior to rainfall periods; work areas that have not been stabilised; bulk earthworks and construction of pavements; ineffective implementation of control measures; inadequate maintenance of environmental control measures; disturbance of sodic soils and time taken for the rehabilitation of disturbed areas.

Potential adverse impacts from erosion and sediment transportation can include: increased water turbidity; decreased levels of dissolved oxygen; changed salinity levels; changed pH levels; smothering of stream beds and aquatic vegetation; reduction in aquatic habitat diversity; decrease in waterway capacity leading to increased flood levels and durations; impact on sensitive or threatened fish species; reduction of light penetration causing reduction in plankton and aquatic plant growth.

In particular:

- Turbidity - The turbidity or ‘muddiness’ of water is caused by the presence of suspended particulate and colloidal matter consisting of suspended clay, silt, phytoplankton and detritus. The suspended material may reduce light penetration and have adverse effects on fish due to mechanical and abrasive impairment of gills in addition to smothering on benthic organisms and their habitats.
- pH - Changes to pH may affect the physiological functioning (e.g., enzymes, membrane processes) of biota.

- Dissolved Oxygen (DO) - Low DO concentrations can result in adverse effects on many aquatic organisms (e.g. fish, invertebrates and microorganisms) which depend upon oxygen for their efficient functioning. Low dissolved oxygen levels may allow the mobilisation of nutrients, such as phosphorus, in soluble forms from the sediments.
- Temperature - Ecosystem functioning is very closely regulated by temperature. Temperature of water is usually significant because it affects the amount of dissolved oxygen in the water. The amount of oxygen that will dissolve in water increases as temperature decreases.

6.2.3 Misuse of Top Soil

Misuse of topsoil may impact on landscape rehabilitation programs due to unsuitable topsoil and/or lack of topsoil. It may also lead to the generation of dust and sedimentation /erosion.

Sediment deposition destroys fish spawning beds, reduces the useful storage volume in reservoirs, clogs streams, may carry toxic chemicals, and requires costly filtration for municipal water supplies. Suspended sediment can reduce in-stream photosynthesis and alter a stream's ecology. Many environmental impacts from sediment are additive, and the ultimate results and costs may not be evident for years. The consequences of off-site sedimentation can be severe and should not be considered as just a problem to those immediately affected.

On-site erosion and sedimentation can cause costly site damage and construction delays. Lack of maintenance may result in failure of control practices, un-authorised discharge(s) and potential hard to aquatic flora and fauna.

6.3 Earthmoving Activities and Works Adjacent to Drainage Lines

The movement of sediment and potential erosion may be exacerbated from the construction of the LNG Facility and vehicle crossings of drainage features (URS, 2009).

6.4 Contaminant Mobilisation and Pollution

There is potential for contaminant mobilisation on site through the use of fuels and chemical including diesel and other petroleum-based fuels and lubricants (URS, 2009). Contamination may result from the spillage and/or leakage of hydrocarbons or oils may occur during dispensing of hydrocarbons.

Potential adverse impacts from spillage and/or leakage of hydrocarbons or oils may include: contamination of ground (soil); contamination of surface water, marine water and groundwater; cause flammable and explosive hazards; create acute and/or chronic toxic hazards and loss of habitat, death of fauna and flora.

6.5 Dewatering of Excavations and Discharge to Surface Drainage Lines

Groundwater monitoring across the LNG Facility (refer to Section 8.6 of the EIS) indicated higher background levels of dissolved metals in both near-surface and deeper aquifers.

7 STORMWATER AND EROSION AND SEDIMENT MANAGEMENT

7.1 General Approach

The main objectives of developing erosion and sediment control measures are to prevent controllable erosion and minimise the adverse impacts of sediment transport. The basic principles for the implementation of erosion and sediment control measures are to:

- minimise clearing and limit the extent of exposed earth (disturbed area);
- divert upslope water around disturbed areas;
- minimise velocity and volume, and control the direction of water run-off;
- minimise erosive effects of wind and water on exposed soil;
- perform rehabilitation works as soon as possible;
- trap sediment as close to the source as possible;
- limit the need for permanent sediment traps;
- preserve existing ground cover; and
- meet regulatory limits.

This section describes the methods that will be implemented to control stormwater, erosion and sedimentation related issues. The sections are listed in order of priority, with erosion prevention preferred over the treatment of sediment laden water.

7.2 Construction Erosion & Sediment Control Plans (ESCP's) (Stage 1 – Early Works)

Concept Stormwater Management Plans are provided in **Appendix 4**.These plans show indicative stormwater management controls for major phases of the Stage 1 – Early Works. The phases described in the Construction ESCP's (Stage 1 – Early Works) may be concurrent (overlap) between the defined phases; the Appendix includes:

- Phase 1:Program Dates09-May-11 to 08-Nov-12;
- Phase 2:Program Dates:26-May-11 to 26-Jul-11;
- Phase 3:Program Dates:03-Jun-11 to 24-Nov-11;
- Phase 4:Program Dates:30-May-11 to 04-Aug-12;
- Phase 5: Program Dates:15-Mar-11 to 29-Sep-12;
- Phase 6:Program Dates: 06-Jul-11 to 02-Mar-12;
- Phase 7: Program Dates: 15-Jun-11 to 16-Nov-12;
- Phase 8: Program Dates: 20-Jul-11 to 29-Nov-12; and
- Phase 9: Program Dates: 06-Aug-11 to 29-Nov-12.

Construction Erosion & Sediment Control Plans (ESCP's) are planning documents which clearly show the site layout and the approximate location of erosion and sediment control structures onsite which will be developed and implemented. ESCP's provide the overall context of erosion and sediment control in an area to which more specific management documents (Work Instructions / Work Method Statements) can be developed. ESCP's will be developed for all work areas prior to commencing activities.

Project Engineers, Superintendents, Foremen and the PEMR will be responsible for the development and implementation of ESCP's onsite. This will ensure that erosion and sediment management is incorporated into the planning phase of activities. However, it is expected that minor adjustments to ESCP's will be required onsite to complement activities.

All ESCPs will be controlled and allocated an appropriate revision number. A list of the status of the ESCP's will be maintained and is provided in **Appendix 3**. ESCP's will be regularly reviewed as site conditions change and flow paths are altered (e.g. the reshaping of drainage lines to direct sediment laden runoff to sediment basins). ESCP's will generally be prepared on detailed drainage diagrams and will incorporate the following aspects:

- details regarding the implementation period and staging;
- a layout of the site, including the location of access roads, ancillary infrastructure, stockpile locations, protected vegetation and disturbed (cleared) areas;
- the location of temporary and permanent erosion and sediment control measures proposed to treat stormwater prior to discharge (including vegetated treatment systems);
- design criteria for control measures; and
- approval and signoff from Deputy Project Manager (DPM) and PEMR.

7.3 Risk Assessment

The identification of the significant environmental aspects and impacts that could eventuate during construction of the Project is central to the selection of appropriate environmental safeguards. Construction Erosion & Sediment Control Plans (ESCP's) are developed based on the site specific risks as described in Section 4.4 of the 'Best Practice Erosion and Sediment Control Guideline' (IECA, 2008). Site specific (locally adopted) risk assessment is undertaken based on the Gladstone Rainfall Intensity-Frequency-Duration (mm/hr) and soil conditions including higher risk erosion areas as well as salinity, sodicity and dispersiveness.

Risk assessment is applied to the selection of controls during Stage 1 – Early Works. In particular the sediment basin sizing is based on the ICEA (Australasia) method, for example:

- Sediment basin design requirement: less than 33% of soil finer than 0.02mm and no more than 10% of soil dispersive (type C basin will be used). Drainage catchment area calculated for each sediment basins (in m2) and side slopes H:1 is 2.00).Relevant controls including rock check dams, silt fences, clean water diversion will be utilised to intercept particles prior to entry into the basin;
- A_s= 3400 H_e(Q) where A_s = surface area of settling pond at the base of the settling zone 9m2); H_e = Hydraulic Efficiency Correction Factor; and, Q = Design Flow Rate (m^3/s);
- Hydraulic Efficiency Correction Factor: He = 1.2 (refer to Table B3, IECA, 2008);
- The Design Flow Rate is based on the peak discharge for the 1 in 1 year ARI event, 35.3mm/hr.

7.4 Construction Activities and Erosion and Sediment Controls

7.4.1 Description of Earthworks Activities

Vegetation Clearing

The environmental impact to surrounding areas shall be kept to a minimum during site preparations work. No clearing is permitted outside the limits of work. The entire area within the limits of clearing will be cleared of all materials above or at the natural ground surface. Materials to be cleared include timber, brush, rubbish and vegetation. Trees outside of the limits of clearing will be protected during construction. Any trees, shrubs and overhanging branches to be left undisturbed shall be clearly marked. This marking will be carried out prior to clearing operations reaching the areas concerned.

The entire area within the limits of clearing shall be grubbed of all stumps, large roots, and other material and/or decayed vegetable matter, to a depth of not less than 600 mm below natural grade.

When tree stumps are present, grubbing will extend to the full depth. Stumps and roots below ground surface will be retained within and directly adjacent to waterways for as long as practical.

Macmahon will chip and mulch cleared vegetation. It is estimated that the vegetation density will produce an average mulch volume of approximately 1000cm/hectare. Macmahon will stockpile excess mulched vegetation at a nominated stockpile location outside of the bulk earthworks footprint as approved by Bechtel. Macmahon may separately stockpile mulch in sufficient quantity to perform re-vegetation, slope protection and landscaping work. All mulch stockpile(s) will be neatly shaped and contoured. Macmahon will develop a procedure for handling the mulch in accordance with local practice and submit it to Bechtel for approval.

Alternatively to chipping and mulching the full quantity of cleared and grubbed vegetation, Bechtel may request Macmahon to shear and stack a portion of the cleared vegetation around the perimeter of the clearing zones to act as a natural habitat to disturbed wildlife. All sheared and stacked vegetation shall be neatly shaped.

Stripping and Topsoil Management

The areas within the limits of stripping indicated on the drawings will be stripped of all topsoil containing organic matter, roots, debris and other material, to a depth of not less than 600 mm below existing grade (GLNG Project Specification for Site Preparation and Earthwork, Rev 002). The actual extend of stripping shall be determined by Macmahon in consultation with Bechtel's Field Geotechnical Engineer during construction. All stripping material will be removed to the designated onsite disposal areas.

Good topsoil materials as described in AUS-SPEC 'Queensland Construction Specification C273 Landscaping' from stripping will be stored in separate stockpiles. Stockpiles will be protected from erosion by wind/weather, and where necessary by drainage ditches. Stockpiles will be a maximum of 3m high. If the stockpile is to be retained for a period of more than six (6) months, the stockpiles will be deep ripped and sown with seed etc. as per the Bechtel CEMP.

Stockpiling will be carried out in a manner which ensures that the properties of the topsoil are not permitted to degrade such that it becomes unsuitable as planting media. To assist preservation of planting media, the following provisions in the management of topsoil stockpiles will be implemented where practicable: a) limiting the height of stockpiles to 3 metres; b) limiting the width of the base of stockpiles to 10 metres; c) adopting batter slopes, protective covers and drainage which reduce potential for erosion and/or segregation; d) limiting the period of stockpiling to a minimum practical time; and e) carrying out herbicide spraying or other treatment of the stockpile at intervals required to prevent weed growth and ensure the stockpile faces are weed-free prior to use.

Excavation

Excavations shall be made to secure clean, neatly formed surfaces of undisturbed soil and rock according to lines and elevations shown on Project drawings. Macmahon will be responsible for maintaining all open slope excavations in accordance with Queensland Safety and Health Regulations and the method of excavation will be undertaken in accordance with Department of Transport and Main Roads (2009) Main Roads Technical Standard, MRTS04, General Earthworks.

Excavations shall be constructed to the shapes, lines, dimensions and other requirements shown on the drawings. The use of excavated material in the construction of embankments shall be subject to the requirements of Clause 14 of MRTS04. Material within the lines of cuttings which is identified as Unsuitable Material in accordance with the provisions of Clause 9.2 of MRTS04 will not be used in the construction of embankments.

Slope Protection and Road Embankments

Macmahon will supply and install cut batter slope protection measures to the type and extents specified and shown on the Project Drawings or as requested by Bechtel following geological mapping of the excavated surfaces. The following will be installed as per the details shown on the

Drawings or where requested to do so by Bechtel: batter chute drains; bench safety berms; geotextile fabric, rip rap (imported); filter rock (imported); rock armour (imported); and the application of hydro-seeding.

Road embankments will be compacted in successive layers for the full width of the cross-section and in lengths to suit the sprinkling and compaction methods utilised. Layers will be constructed paralleled to the finish grade, with a minimum cross slope of 20 mm/meter.

Interceptor ditches shall be constructed beyond the limits of excavated slopes in order to prevent surface run-off from eroding the slopes and/or entering the area of the Works. They shall be constructed such that the water contained in the drain shall be no closer than five (5) metres from the top of the excavation slope.

Interception Drains / Permanent Stormwater Diversion Ditch

Interception drains will be constructed to gradients that will not permit ponding of water. To prevent the accumulation of water in the drains, they shall, at intervals, be directed away from the excavation slope so as to discharge onto natural ground or into natural creek systems.

Macmahon will construct clean water interceptor ditches above cut batter slopes at the locations and details specified and shown on the Drawings or as requested by Bechtel. Interception drains will be constructed by excavating on the lowest side of the drain area and forming and compacting a bank on the highest side so that run-off flows on the natural ground above the earth bank. Measures shall be taken to ensure the discharge of water onto natural ground or into natural creek systems does not cause erosion of the ground.

For definition purposes the permanent perimeter open channel drainage ditch has been broken into three sub-sections; Eastern Section which starts from behind the main flare area and discharges under the Module Haul Road; Western Section which starts from behind the main flare area and discharges at the Jetty; and the Module Haul Road section which runs along the length of the Module Haul Road discharging at the MOF and at a natural creek system halfway along the Module Haul Road. The perimeter open channel ditch sections shall be constructed as per the extents, lines, levels and details shown on the Project Drawings.

Permanent Sediment Ponds

Macmahon will construct the permanent sedimentation ponds to manage and control sediment loaded runoff discharge from the Jobsite, as well as store rainfall runoff for use as construction water as early as practically possible. The sedimentation ponds have been labelled as; Sedimentation Pond #1; Sedimentation Pond #2, and Sedimentation Pond #3. Sedimentation Ponds shall be constructed as per the extents, lines, levels and details shown on the Drawings.

Earth Dikes for Tanks, Ponds and Basins

Embankments for earth dikes for tank farms, temporary runoff containment ponds, raw water storage ponds, non-toxic water storage points, and similar impoundments are classified as impervious fill and shall be compacted according to GLNG Project Specification for Site Preparation and Earthwork (Document No. 3PF-CG00-F0001) (Bechtel, 2009).

Roads

Macmahon will construct the road to the lines, levels and as per the details shown on the Project Drawings. It shall include subgrade preparation, mass and detailed earthworks including final trimming, supply and installation of select fill, supply and installation of service conduits, supply and installation of granular fill, supply and installation of geogrid, supply and installation of imported sub-base and base course pavements, supply and application of prime coat and two coat chip seal, supply and installation of safety guard rail, application of line marking and the supply and installation of road furniture as per the details shown on the Drawings.

7.4.2 Drainage Control

Effective drainage controls form the basis of all erosion and sediment control measures. Stormwater / site runoff will be controlled using best-practice methods, which includes stormwater/site runoff being diverted around active disturbed work areas where possible or within the site to sediment control devices. Clean water from outside the works should be diverted into the natural drainage system by the installation of diversion channels and perimeter banks. The structures are to be designed and placed in accordance with relevant best-practice guidelines, so as to minimise the accumulation and velocity of run-off waters. Commonly used drainage structures are summarised in **Appendix 3** and described below:

- grass drains, channels and swales, which prevent scouring and promote sediment retention; and other protective measures such as rock-lining, rock mattressing, reinforced grass channels, and/or geo-synthetic lined channels;
- rock check dams to reduce flow velocity and minimise erosion;
- where required rock aprons will be implemented as scour protection at drainage outlets;
- where required, under-road culverts should be provided to prevent vehicles driving through drainage lines and creating turbid water;
- diversion banks constructed by pushing soil from the lower side of the slope - this results in flatter, more stable structures, by preventing disturbance of natural surface at the base of the drain, and creating a bund consisting of natural surface soils, which are more likely to revegetate; and
- grader or dozer cut V-drains which are suitable for minor catchments where erosive velocities can be kept low.

7.4.3 Erosion Control

Erosion control measures will be implemented during the earthworks phase of activities. Erosion control measures will be inspected and their effectiveness reviewed during earthworks and the necessary changes made to ensure the effectiveness of the erosion control measures. Common erosion control methods are summarised in **Appendix 3**.

The main batters will need to be protected from erosion through the use of grass/mulch, geo-synthetic lining or rock rip-rap.

7.4.4 Sediment Control

Sediment mobilised during earthworks activities may enter surface water runoff during rainfall events. Measures will be implemented to prevent sedimentation of off-site waterways through the use of appropriate surface water management measures such as silt fences or formal drainage lines discharging to sediment ponds. Topsoil will be graded and revegetated in order to limit erosion so the overall impact of sedimentation from soil stockpiles is considered to be low.

A flexible and fast response is needed to cater for the changing conditions on site. It is appropriate to determine the required measures and review when implementing on site. Where site and/or environmental conditions change, the current control measures are to be reviewed, and managed in accordance with these changes. Sediment control methods are summarised in **Appendix 3**.

Bechtel has proposed several sediment control basins that will be completed at the end of construction Stage 1 – Early Works (**Appendix 1)**. The Appendix 1 drawing includes the location of the sedimentation basins, details and sizing of basins and site drainage plans. During Site Civil works these sedimentation basins will be progressively developed and utilised until they achieve their final configuration.

The temporary and final sediment basins have been designed as per the Australian Best Practice Erosion and Sediment Control (International Erosion Control Association Australasia, 2008). The

basins have been designed to operate as continuous flow settling basins to produce high quality outflows during 1 in 1 ARI rainfall events, but should allow the continuing trapping of course sediment during less frequent heavier rainfall events (greater than 1 in 1 ARI). The final emergency spillway on all sedimentation basins has been designed for a 1 in 50 year ARI event. During construction the volume that the sedimentation basins can handle will be reduced so that the emergency spillway capacity will be for a 1 in 10 year ARI. Any rainfall event greater than a 1 in 10 year ARI may result in the sedimentation basin overtopping and an exceedance in nominated water quality parameters.

7.4.5 Discharge Locations

Stage 1 – Early Works stormwater discharge locations are shown on Figure 5and coordinates (±25 m) of the discharge points in Table 7-1 (**Appendix 9)**. These points, designated by letter labels (I and O were skipped to avoid confusion), are the natural existing channels that will be used for discharging stormwater until the final 7 stormwater discharge points are constructed. The discharge points are grouped by drainage areas and all will eventually cease discharging as the final 7 discharge points are completed and stormwater is diverted into those points. Note, in some cases one of the temporary discharge locations may become a final discharge point when the designed stormwater discharge structures are finalised.

The final 7 stormwater discharge points will be completed at different times and the dates when discharge from the temporary points is expected to cease and water be diverted to a final discharge point is also shown on Figure 5.Note, not every ‘phase’ of construction is included in the discharge point schedule because some construction phases are inland and do not directly affect management and maintenance of the temporary discharge points.

All temporary discharge points will have best management practices installed in the watershed and along the watercourse as judged necessary by on-site environmental staff per IECA guidelines. Whenever stormwater from areas affected by construction is discharged at the temporary discharge points they will be monitored per Table 5.

Figure 7-2 (**Appendix 9)**shows the location and coordinates (±25 m) of the final 7 stormwater discharge points that will be constructed during Stage 1 Early Works and put into operation. The date that each discharge point is expected to be fully functioning is also shown in Figure 7-2. In some cases a final stormwater discharge point may be put into operation, but nearby temporary discharge points will still be used until the topography/landform is correct to divert all stormwater to the final discharge point.

7.5 Summary of Environmental Control Measures

Table 4 summaries environmental control measures relating to stormwater management including responsibility for the implementation of the management measure.

Table 4: Management Measures

ID	Management Measures	Record	Reference	Responsibility
ES01	An Erosion and Sediment Control Plan must be developed and implemented for all stages of the petroleum activities and which has been certified by a Certified Professional in Sediment and Erosion Control, or a professional with appropriate experience and or qualifications accepted by the administrating authority.	ESCP	F1 EA (DERM)	PEMR Project Manager Bechtel ES
ES02	Appropriate measures to achieve compliance with condition (F1) for the petroleum activity must be described in the EM plan and include: (1) to (8) of the EA.	ESCP	F2 EA (DERM)	PEMR Project Manager Bechtel ES

ID	Management Measures	Record	Reference	Responsibility
ES03	Erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment and contamination of stormwater.	ESCP	F3 EA (DERM)	PEMR / Project Manager / Bechtel ES
ES04	In addition to Part A, Condition (C1), the only contaminant(s) permitted to be released directly to any waters from the petroleum activities authorised on the petroleum facilities licence are the following releases to Port Curtis: Stormwater via discharge points SW1, SW2, SW3, SW4, SW5, SW6 and SW7 to Port Curtis, Appendix 2 – Figure 3: Plan C Air and Water Discharge Points Port Curtis Island Australia during Stage 1 – early works Uncontaminated stormwater via discharge points SW1, SW2, SW3, SW4, SW5, SW6 and SW7 to Port Curtis, Appendix 2 – Figure 3: Plan C Air and Water Discharge Points Port Curtis Island Australia during Stage 2 – construction works	ESCP	BC3 EA (DERM)	DPM Bechtel ES
ES05	The release of contaminants to waters must only occur from the release points specified in Schedule BC – Table 1: Contaminant Release Points. *Macmahon Note: No discharges to the stormwater / creek systems from site without prior written approval from the PEMR (who will liaise with Bechtel). Discharge from the sediment pond will be in accordance with the approved levels of discharge.*	-	BC7 EA (DERM)	DPM Bechtel ES
ES06	The release of contaminants to waters must not exceed the release limits stated in and monitored at the locations specified in Schedule BC – Table 3: Stormwater Release Limits (excluding stage 2 – construction works).	-	BC8 EA (DERM)	DPM Bechtel ES
ES07	The holder of this environmental authority must ensure that sediment and erosion control is conducted and implemented in accordance with the Stormwater Management Plan and the Erosion and Sediment Control Plans developed in accordance with Conditions (BC13), (BC14), (BC15), (BC16), Part A - (A11) and Part A - (F1) and (F2).	-	BC18 EA (DERM)	Bechtel ES
ES08	Water velocities through temporary diversions around the works area must not be increased above pre-work velocities during such diversions, and must be re-instated once petroleum activities are completed.	-	BC19 EA (DERM)	Bechtel ES PEMR
ES09	The release of contaminants from the stormwater discharge points to waters must be monitored at the locations and for each quality characteristic and at the frequency specified in Schedule B – Table 3: Stormwater Release Limits (excluding stage 2 construction works).	-	BC20 EA (DERM)	DPM Engineers PEMR Bechtel ES
ES10	The release of contaminants from the stormwater discharge points to waters must not exceed the release limits stated in Schedule BC – Table 3: Stormwater Release Limits for each quality characteristic (excluding stage 2 construction works). *Note: Refer to Schedule BC – Table 3: Stormwater Release Limits (excluding stage 2 – construction works)*	-	BC21 EA (DERM)	Project Manager Engineers PEMR Bechtel ES
ES11	The background turbidity must be calculated using the 80th percentile of a statistically valid data set from any one monitoring point specified in Schedule BC – Table 4: Port Curtis Background Turbidity Monitoring Points obtained the day prior to the commencement of release from the release points SW1 – SW7.	-	BC22 EA (DERM)	Bechtel ES
ES12	The monitoring point selected to determine the background turbidity in accordance with condition BC 22 must be the monitoring point most representative of the receiving environment (i.e. China Bay) and not affected by dredging activities.	-	BC23 EA (DERM)	Bechtel ES
ES13	The holder of the environmental authority must maintain records of the data used in calculation of background turbidity and make available to the administering authority upon request.	-	BC24 EA (DERM)	Bechtel ES GLNG

ID	Management Measures	Record	Reference	Responsibility
ES14	The Erosion and Sediment Control Plan required by Part A – Conditions (F1) and (F2) must include but not necessarily be limited to: (a to i of the EA).	-	BC25 EA (DERM)	Bechtel ES PEMR
ES15	Notwithstanding Part A – Conditions (F1) and (F2) and Part B – Condition (BC24), Stage 1 – Early works and Stage 2 - Construction works must include the implementation and maintenance of erosion protection measures and sediment control measures, including but not necessarily limited to: (i to ix of the EA)	-	BC26 EA (DERM)	Bechtel ES PEMR
ES16	Notwithstanding Part A – Conditions (F1) and (F2) and Part B – Condition (BC25), Stage 1 – Early works and Stage 2 - Construction works must include the stabilisation of slopes and areas of high erosion potential by implementing and maintaining measures including but not limited to: (a to iv of the EA).	-	BC27 EA (DERM)	Bechtel ES PEMR
ES17	During Stage 1 – Early works and Stage 2 - Construction works vehicle access to salt marshes, mudflats, mangroves and riparian zones is prohibited unless authorised under a separate approval. Note: A separate approval would include a Prescribed Tidal Works Approval or Marine Plants Disturbance Approval.	-	BC28 EA (DERM)	Bechtel ES PEMR
	During Stage 1 – Early works and Stage 2 - Construction works inlet and outlet filters must be installed and maintained to prevent the clogging of existing stormwater drains and to prevent the release of gross pollutants.	-	BC29 EA (DERM)	Bechtel ES PEMR
ES19	During Stage 1 – Early works and Stage 2 - Construction works must include the installation and maintenance of erosion control measures to prevent scouring at outfall locations, including but not limited to pipes, culverts and sediment basins. Erosion control measures are to include but not, necessarily be limited to: (a) matting; (b) gravel check dams; and (c) rock armouring.	-	BC30 EA (DERM)	Bechtel ES PEMR
ES20	Degraded sediment control structures and stormwater control devices are to repaired and replaced immediately upon identification in the monitoring and maintenance program required by Part B – Condition (BC25).	-	BC31 EA (DERM)	Bechtel ES PEMR
ES21	Sediment basins must be designed and maintained in accordance with the guideline “Best practice erosion and sediment control, International Erosion Control Association 2008” and supporting documentation as updated from time to time.	-	BC32 EA (DERM)	Bechtel ES PEMR
ES15	ESCPs (project drawings) detailing key information relating to sediment and erosion control will be maintained, communicated and displayed throughout the duration of the project. The project drawings will be updated to reflect the different phases in the construction activities on site or where changes in control measures are required. Drawings will show as a minimum: drainage paths; vegetation; stockpiles (topsoil, excavated material, etc.); stormwater drains; receiving waterways; location and types of sediment and erosion control measures; and legend (including standard symbol for control measures).	ESCPs	Macmahon	PEMR
ES16	Open excavations will be bunded and/or provided with effective cut-off or diversion drains on their perimeter (where required) to divert overland stormwater runoff away from the excavation.	Inspection Checklist	Macmahon	PEMR
ES17	Diversion drains shall be installed prior to significant land disturbance and around stockpile sites to divert runoff from undisturbed areas into stable drainage lines at non-erosive velocities.	Inspection Checklist	Macmahon	PEMR
ES18	Exposed soil, batters and other erosion sensitive areas will be adequately protected through velocity reduction, covering, grassing or water diversion.	Inspection Checklist	Macmahon	PEMR
ES19	Silt fencing will be installed around the perimeter of exposed soil stockpiles and at the toe of exposed batters.	Inspection Checklist	Macmahon	PEMR
ES20	Ensure all temporary erosion and sediment control devices are decommissioned and removed.	Inspection Checklist	Macmahon	PEMR

ID	Management Measures	Record	Reference	Responsibility
ES21	Areas of high erosivity shall be cordoned off and tracks and access roads shall be marked using star pickets, wire and marked with tape. Locations are to be marked on the site plan.	Inspection Checklist	Macmahon	PEMR
ES22	Erosive potential of runoff on disturbed areas shall be reduced through use of bunds and/or cut-off drains across the contour. This shall reduce the distance of overland flow and convey water to stable drainage lines at a non-erosive velocity.	ESCPs	Macmahon	PEMR
ES23	Access roads shall be clearly indicated. Movement of vehicles will be restricted to access tracks and designated roads.	Inspection Checklist	Macmahon	PEMR
ES24	The amount of stormwater leaving the site shall be minimised through onsite storage and reuse. For example, in construction activities, dust suppression and revegetation.	-	PEMR	PEMR
ES25	All construction fill and stored materials shall be situated in approved storage areas. These areas shall have cut-off and diversion drains to divert runoff, be located on flat land, bunded and away from drainage lines.	Inspection Checklist	Macmahon	PEMR
ES26	Alternative drainage paths shall be provided where permanent or temporary works impact existing drainage paths. These paths shall be designed, constructed and maintained to ensure non-erosive velocities. If a significant storm event occurs before construction of new flow paths are complete, existing or alternative drainage paths shall be provided.	ESCPs	Macmahon	PEMR
ES27	Drainage channels which exhibit steep slopes will have (if necessary) check dams/batter drains so as to control potential for gully erosion and minimise overland flow velocities.	ESCPs	Macmahon	PEMR
ES28	Sediment fences will not be removed until disturbed areas have been stabilised.	-	Macmahon	PEMR
ES29	Revegetation measures will be carried out as soon as practicable on post development exposed areas.	-	Macmahon	PEMR
ES30	Water held in sediment control basins may be treated as necessary before release. Flocculation of sediment laden water, if used, will be in accordance with an approved Flocculation Procedure. Gypsum will be the preferred flocculent. Flocculation by any other chemical must be approved by the PEMR before approval for use.	Sediment Basin Flocculation Record	Macmahon	PEMR
ES31	Gypsum will be applied at a rate appropriate to the level and type of sediment in the water. Flocculation will only be used on waters that will not settle within an acceptable time frame, acceptable time frames being dependent upon the prevailing weather conditions, and the level of water in the basin.	Sediment Basin Flocculation Record	Macmahon	PEMR

8 MONITORING, INSPECTION & AUDITING

8.1 Monitoring and Inspection

Erosion and sediment related monitoring and inspection will be undertaken according to the monitoring measures summarised in **Table 5** Summary of Monitoring Measures. Normally, routine inspections of the site will be performed on a daily basis when active construction activities are taking place. Active construction areas will be inspected at least once per week. An example Erosion and Sediment Control Inspection Checklist is provided in **Appendix 7**.

Water quality monitoring will be undertaken at the discharge locations in Figure 5 and Table 7-1 od **Appendix 9**. The sampling locations should be representative of where the site discharge mixes with the receiving waters.

Table 5: Summary of Monitoring Measures, Trigger Values and Corrective Actions

Monitoring Measure	Responsibility	Frequency[1]	Trigger / Value	Record	Corrective Action on Exceedance of Trigger Value
Inspection of silt fences, erosion and sediment control devices, disturbed areas, topsoil stockpiles.	PEMR	Daily.	Structural integrity is retained.70% of capacity of sediment fences remains, and 50% of capacity for drop inlet structures remains.	Daily Erosion and Inspection Form	Maintenance to restore capacity of erosion and sediment control device and to address source of instability. Other corrective actions as appropriate (determined on a case-by-case basis).
Inspection of the integrity of diversion bunds, silt fences, and stormwater drainage channels to verify their condition and effectiveness.	PEMR	Weekly. In response to rainfall events (>25mm in 24 hours (maximum once per day).	Structural Integrity is Retained.70% of capacity of sediment fences remains, and 50% of capacity for drop inlet structures remains.	Weekly Erosion and Sediment Inspection Checklist	Maintenance to restore capacity of erosion and sediment control device and to address source of instability.
Inspection of stormwater discharge outlets from site.	PEMR	Weekly. In response to rainfall events (>25mm in 24 hours) (maximum once per day).	No off-site build-up of sediment in waters, roadside gutters, stormwater drains or land. No off-site scouring to the bed or banks of any watercourse or land.	Inspection Checklist	Inspect erosion and sediment control measures in the catchment draining to the stormwater discharge to ensure they are functional and that the capacity is retained. Undertake maintenance or repairs as necessary. Review the adequacy of the installed sediment and erosion control measures in the catchment draining to the stormwater discharge, and assess whether additional measures could be practicably implemented.
Inspection of the integrity and capacity of sedimentation basins.	PEMR	Weekly.	Accumulation of gross pollutants (litter and waste). Sediment accumulation such that 70% of capacity of sediment basin.	Inspection Checklist	Remove accumulated gross pollutants and sediment to restore capacity of sediment basin.

Monitoring Measure	Responsibility	Frequency[1]	Trigger / Value	Record	Corrective Action on Exceedance of Trigger Value
Water acidity/alkalinity	PEMR	Following commencement of stormwater discharges from site (maximum once per day).	pH <6.5 or pH >8.5 (based on project's Acid Sulfate Soil Management Plan)	Surface Water Monitoring Form	Inspect ASS treatment areas or other potential acid generating activities to verify leachate and runoff controls are in place.
Monitor turbidity in stormwater discharges from the LNG facility site to Port Curtis (at discharge locations). Monitoring to be undertaken by in-situ measurements of turbidity (NTU value).	PEMR	Following commencement of stormwater discharges from site (maximum once per day).	The turbidity of stormwater releases from sediment basins must be <10% higher than the 80th percentile turbidity measured in the receiving environment on the day prior to the commencement of releases [2] The receiving water monitoring points are provided in Schedule BC Table 4 of the Environmental Authority.	Surface Water Monitoring Form	Inspect erosion and sediment control measures in the catchment draining to the stormwater discharge to ensure they are functional and that the capacity is retained. Undertake maintenance or repairs as necessary. Review the adequacy of the installed sediment and erosion control measures in the catchment draining to the stormwater discharge, and route runoff to sediment basins for treatment prior to discharge.
Monitor total petroleum hydrocarbon (TPH) by grab sample at stormwater discharge points	PEMR	Following commencement of stormwater discharges from site (maximum once per day).	Observable sheen (TPH >10 mg/l).	Surface Water Monitoring Form	Inspect upstream construction area for spills to ground/water and clean contaminated water with absorbents and/or remove contaminated soil.
Monitor TSS and Total and Dissolved Heavy Metals (Aluminium, Iron, Arsenic, Chromium, Copper, Manganese and Vanadium) by grab sample at stormwater outlets from sediment basins during releases	PEMR	Following commencement of stormwater discharges from site (maximum once per event).	Monitoring only. No limit specified	Surface Water Monitoring Form	N/A

Notes:

1. In-situ measurements to be taken where and when it is safe to do so: This includes occasions when:

a. Ferry access to the island is curtailed on account of severe weather.
b. Access to sampling points during heavy rain could only be achieved by walking. Under severe conditions, including significant runoff, it is not possible to safely access the remote areas of the site from the ferry landing area.

2. For controlled discharge points (sediment basins) for 0.5 of a 1 year, 1 hour rainfall event described in the IECA Guidelines (2008); does not apply to natural drainage channels.

8.2 Internal Audits

As described in the Environmental Compliance Plan, internal audits aimed at evaluating the conformance of the system, process or product, as appropriate, shall be carried out as detailed in procedure **Auditing Procedure (G-505)** by the Quality & Environmental Manager or Coordinator, who is independent of the project. The audit will specifically include compliance with this plan. Audits performed will be conducted as an independent environmental audit in general accordance with the relevant guidance specified in ISO 19011 - Guidelines for Quality and/or Environmental Management Systems Auditing.

The Quality and Environmental Manager will establish an Internal Audit Plan. An internal audit will be completed within the first three months of start-up and thereafter every 12 months (as a minimum). Audit reports will be issued to Macmahon Project Manager within two weeks of completion of the audit.

Any non-conformance identified during the audit shall be actioned in accordance with procedure **Non-conformance and Corrective Action Procedure (G-450)**. Management personnel responsible for the area shall take timely corrective action on the deficiencies found.

8.3 Corrective Actions

Any environmental non-conformance will be reported in accordance with procedure **Non-conformance and Corrective Action Procedure (G-450)**. Concessions or waivers shall be sought from Bechtel for the proposed corrective action for any non-conformance which varies the requirements of the Specification or Contract. The action taken shall be to a degree appropriate to mitigate any impacts caused and risks encountered. A **Non-conformance Register (G-449)** or similar shall be maintained to monitor the status of the Non-conformance raised. The table below lists example corrective actions. The source of the complaint or non-conformance shall be corrected as soon as possible and strategies implemented to reduce likelihood of incident occurring again. An incident/accident report form **Environmental Incident Details Form (G-051)** shall be completed if environmental impact had the potential to occur (refer to the Macmahon Environmental Compliance Plan and Bechtel Construction Environmental Management Plan).

Should it become necessary to revise the information and/or control measures described in this Plan because the measures are not adequate or in order to more effectively prevent erosion and sediment control or stormwater pollution at the site, the SMP will be amended as necessary. If the amendment includes changes to the stormwater routing design layout or to the calculations, these also will be updated as part of the amendment of the document.

8.4 Non-conformance Reporting

Any release of significant contaminates or any event where environmental harm has been caused or may be threatened shall be reported to Bechtel for further notification and distribution to GLNG, DERM and the proper authorities. Spills (e.g., fuel, hydraulic fluid) into the sea or waters flowing into the sea shall be immediately reported to the Gladstone Harbour Master (Maritime Safety Queensland).

9 REFERENCES AND RELATED DOCUMENTS

9.1 References

AUS-SPEC Queensland Construction Specification C273 Landscaping

Australian Government, Department of Sustainability, Environment, water, Population and Communities (2010); Approval, Development of a Natural Gas Liquefaction Park associated with the Gladstone LNG Project – EPBC No 2008/4057.

Bechtel (2009). Earthworks will be undertaken in accordance the GLNG Project Specification for Site Preparation and Earthwork (Document No. 3PF-CG00-F0001).

Bechtel (2010). Spill Prevention, Control, and Countermeasures Plan (GLNG Document Number: 3310-BTH-3.3.3.6832) (Bechtel Document Number: -100-G01-GHX-00032).

Bechtel (2010). Stormwater Management & Erosion & Sediment Control Plan (GLNG Document Number: 3310-BTH-3.3.3.6833) (Bechtel Document Number: -100-G01-GHX-00033).

Bechtel (2011) Acid Sulfate Soils Management Plan (GLNG Document Number: 3310-BTH-3.3.3.6503) (Bechtel Document Number: -100-GPP-GCE-00003).

Department of Environment and Resource Management (2009) Queensland Water Quality Guidelines, Version 3.ISBN 978-0-9806986-0-2.

Department of Environment and Resource Management (2010), Environmental Authority (Permit Number PEN101623910).Unpublished Document.

Department of Transport and Main Roads(2009) Main Roads Technical Standard, MRTS04, General Earthworks.

International Erosion Control Association (IECA) Australasia (2008).Best Practice Erosion and Sediment Control.

Queensland Government (2010). Coordinator-General's evaluation report for an environmental impact statement, Gladstone Liquefied Natural Gas—GLNG project Under Part 4 of the State Development and Public Works Organisation Act 1971, May 2010.

Santos (2009). Environmental Impact Statement Supplement GLNG Project (SEIS). Unpublished Document

URS(2009). Environmental Impact Statement GLNG Project (EIS). Unpublished Document.

9.2 Macmahon EMS Documents

Non-conformance and Corrective Action Procedure (G-450)

Legal and Other Requirements Procedure (G-395)

Archive Procedure (G-075)

Auditing Procedure (G-505)

Emergency Preparedness and Response Procedure (G-540)

Environmental Management Manual (G-097)

Appendix 1: Site Drainage Plan at Completion of Construction Stage 1 – Early Works (DWG 100-CG-0000-00009)

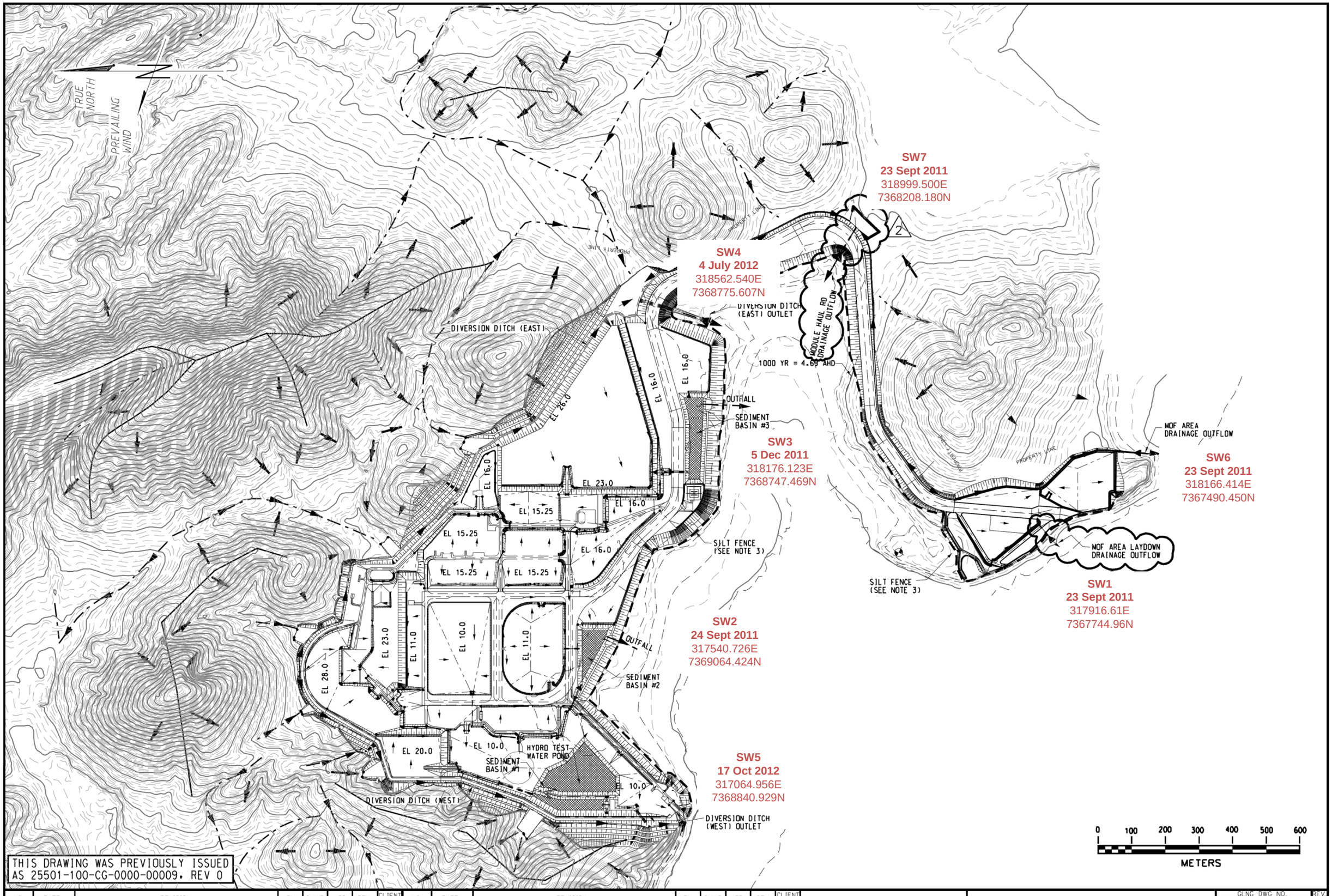

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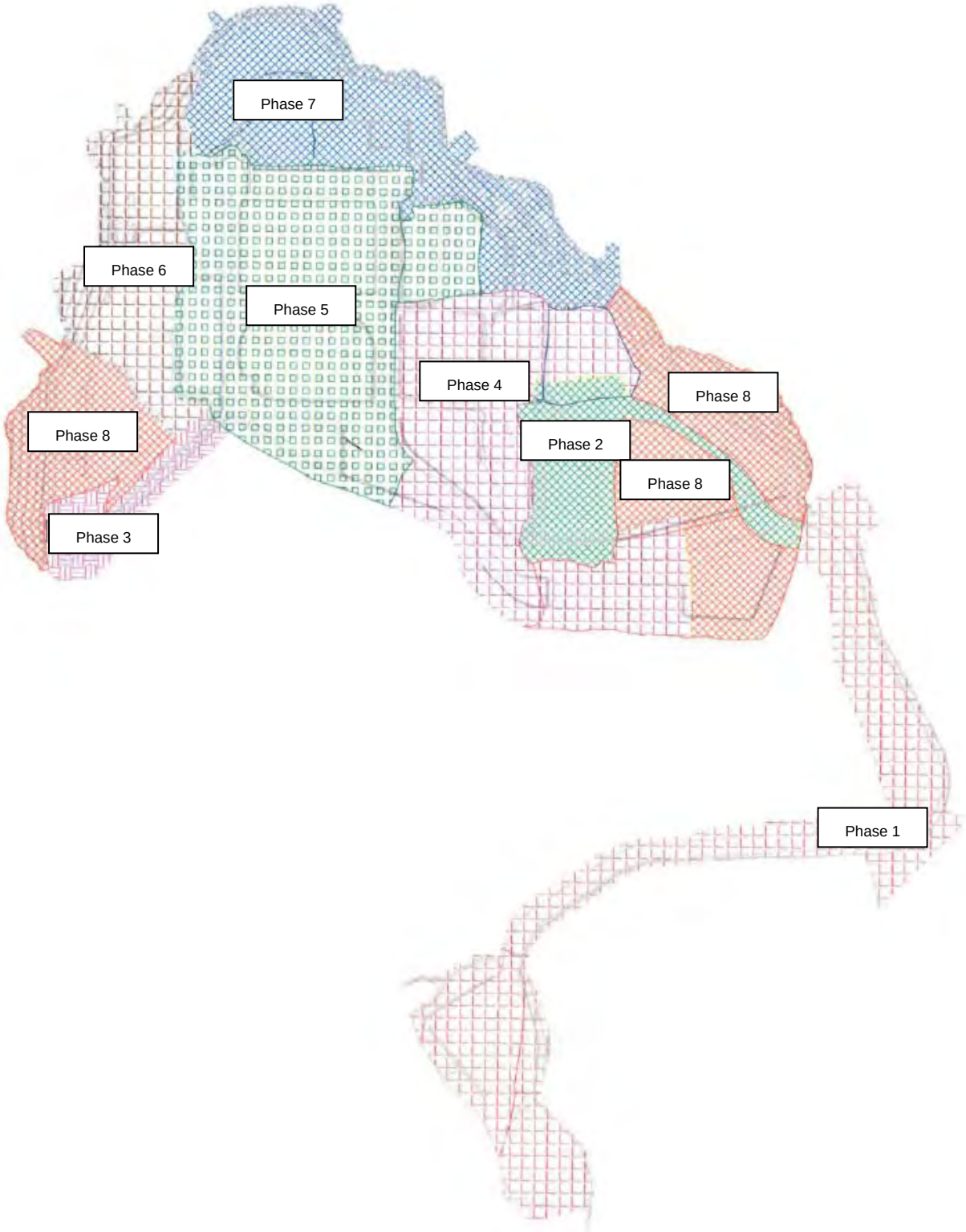
Fig. 7-2 Final Stormwater Drainage Point Locations

GLNG PROJECT — CURTIS ISLAND, AUSTRALIA

GLNG DWG NO.	REV.
	2
SCALE: 1:5000	
DRAWING NO.	REV.
	2

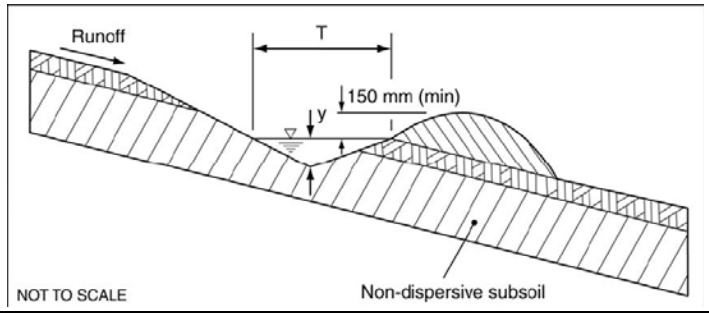
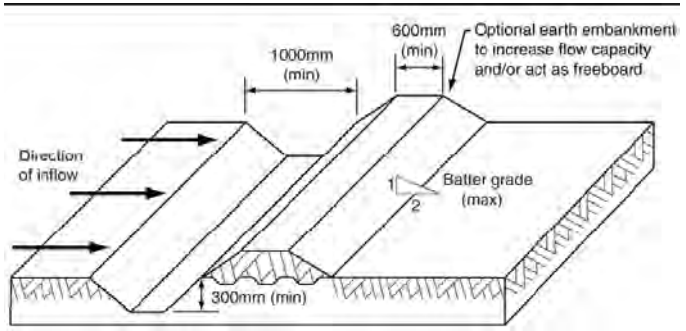
Appendix 2: Construction Phases (Sub-Staging Plan) (Stage 1 – Early Works)

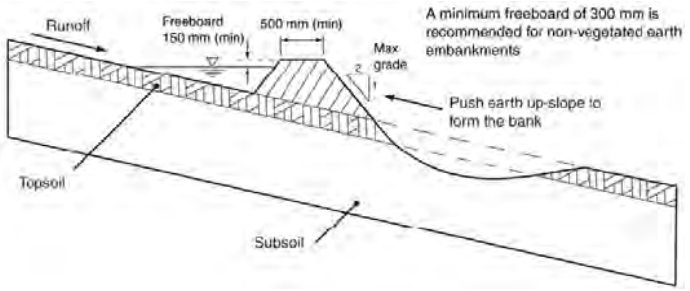
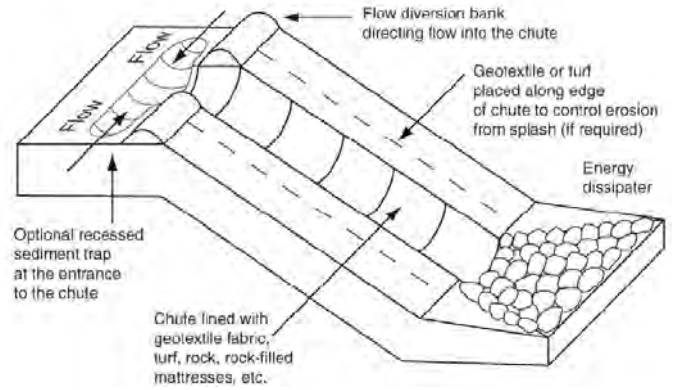
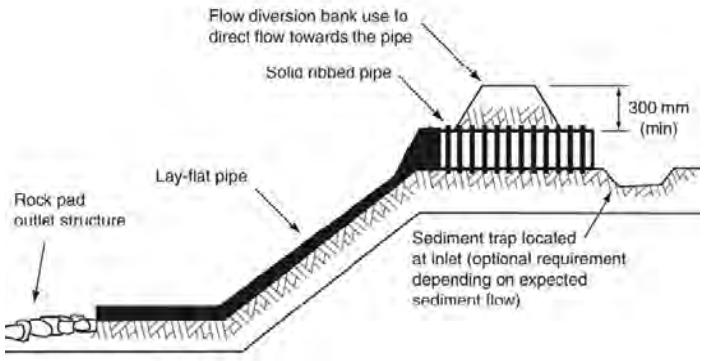
Phase nine (9) is not shown geographically and relates to the discipline specific activities of bitumen sealing to roads and completion of fencing works.

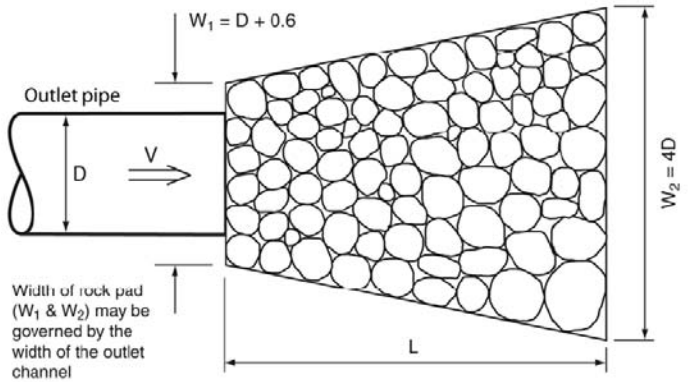
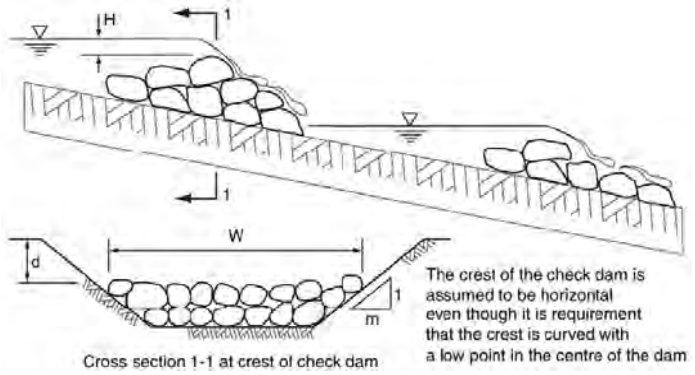


Appendix 3: Erosion and Sediment Control Techniques

Table: Drainage Structures and their Application

Control Measure	Typical Use	Symbol	Example Illustration	Reference
Catch Drain	Low-gradient drainage technique; The collection and diversion of sheet flow across a slope or around soil disturbance; and Best used in non-dispersive soils, otherwise the drain must be lined with non-dispersive soil (minimum 100mm thick) prior to placement of a channel liner.	→ CD →		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.
Diversion Channel	Low-gradient drainage technique; Diversion of large concentrated flows; and Permanent flow diversion channels.	→ DC →		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.

Control Measure	Typical Use	Symbol	Example Illustration	Reference
Flow Diversion Bank	Low-gradient drainage technique; Diversion of minor flows when in-situ subsoil's are dispersive or otherwise highly erodible;	→ DB →		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.
Chute	Steep-gradient flow diversion technique; Discharge of concentrated flows down steep slopes; Control of flow into Sediment Basins; and Temporary drainage down the face of newly formed road embankments.	→ CH →		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.
Slope Drain	Steep-gradient flow diversion technique; Discharge of minor flows down steep slopes; Discharge of minor flows through adjacent properties; and Discharge of minor flows through bushland and other areas where it is essential to minimise disturbance to vegetation and soil.	→ SD →		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.

Control Measure	Typical Use	Symbol	Example Illustration	Reference
Outlet Structure	Used at the end of Chutes and Slope Drains to dissipate flow energy and control scour; and Used as a permanent energy dissipater on pipe and culvert outlets.	OS		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.
Rock Check Dams	Velocity control structure for channels and drains; Best used only in drains at least 500mm deep with a gradient less than 10%; Should only be used in locations where it is known that they will be removed once a suitable grass cover has been established; and Can also be used as a minor sediment trap.	→ RCD →		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.

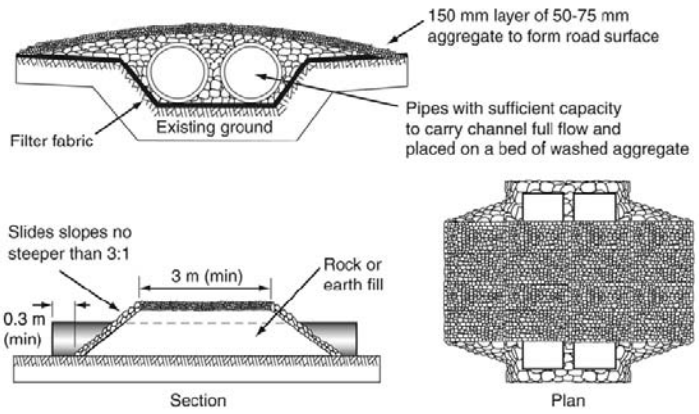
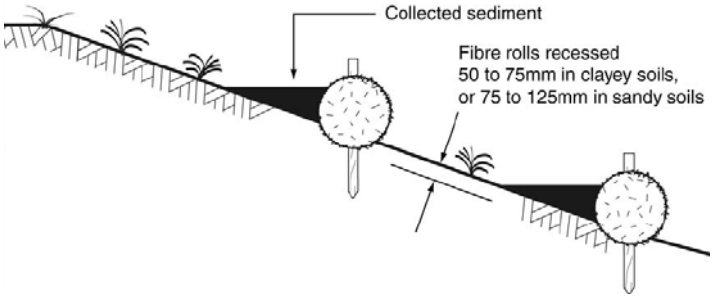
Control Measure	Typical Use	Symbol	Example Illustration	Reference
Fibre Roll	Velocity control structure for channels and drains; Used in wide, shallow drains where the logs can be successfully anchored down; Used in locations where it is desirable to allow the log to integrate into the vegetation, such as vegetated channels; and Can also be used as a minor sediment trap.	→ FCD →		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.
Culvert	Temporary Watercourse Crossing; Used in wide stream crossings; and Used when fish passage is not critical.	TCC		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.

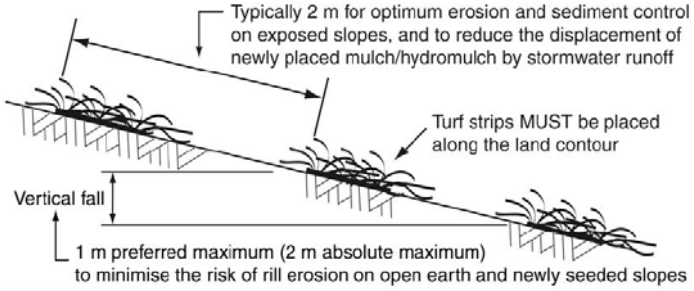
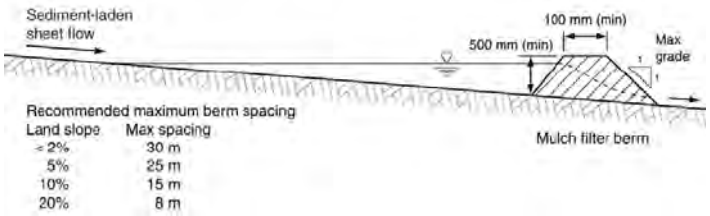
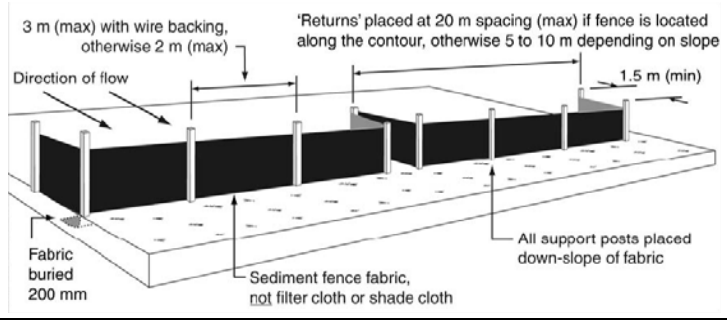
Table: Erosion Control Methods

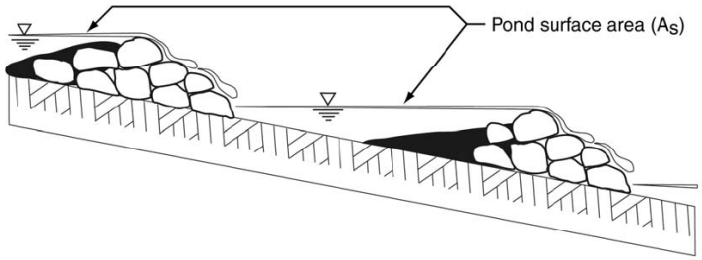
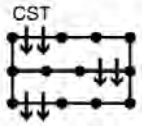
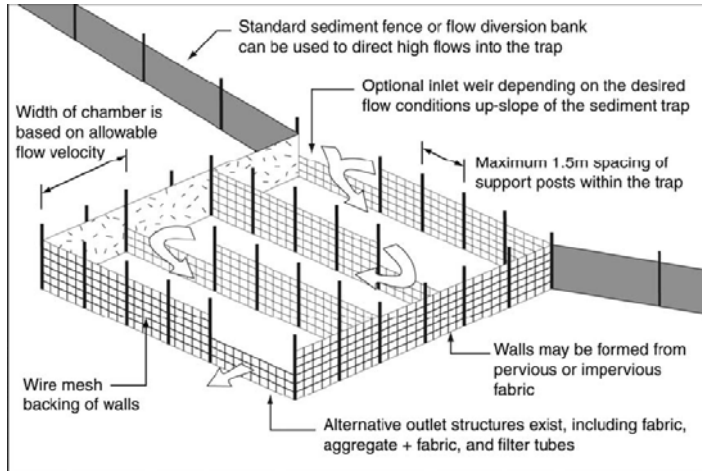
Control Measure	Typical Uses	Symbol	Example Illustration	Reference
Light Mulching	Control of raindrop impact erosion on flat and mild slopes. May be placed on steeper slopes with appropriate anchoring; and Control water loss and assist seed germination on newly seeded soil.	M		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.
Rock Mulching	Stabilisation of long-term, non-vegetated banks and minor drainage channels	MR		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.

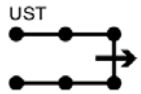
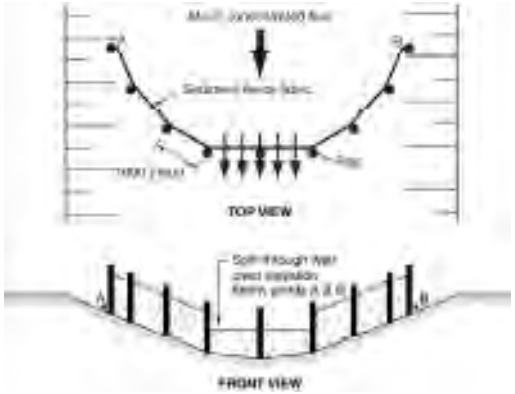
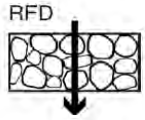
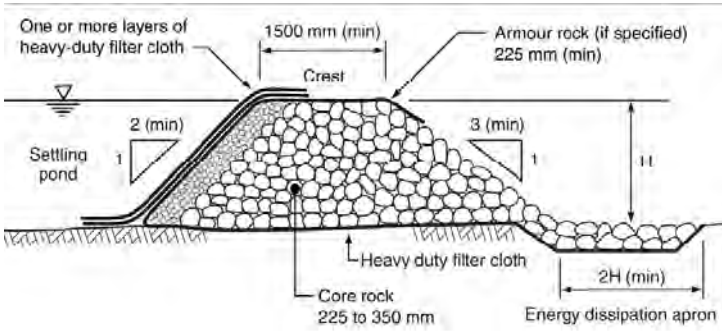
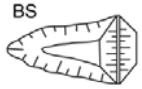
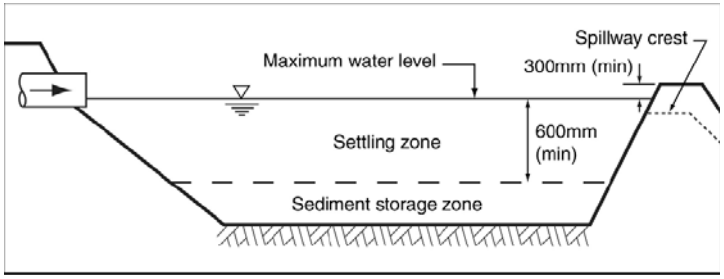
Control Measure	Typical Uses	Symbol	Example Illustration	Reference
Gravelling	Protection of non-vegetated soils from raindrop impact erosion; and Stabilisation of site office area, temporary car parks and access roads.	GRAVEL		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.

Table: Sediment Control Methods

Control Measure	Typical Uses	Symbol	Example Illustration	Reference
Buffer Zones	Sheet flow sediment control technique; Type 3 sediment trap; Most suited to sandy soils; Generally only suitable for rural and rural-residential building/construction sites; and Can provide some degree of turbidity control while the Buffer Zone remains unsaturated.	Buffer zone		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.
Fibre Roll	Sheet flow sediment control technique; Supplementary sediment trap; Most suited to sandy soils; and Suitable for minor flows only.	FR		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.

Control Measure	Typical Uses	Symbol	Example Illustration	Reference
Grass Filter Strips	Sheet flow sediment control technique; Supplementary sediment trap; Most suited to sandy soils; Minor sediment traps placed along contour; and Can be used as a drainage control measure to maintain sheet flow down earth banks.	GFS		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.
Mulch Berm	Sheet flow sediment control technique; Type 2 sediment trap; and Suitable for all soil types.	MFB MB		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.
Sediment Fence	Sheet flow sediment control technique; Type 3 sediment trap; Suitable for all soil types; and Long duration construction sites likely to experience several storm events.	SF		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.

Control Measure	Typical Uses	Symbol	Example Illustration	Reference
Check Dam Sediment Trap	Sediment control technique for minor concentrated flow; Supplementary sediment trap; Trapping sediment in table drains and other minor drainage lines; Check Dams may be constructed from rock, sand bags or compost-filled socks; and Compost-filled socks can absorb some dissolved and fine particulate matter.	CDT 		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.
Coarse Sediment Trap	Sediment control technique for minor concentrated flow; Type 3 Sediment Trap; Best used on sandy soils; Commonly used as sediment trap the low point of a Sediment Fence; and Used as an alternative to a spill-through weir on a Sediment Fence.	CST 		Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.

Control Measure	Typical Uses	Symbol	Example Illustration	Reference
U-Shaped Sediment Trap	Sediment control technique for minor concentrated flow; Type 3 sediment trap; Minor concentrated flows such as table drains; The sediment fence must be constructed in a U-shape with an appropriate spill-through weir; and Filter tubes can be integrated into a U-Shaped Sediment Trap to increase the effective hydraulic capacity and to improve the treatment of low flows.			Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.
Rock Filter Dam	Concentrated flow sediment control technique; Type 2 sediment trap Locations where there is sufficient room to construct a relatively large rock embankment; and The incorporation of filter cloth is the preferred construction technique if the removal of fine-grained sediment is critical; however, de-silting and replacement of the fabric can be difficult and can lead to ongoing poor performance.			Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.
Sediment Basin – Type C	Concentrated flow sediment control technique; Type 1 sediment trap; Best suited to coarse-grained soils; The trapping of coarse and fine sediment in major earthworks projects; and Used when a major (Type 1) sediment trap is required when working in areas containing coarse-grained, good settling soils.			Best Practice Erosion & Sediment Control (2008), International Erosion Control Association (IECA) Australasia.

Appendix 4: Construction Concept Stormwater Management Plans (Stage 1 – Early Works)

PHASE 1 SITE CIVIL WORKS – Construction Concept Stormwater Management Plan

Program Dates – 09-May-11 to 08-Nov-12

Key:

Construction Boundary

Sediment Fence (or alternative Mulch Berm)

Rock Filter Dam / Sediment Weir

Diversion Drain / Catch (with Rock Check Dams)

Silt Curtain (viability to be determined on-site)

Settling Pond */ Sediment Basin

Notes:

1. *Construction phases relate to the GLNG Civil Works Subcontract (a number of construction phases will be undertaken in each Stage listed in the Environmental Authority (DERM Permit Number PEN101623910)*
2. *This Concept Stormwater Management Plan is intended as a concept temporary construction design only. Actual positioning and timing of temporary construction stormwater and erosion and sediment control measures will be detailed in progressive erosion and sediment control plans based off anticipated weather conditions and current work program.*

SW7
318999.500E
7368208.180N

SW4
318562.540E
7368775.607N

SW6
318166.414E
7367490.450N

SW3
318176.123E
7368747.469N

SW2
317540.726E
7369064.424N

SW1
317916.61E
7367744.96N

SW5
317064.956E
7368840.929N

DIVERSION DITCH (EAST)
DIVERSION DITCH (EAST) OUTLET
1000 YR = 4.69 L/s
OUTFALL
SEDIMENT BASIN #3
SILT FENCE (SEE NOTE 3)
MOF AREA DRAINAGE OUTFLOW
SEDIMENT BASIN #2
SEDIMENT BASIN #1
HYDRO TEST WATER POND
DIVERSION DITCH (WEST)
DIVERSION DITCH (WEST) OUTLET
EL 26.0
EL 16.0
EL 23.0
EL 15.25
EL 11.0
EL 10.0
EL 28.0
EL 20.0

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0 100 200 300 400 500 600
METERS

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GLNG PROJECT

PHASE 1 SITE CIVIL WORKS - Construction Concept Stormwater Management Plan

GLNG PROJECT — CURTIS ISLAND, AUSTRALIA

GLNG DWG NO. — REV. 2

SCALE: 1:5000

DRAWING NO. — REV. 2

PHASE 2 SITE CIVIL WORKS - Construction Concept Stormwater Management Plan

Program Dates – 26-May-11 to 26-Jul-11

Key:

Construction Boundary

Sediment Fence (or alternative Mulch Berm)

Rock Filter Dam / Sediment Weir

Diversion Drain / Catch (with Rock Check Dams)

Silt Curtain (viability to be determined on-site)

Settling Pond */ Sediment Basin

Notes:

1. *Construction phases relate to the GLNG Civil Works Subcontract (a number of construction phases will be undertaken in each Stage listed in the Environmental Authority (DERM Permit Number PEN101623910)*
2. *This Concept Stormwater Management Plan is intended as a concept temporary construction design only. Actual positioning and timing of temporary construction stormwater and erosion and sediment control measures will be detailed in progressive erosion and sediment control plans based off anticipated weather conditions and current work program.*
3. *It is intended that Settling Pond #1 will be constructed as part of the Phase 2 works.*

SW7
318999.500E
7368208.180N

SW4
318562.540E
7368775.607N

SW3
318176.123E
7368747.469N

SW6
318166.414E
7367490.450N

SW1
317916.61E
7367744.96N

SW2
317540.726E
7369064.424N

SW5
317064.956E
7368840.929N

SETTLING POND #3

DIVERSION DITCH (EAST) OUTLET

MODULE HAUL RD DRAINAGE OUTFLOW

1000 YR = 4.69 AHD

MOF AREA DRAINAGE OUTFLOW

MOF AREA LAYDOWN DRAINAGE OUTFLOW

SILT FENCE (SEE NOTE 3)

SILT FENCE (SEE NOTE 3)

DIVERSION DITCH (EAST)

DIVERSION DITCH (WEST)

DIVERSION DITCH (WEST) OUTLET

SEDIMENT BASIN #2

SEDIMENT BASIN #1

HYDRO TEST WATER POND

OUTFALL

EL 28.0 EL 23.0 EL 20.0 EL 16.0 EL 15.25 EL 11.0 EL 10.0

PROPERTY LINE

0 100 200 300 400 500 600
METERS

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GLNG PROJECT

PHASE 2 SITE CIVIL WORKS - Construction Concept Stormwater Management Plan

GLNG PROJECT — CURTIS ISLAND, AUSTRALIA

GLNG DWG NO. — REV. 2

SCALE: 1:5000

DRAWING NO. — REV. 2

PHASE 3 SITE CIVIL WORKS - Construction Concept Stormwater Management Plan

Program Dates – 03-Jun-11 to 24-Nov-11

Key:

Construction Boundary

Sediment Fence (or alternative Mulch Berm)

Rock Filter Dam / Sediment Weir

Diversion Drain / Catch (with Rock Check Dams)

Silt Curtain (viability to be determined on-site)

Settling Pond */ Sediment Basin

Notes:

1. *Construction phases relate to the GLNG Civil Works Subcontract (a number of construction phases will be undertaken in each Stage listed in the Environmental Authority (DERM Permit Number PEN101623910)*
2. *This Concept Stormwater Management Plan is intended as a concept temporary construction design only. Actual positioning and timing of temporary construction stormwater and erosion and sediment control measures will be detailed in progressive erosion and sediment control plans based off anticipated weather conditions and current work program.*

SW7
318999.500E
7368208.180N

SW4
318562.540E
7368775.607N

SW3
318176.123E
7368747.469N

SW6
318166.414E
7367490.450N

SW1
317916.61E
7367744.96N

SW2
317540.726E
7369064.424N

SW5
317064.956E
7368840.929N

DIVERSION DITCH (EAST)
DIVERSION DITCH (EAST) OUTLET
MODULE HAUL RD DRAINAGE OUTFLOW
1000 YR = 4.69 AHD
OUTFALL
SEDIMENT BASIN #3
MOF AREA DRAINAGE OUTFLOW
MOF AREA LAYDOWN DRAINAGE OUTFLOW
SILT FENCE (SEE NOTE 3)
SILT FENCE (SEE NOTE 3)
OUTFALL
SEDIMENT BASIN #2
HYDRO TEST WATER POND
SEDIMENT BASIN #1
DIVERSION DITCH (WEST)
EL 26.0
EL 16.0
EL 16.0
EL 16.0
EL 23.0
EL 15.25
EL 16.0
EL 15.25
EL 15.25
EL 15.25
EL 16.0
EL 23.0
EL 11.0
EL 10.0
EL 11.0
EL 28.0
EL 20.0
EL 10.0
10.0
CD
CD
CD
PROPERTY LINE
PROPERTY LINE
PROPERTY LINE
2
2
0 100 200 300 400 500 600
METERS

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GLNG PROJECT

PHASE 3 SITE CIVIL WORKS - Construction Concept Stormwater Management Plan

GLNG PROJECT — CURTIS ISLAND, AUSTRALIA

GLNG DWG NO. — REV. 2

SCALE: 1:5000

DRAWING NO. — REV. 2

PHASE 4 SITE CIVIL WORKS - Construction Concept Stormwater Management Plan

Program Dates – 30-May-11 to 04-Aug-12

Key:

Construction Boundary

Sediment Fence (or alternative Mulch Berm)

Rock Filter Dam / Sediment Weir

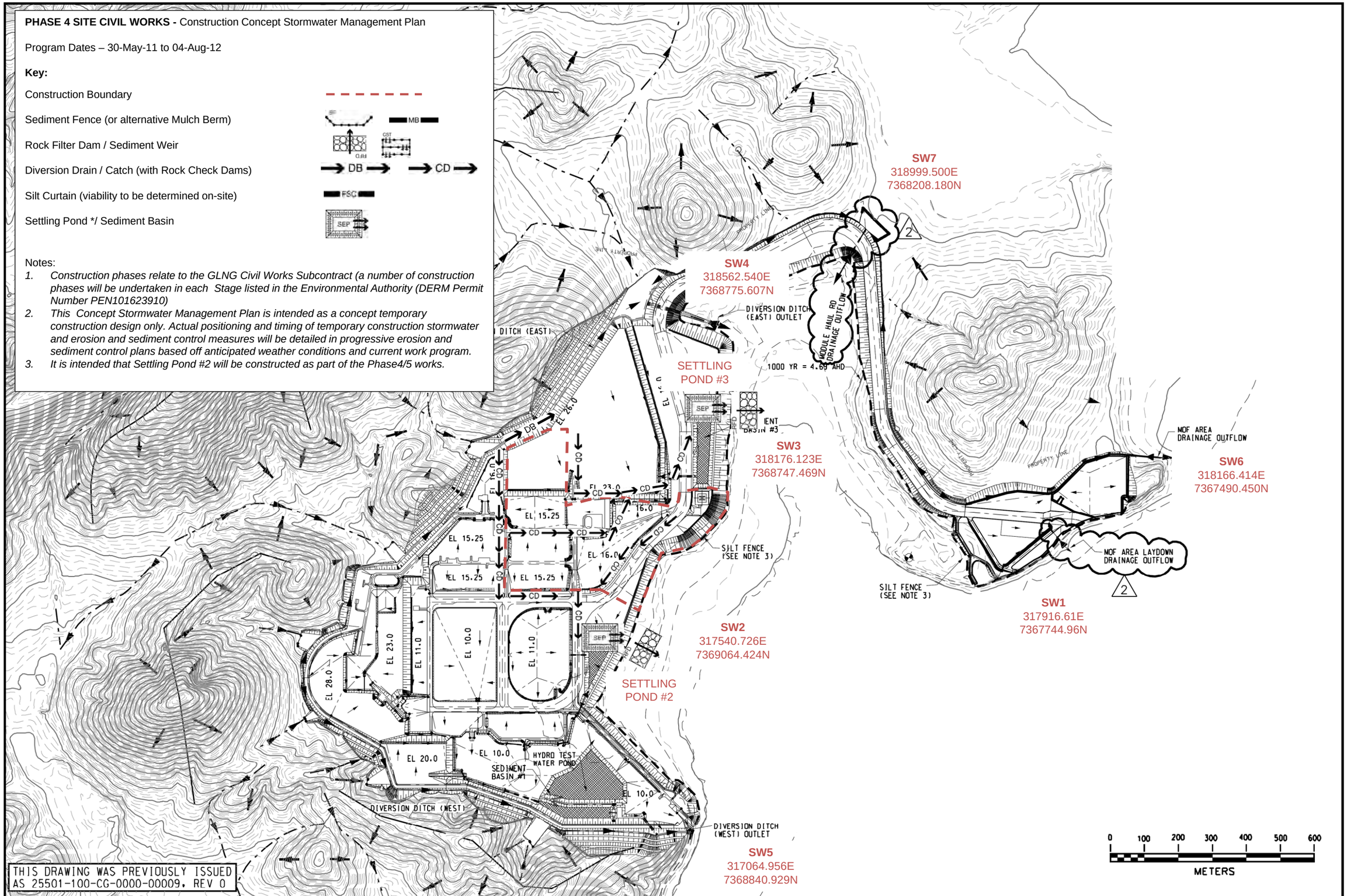
Diversion Drain / Catch (with Rock Check Dams)

Silt Curtain (viability to be determined on-site)

Settling Pond */ Sediment Basin

Notes:

1. *Construction phases relate to the GLNG Civil Works Subcontract (a number of construction phases will be undertaken in each Stage listed in the Environmental Authority (DERM Permit Number PEN101623910)*
2. *This Concept Stormwater Management Plan is intended as a concept temporary construction design only. Actual positioning and timing of temporary construction stormwater and erosion and sediment control measures will be detailed in progressive erosion and sediment control plans based off anticipated weather conditions and current work program.*
3. *It is intended that Settling Pond #2 will be constructed as part of the Phase4/5 works.*



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GLNG PROJECT

PHASE 4 SITE CIVIL WORKS - Construction Concept Stormwater Management Plan

GLNG PROJECT — CURTIS ISLAND, AUSTRALIA

GLNG DWG NO. — REV. 2

SCALE: 1:5000

DRAWING NO. — REV. 2

PHASE 5 SITE CIVIL WORKS - Construction Concept Stormwater Management Plan

Program Dates – 15-Mar-11 to 29-Sep-12

Key:

Construction Boundary

Sediment Fence (or alternative Mulch Berm)

Rock Filter Dam / Sediment Weir

Diversion Drain / Catch (with Rock Check Dams)

Silt Curtain (viability to be determined on-site)

Settling Pond */ Sediment Basin

Notes:

1. *Construction phases relate to the GLNG Civil Works Subcontract (a number of construction phases will be undertaken in each Stage listed in the Environmental Authority (DERM Permit Number PEN101623910)*
2. *This Concept Stormwater Management Plan is intended as a concept temporary construction design only. Actual positioning and timing of temporary construction stormwater and erosion and sediment control measures will be detailed in progressive erosion and sediment control plans based off anticipated weather conditions and current work program.*
3. *It is intended that Settling Pond #2 will be constructed as part of the Phase 4/5 works.*

SW7
318999.500E
7368208.180N

SW4
318562.540E
7368775.607N

SETTLING POND #3

SW3
318176.123E
7368747.469N

SW6
318166.414E
7367490.450N

SW1
317916.61E
7367744.96N

SW2
317540.726E
7369064.424N

SETTLING POND #2

SW5
317064.956E
7368840.929N

DIVERSION DITCH (EAST) OUTLET

MODULE HAUL RD DRAINAGE OUTFLOW

1000 YR = 4.69 AHD

MOF AREA DRAINAGE OUTFLOW

MOF AREA LAYDOWN DRAINAGE OUTFLOW

SILT FENCE (SEE NOTE 3)

DIVERSION DITCH (WEST)

SEDIMENT BASIN #1

HYDRO TEST WATER POND

EL 26.0 EL 23.0 EL 16.0 EL 15.25 EL 11.0 EL 10.0 EL 28.0 EL 20.0

0 100 200 300 400 500 600
METERS

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GLNG PROJECT

PHASE 5 SITE CIVIL WORKS - Construction Concept Stormwater Management Plan

GLNG PROJECT — CURTIS ISLAND, AUSTRALIA

GLNG DWG NO. — REV. 2

SCALE: 1:5000

DRAWING NO. — REV. 2

PHASE 6 SITE CIVIL WORKS - Construction Concept Stormwater Management Plan

Program Dates – 06-Jul-11 to 02-Mar-12

Key:

Construction Boundary

Sediment Fence (or alternative Mulch Berm)

Rock Filter Dam / Sediment Weir

Diversion Drain / Catch (with Rock Check Dams)

Silt Curtain (viability to be determined on-site)

Settling Pond */ Sediment Basin

Notes:

1. *Construction phases relate to the GLNG Civil Works Subcontract (a number of construction phases will be undertaken in each Stage listed in the Environmental Authority (DERM Permit Number PEN101623910)*
2. *This Concept Stormwater Management Plan is intended as a concept temporary construction design only. Actual positioning and timing of temporary construction stormwater and erosion and sediment control measures will be detailed in progressive erosion and sediment control plans based off anticipated weather conditions and current work program.*
3. *It is intended that Settling Pond #2 will be constructed as part of the Phase 4/5 works.*

SW7
318999.500E
7368208.180N

SW4
318562.540E
7368775.607N

SETTLING POND #3

SW3
318176.123E
7368747.469N

SW6
318166.414E
7367490.450N

SW2
317540.726E
7369064.424N

SETTLING POND #2

SW1
317916.61E
7367744.96N

SW5
317064.956E
7368840.929N

DIVERSION DITCH (EAST) OUTLET

MODULE HAUL RD DRAINAGE OUTFLOW

1000 YR = 4.69 AHD

OUTFALL SEDIMENT BASIN #3

MOF AREA DRAINAGE OUTFLOW

MOF AREA LAYDOWN DRAINAGE OUTFLOW

SILT FENCE (SEE NOTE 3)

SILT FENCE (SEE NOTE 3)

DIVERSION DITCH (EAST)

DIVERSION DITCH (WEST)

SEDIMENT BASIN #1

HYDRO TEST WATER POND

EL 26.0 EL 16.0 EL 23.0 EL 15.25 EL 16.0 EL 15.25 EL 15.25 EL 15.25 EL 23.0 EL 11.0 EL 10.0 EL 11.0 EL 28.0 EL 20.0 EL 10.0 EL 10.0

DB CD SEP RFD FSC

PROPERTY LINE

0 100 200 300 400 500 600
METERS

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GLNG PROJECT

PHASE 6 SITE CIVIL WORKS - Construction Concept Stormwater Management Plan

GLNG PROJECT — CURTIS ISLAND, AUSTRALIA

GLNG DWG NO. — REV. 2

SCALE: 1:5000

DRAWING NO. — REV. 2

PHASE 7 SITE CIVIL WORKS - Construction Concept Stormwater Management Plan

Program Dates – 15-Jun-11 to 16-Nov-12

Key:

Construction Boundary

Sediment Fence (or alternative Mulch Berm)

Rock Filter Dam / Sediment Weir

Diversion Drain / Catch (with Rock Check Dams)

Silt Curtain (viability to be determined on-site)

Settling Pond */ Sediment Basin

Notes:

1. *Construction phases relate to the GLNG Civil Works Subcontract (a number of construction phases will be undertaken in each Stage listed in the Environmental Authority (DERM Permit Number PEN101623910)*
2. *This Concept Stormwater Management Plan is intended as a concept temporary construction design only. Actual positioning and timing of temporary construction stormwater and erosion and sediment control measures will be detailed in progressive erosion and sediment control plans based off anticipated weather conditions and current work program.*
3. *It is intended that Settling Pond #2 will be constructed as part of the Phase 4/5 works.*

SW7
318999.500E
7368208.180N

SW4
318562.540E
7368775.607N

SETTLING POND #3

SW3
318176.123E
7368747.469N

SW6
318166.414E
7367490.450N

SW1
317916.61E
7367744.96N

SW2
317540.726E
7369064.424N

SETTLING POND #2

SW5
317064.956E
7368840.929N

DIVERSION DITCH (EAST) OUTLET

1000 YR = 4.69 AHD

MODULE HAUL RD DRAINAGE OUTFLOW

MOF AREA DRAINAGE OUTFLOW

MOF AREA LAYDOWN DRAINAGE OUTFLOW

SILT FENCE (SEE NOTE 3)

DIVERSION DITCH (WEST)

HYDRO TEST WATER POND

SEDIMENT BASIN #1

0 100 200 300 400 500 600
METERS

THIS DRAWING WAS PREVIOUSLY ISSUED AS 25501-100-CG-0000-00009, REV 0

NO.	DATE	REVISION	BY	CHK'D	APP.	PEM	CLIENT ACC.
0							
1							
2							

GLNG PROJECT

PHASE 7 SITE CIVIL WORKS - Construction Concept Stormwater Management Plan

GLNG PROJECT — CURTIS ISLAND, AUSTRALIA

GLNG DWG NO. — REV. 2

SCALE: 1:5000

DRAWING NO. — REV. 2

PHASE 8 SITE CIVIL WORKS - Construction Concept Stormwater Management Plan

Program Dates – 20-Jul-11 to 29-Nov-12

Key:

Construction Boundary

Sediment Fence (or alternative Mulch Berm)

Rock Filter Dam / Sediment Weir

Diversion Drain / Catch (with Rock Check Dams)

Silt Curtain (viability to be determined on-site)

Settling Pond */ Sediment Basin

Notes:

1. *Construction phases relate to the GLNG Civil Works Subcontract (a number of construction phases will be undertaken in each Stage listed in the Environmental Authority (DERM Permit Number PEN101623910)*
2. *This Concept Stormwater Management Plan is intended as a concept temporary construction design only. Actual positioning and timing of temporary construction stormwater and erosion and sediment control measures will be detailed in progressive erosion and sediment control plans based off anticipated weather conditions and current work program.*
3. *It is intended that Settling Pond #2 will be constructed as part of the Phase 4/5 works.*

SW7
318999.500E
7368208.180N

SW4
318562.540E
7368775.607N

SW3
318176.123E
7368747.469N

SW6
318166.414E
7367490.450N

SW2
317540.726E
7369064.424N

SW1
317916.61E
7367744.96N

SW5
317064.956E
7368840.929N

SETTLING POND #3

SEDIMENT BASIN #2

SEDIMENT BASIN #1

HYDRO TEST WATER POND

DIVERSION DITCH (EAST) OUTLET

MODULE HAUL RD DRAINAGE OUTFLOW

1000 YR = 4.69 AHD

MOF AREA DRAINAGE OUTFLOW

MOF AREA LAYDOWN DRAINAGE OUTFLOW

SILT FENCE (SEE NOTE 3)

DIVERSION DITCH (WEST)

OUTFALL

THIS DRAWING WAS PREVIOUSLY ISSUED AS 25501-100-CG-0000-00009, REV 0

0 100 200 300 400 500 600
METERS

NO.	DATE	REVISION	BY	CHK'D	APP.	PEM	CLIENT ACC.
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GLNG PROJECT

PHASE 8 SITE CIVIL WORKS - Construction Concept Stormwater Management Plan

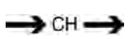
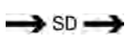
GLNG PROJECT — CURTIS ISLAND, AUSTRALIA

GLNG DWG NO. — REV. 2

SCALE: 1:5000

DRAWING NO. — REV. 2

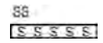
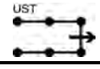
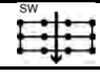
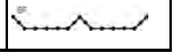
Drainage Control Techniques

Technique	Code	Symbol
Catch Drain	CD	
Diversion Channel	DC	
Level Spreader	LS	
Recessed Rock Check Dam	RRC	
Sandbag Check Dam	SBC	
Bridge	TBC	
Temporary Downpipe	TD	
Triangular Ditch Check	TDC	
Chute	CH	
Flow Diversion Bank	DB	
Outlet Structure	OS	
Rock Check Dam	RCD	
Slope Drain	SD	
Culvert	TCC	
Ford	TFC	

Erosion Control Techniques

Technique	Code	Symbol
Bonded Fibre Matrix	BFM	
Compost Blanket	CBT	
Gravelling	Gravel	
Light Mulching	M	
Revegetation	R	
Soil Binders	SBS	
Cellular Confinement System	CCS	
Erosion Control Blanket	ECB	
Heavy Mulching	MH	
Poly-acrylamide	Poly or PAM	
Rock Mulching	MR	
Surface Roughening	SR	

Sediment Control Techniques

Technique	Code	Symbol
Buffer Zones	BZ	
Coarse Sediment Trap	CST	
Fibre Roll	FR	
Filter Sock	FS	
Grass Filter Strips	GFS	
Mulch Berm	MB	
Sediment Basin	SB	
Sediment Trench	SS	
Stiff Grass Barrier	SGB	
U-Shaped Sediment Trap	UST	
Check Dam Sediment Trap	CDT	
Compost Berm	CB	
Filter Fence	FF	
Settling Pond	SEP	
Modular Sediment Trap	MST	
Rock Filter Dam	RFD	
Sediment Fence	SF	
Sediment Weir	SW	
Straw Bale Barrier	SBB	
Sediment Fence (alt)		

In-Stream Sediment Control Techniques

Technique	Code	Symbol
Filter Tube Barrier	FTB	
Rock Filter Dam	RFD	
Sediment Weir	SW	
Modular Sediment Barrier	MSB	
Sediment Filter cage	SFC	

NO.	DATE	REVISION	BY	CHK'D	APP.	PEM	CLIENT ACC.	NO.	DATE	REVISION	BY	CHK'D	APP.	PEM	CLIENT ACC.
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1															
2															

GLNG PROJECT

STORMWATER, EROSION AND SEDIMENT CONTROL SYMBOLS

GLNG PROJECT — CURTIS ISLAND, AUSTRALIA

GLNG DWG NO. — REV. 2

SCALE: 1:5000

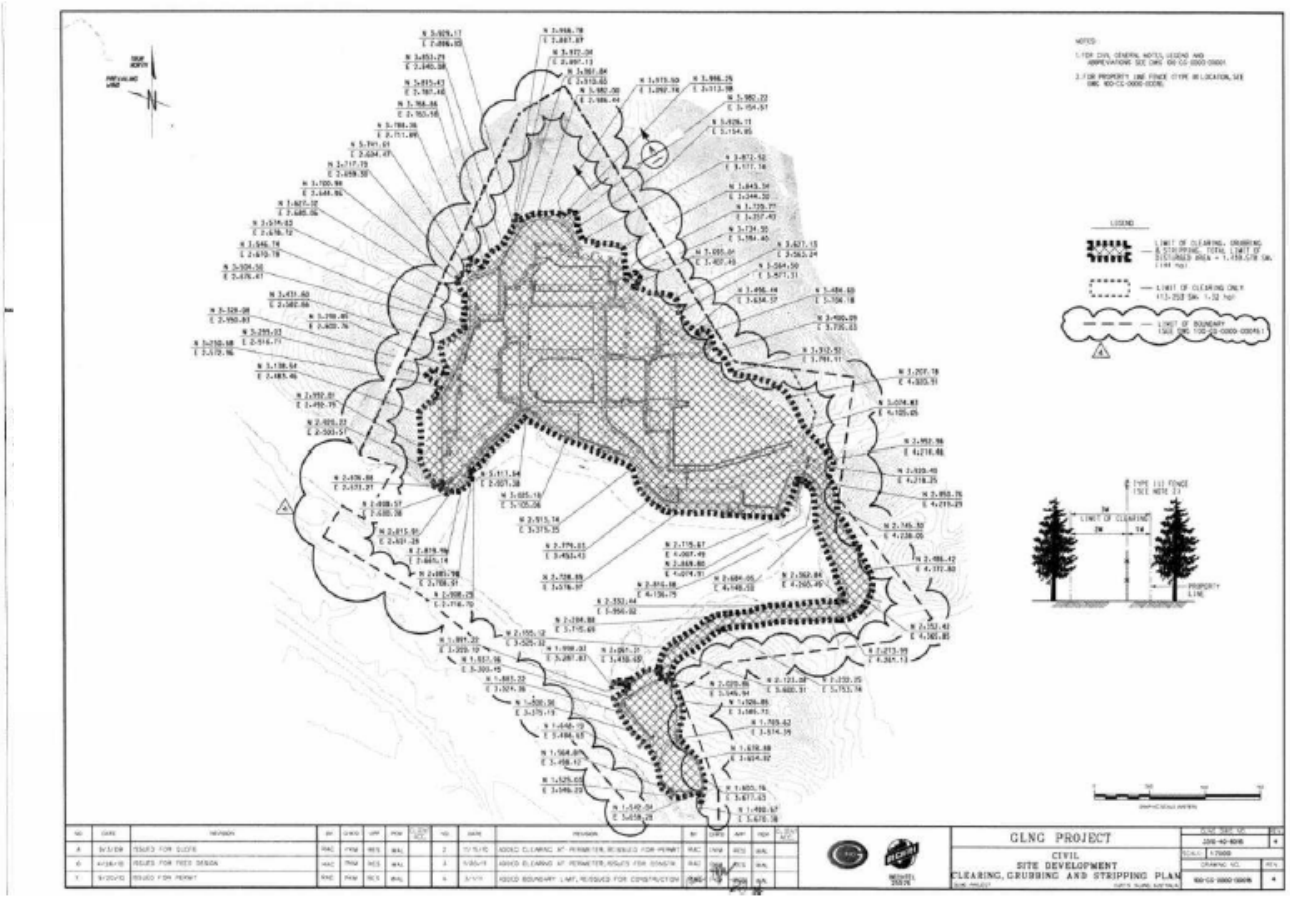
DRAWING NO. — REV. 2

Appendix 5: Construction Concept SMP and ESCP Register (Stage 1 – Early Works)

Note: Register updated 9-May-2011

Area / Phase	Drawing Number	Revision Number / Comment	Review Date	Review By
Phase 1	-	Construction Concept SWP (Stage 1 – Early Works)	9-May-11	JM
1 & 4A	ESCP-0001-0004A	Replaced by ESCP-0001-0004B	-	-
2	ESCP-0001-0002	Revision 1	5-May-11	MR
3	ESCP-0001-0003	Not required - E&S controls covered by Areas 1, 2, 4A & 4B	-	-
1, 4A & 4B	ESCP-0001-0004B	Revision 1	29-Apr-11	MR
6	ESCP-0001-0006	Revision 1	27-Apr-11	MR
Phase 2	-	Construction Concept SWP (Stage 1 – Early Works)	9-May-11	JM
7	ESCP-0002-0007	-	-	-
Phase 3	-	Construction Concept SWP (Stage 1 – Early Works)	9-May-11	JM
15	ESCP-0003-0015	-	-	-
Phase 4	-	Construction Concept SWP (Stage 1 – Early Works)	9-May-11	JM
8A	ESCP-0004-0008A	-	-	-
8B	ESCP-0004-0008B	-	-	-
11	ESCP-0004-0011	-	-	-
14A	ESCP-0004-0014A	-	-	-
19 & 20	ESCP-0004-00019	-	-	-
Phase 5	-	Construction Concept SWP (Stage 1 – Early Works)	9-May-11	JM
9	ESCP-0005-0009	-	-	-
16	ESCP-0005-0016	-	-	-
17A	ESCP-0005-0017A	-	-	-
19	ESCP-0005-0019	-	-	-
Phase 6	-	Construction Concept SWP (Stage 1 – Early Works)	9-May-11	JM
10A	ESCP-0006-0010A	-	-	-
10B	ESCP-0006-0010B	-	-	-
13	ESCP-0006-0013	-	-	-
Phase 7	-	Construction Concept SWP (Stage 1 – Early Works)	9-May-11	JM
14B	ESCP-0007-0014B	-	-	-
17B	ESCP-0007-0017B	-	-	-
18	ESCP-0007-0018	-	-	-
24	ESCP-0007-0024	-	-	-
Phase 8	-	Construction Concept SWP (Stage 1 – Early Works)	9-May-11	JM
19	ESCP-0008-0019	-	-	-
20	ESCP-0008-0020	-	-	-
21	ESCP-0008-0021	-	-	-
24B	ESCP-0008-0024B	-	-	-
25	ESCP-0008-0025	-	-	-

Appendix 6: Site Clearing Boundary (Drawing 25576-100-CG-0000-00016)



Appendix 7: Erosion and Sediment Inspection Checklist

MDL Ref.: C-XXX

Rev. Date: 25-Mar-11

Erosion and Sedimentation Inspection Checklist

This Form is referenced by the following documents:

GLNG SCW Stormwater Management Plan

Project Site: ..... Date: .....

Location: ..... Time: .....

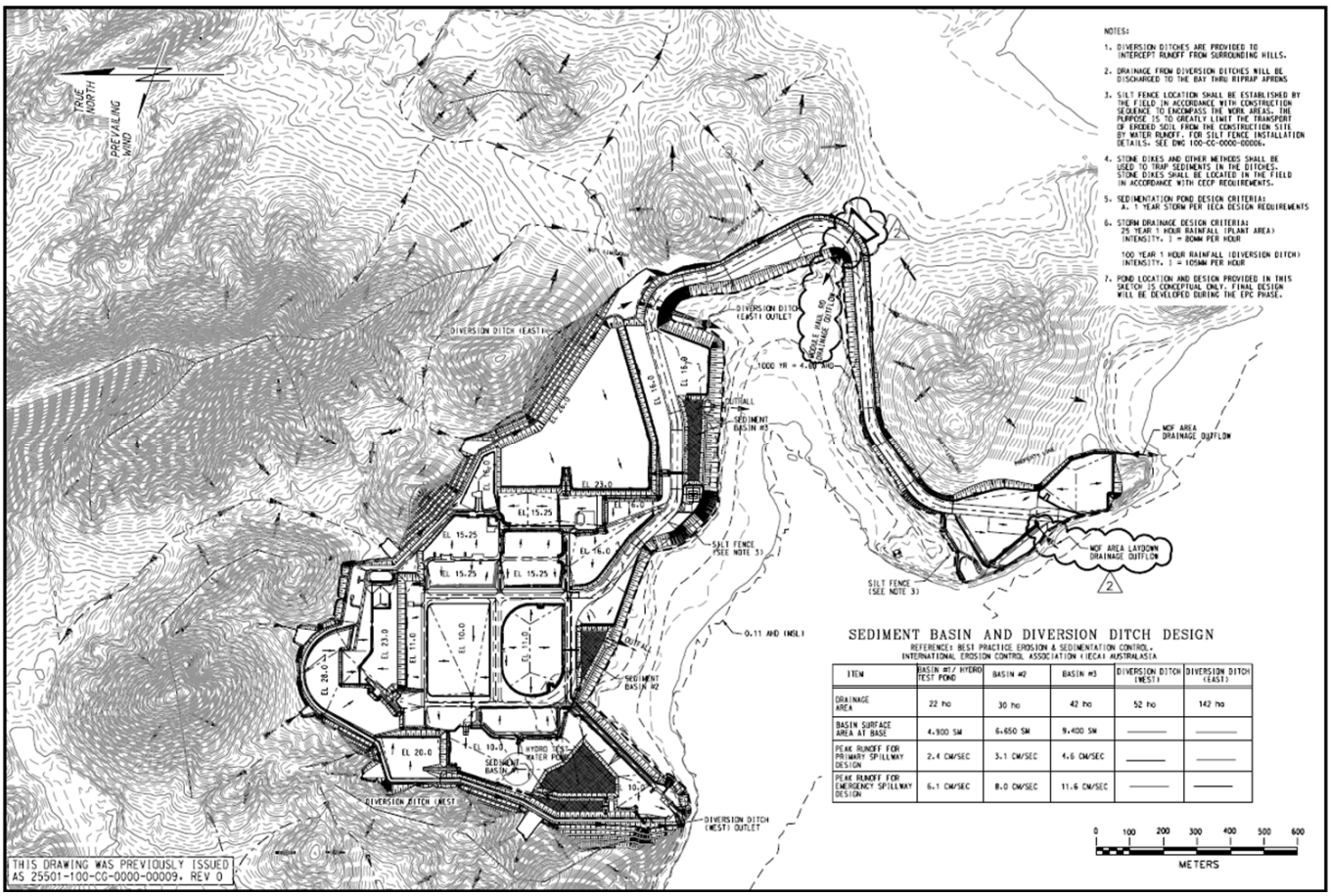
Assessor's Name: ....

Rainfall (mm) (hr) .....

Images Attached: .....

Signed: ..... Date: .....

Areas Inspected: *<mark areas inspected below; indicate approximate location of issues with the Item No.>*



Erosion and Sedimentation Inspection Checklist

This Form is referenced by the following documents:

GLNG SCW Stormwater Management Plan

Item	Consideration	Compliance			Comment
		N/A	Yes	No	
-	**General / Site Management**	-	-	-	-
1	The 'Progressive Erosion and Sediment Control Plan Register' in the Erosion and Sediment Control Plan is up-to-date?	☐	☐	☐	Revision Date:
2	An Erosion and Sediment Control Plan has been certified by a Certified Professional in Sediment and Erosion Control, or a professional with appropriate experience and or qualifications accepted by the administrating authority.	☐	☐	☐	Certified Date:
3	Appropriate drainage and sediment controls installed prior to new areas being cleared or disturbed.	☐	☐	☐	
4	Access roads shall be clearly indicated. Movement of vehicles will be restricted to access tracks and designated roads. Site vehicles and plant restricted to the defined roadways to prevent the unnecessary destabilization of surfaces.	☐	☐	☐	
5	Temporary access roads stabilized with ES controls where appropriate.	☐	☐	☐	
6	Site adequately prepared for the anticipated weather conditions	☐	☐	☐	
7	Adequate protection is provided for non-disturbance areas, buffer zones, protected trees.	☐	☐	☐	
-	**Soil Management**	-	-	-	-
8	Stockpiles located away from top of watercourse banks.	☐	☐	☐	
9	Long-term soil stockpiles adequately protected against wind and rain	☐	☐	☐	
10	Topsoil stockpiles are no greater than 3m in height where possible	☐	☐	☐	
11	Adequate sediment controls placed down-slope of stockpiles	☐	☐	☐	
12	Stockpile sediment controls are appropriate for the type of soil type and site conditions	☐	☐	☐	
13	Soil stockpiles do not encroach upon protected vegetation	☐	☐	☐	
14	Disturbed surfaces are shaped to spread rather than concentrate flows	☐	☐	☐	
15	Use of quick growing groundcover plants to protect stockpiles where possible.	☐	☐	☐	
16	Areas of potential acid sulfate soil identified	☐	☐	☐	
17	Exposure of acid sulfate soils minimised	☐	☐	☐	
18	Acid sulfate soils stockpiled in accordance with Acid Sulfate Soil Management Plan	☐	☐	☐	
19	Acid sulfate soils treated in accordance with Acid Sulfate Soil Management Plan	☐	☐	☐	
20	Exposure of highly dispersive soils minimised.	☐	☐	☐	
-	**Drainage Control**	☐	☐	☐	-
21	Diversion drains shall be installed prior to significant land disturbance and around stockpile sites to divert runoff from undisturbed areas into stable drainage lines at non-erosive velocities.	☐	☐	☐	

Erosion and Sedimentation Inspection Checklist

This Form is referenced by the following documents:

GLNG SCW Stormwater Management Plan

Item	Consideration	Compliance			Comment
		N/A	Yes	No	
22	Up-slope “clean” water is being appropriately diverted around/through the site.	☐	☐	☐	
23	Drainage controls are consistent with actual site conditions (i.e. current stage of works).	☐	☐	☐	
24	Drainage control measures consistent with the Stormwater, Erosion and Sediment Control Plan.	☐	☐	☐	
25	Drainage controls adequately maintained in proper working order.	☐	☐	☐	
26	Stormwater runoff diverted away from unstable slopes.	☐	☐	☐	
27	Diversion channels/banks stabilized against erosion.	☐	☐	☐	
28	Spread flows at culvert or drain outlets to reduce discharge velocity if necessary.	☐	☐	☐	
29	Drainage control measures removed after erosion controlled and significant permanent vegetation coverage is obtained over all upstream disturbed land.	☐	☐	☐	
30	Catch Drains: Clear of sediment deposition.	☐	☐	☐	
31	Catch Drains: Adequate depth/width.	☐	☐	☐	
32	Catch Drains: Adequate flow capacity maintained	☐	☐	☐	
33	Catch Drains: Water discharges via a stable outlet	☐	☐	☐	
34	Check Dams: Flow is passing over the dams, not around them	☐	☐	☐	
35	Check Dams: Check Dams are not causing excessive channel restriction	☐	☐	☐	
36	Check Dams: Clear of sediment deposition	☐	☐	☐	
37	Check Dams: Check Dams appropriately spaced along drain	☐	☐	☐	
-	**Erosion Controls**	-	-	-	-
38	Erosion Control measures are consistent with the Stormwater, Erosion and Sediment Control Plan	☐	☐	☐	
39	Where practical, exposed areas experiencing excessive erosion to be grass seeded	☐	☐	☐	
40	Disturbance to existing ground cover delayed as long as possible	☐	☐	☐	
41	Earth batters are free of “rill” erosion.	☐	☐	☐	
-	**Sediment Controls**	-	-	-	-
42	Sediment Control measures are consistent with the Stormwater, Erosion and Sediment Control Plan.	☐	☐	☐	
43	Sediment Control is appropriate for the soil type.	☐	☐	☐	
44	Sediment Control measures are being adequately maintained in proper working order at all times.	☐	☐	☐	
45	Collected sediment is being disposed of in an appropriate manner.	☐	☐	☐	
46	Sediment Fences: Sediment Fence is installed correctly.	☐	☐	☐	

Erosion and Sedimentation Inspection Checklist

This Form is referenced by the following documents:

GLNG SCW Stormwater Management Plan

Item	Consideration	Compliance			Comment
		N/A	Yes	No	
47	Sediment Fences: Sediment Fence does not cause flow diversion/bypass.	☐	☐	☐	
48	Sediment Fences: Sediment Fence has regular returns and lower end is returned up the slope.	☐	☐	☐	
49	Sediment Fences: Sediment Fences are free of damage.	☐	☐	☐	
50	Sediment Fences: Sediment Fences are free of excessive sediment deposition.	☐	☐	☐	
51	Sediment Fences: Sediment Fences are adequately spaced from tow of fill banks.	☐	☐	☐	
52	Sediment Basins: Location and size of sediment basins adequate for catchment size.	☐	☐	☐	
53	Sediment Basins: Sufficient capacity available in sediment basins for anticipated weather conditions.	☐	☐	☐	
54	Sediment Basins: Excessive sediment removed from sediment basins (>33% sediment).	☐	☐	☐	
55	During State 1 – Early Works and Stage 2 – Construction works inlet and outlet filters must be installed and maintained to prevent the clogging of existing stormwater drainage and to prevent the release of gross pollutants.	☐	☐	☐	
56	Silt fencing will be installed around the perimeter of exposed soil stockpiles and at the toe of exposed batters.	☐	☐	☐	
57	Sediment-laden stormwater is not simply flowing “around” the sediment fences or other sediment traps.	☐	☐	☐	
58	Sediment controls placed up-slope/around stormwater inlets are appropriate for the type of inlet structure.	☐	☐	☐	
59	No evidence of unauthorised discharges.	☐	☐	☐	

Appendix 8: EA PEN101623910/ EPBC No 2008/4057 and SMP Cross-Reference Checklists

EA Ref.	Requirement	SMP Ref.	Comment
A9	**Environmental Management Plan**	-	-
A11	A Stormwater Management Plan must be prepared and implemented for the site prior to construction and operation. The Stormwater Management Plan must address at least the following:	-	Noted. The Stormwater Management Plan (Stage 1 – Early Works) has been prepared to meet the requirements of the Environmental Authority (DERM Permit Number PEN101623910) and will be implemented prior to the commencement of operations.
A11(a)	Prevention of incident stormwater water and storm water run-off from contacting wastes of contaminants;	Appendix 4 7.4.2 Drainage Control	Appendix 4: Construction Concept Stormwater Management Plans (Stage 1 – Early Works) has been prepared, in particular the Appendix takes into consideration the prevention of incident stormwater water and storm water run-off from contacting wastes of contaminants. Section 7.4.2 Drainage Control describes the prevention of incident stormwater water and storm water run-off from contacting wastes of contaminants.
A11(b)	Diversion of upstream run-off away from areas where it may be contaminated by bulk products being loaded or unloaded, waste, contaminates or other materials; and	Appendix 4 7.4.2 Drainage Control	Appendix 4: Construction Concept Stormwater Management Plans (Stage 1 – Early Works) has been prepared in accordance with Environmental Authority conditions and in particular the diversion of upstream run-off away from areas where it may be contaminated by bulk products being loaded or unloaded, waste, contaminates or other materials Section 7.4.2 Drainage Control describes the prevention of incident stormwater water and storm water run-off from contacting wastes of contaminants.
A11(c)	Collection, treatment and disposal of all contaminated storm water run-off.	Appendix 4 7.4.2 Drainage Control 7.4.4 Sediment Control	Appendix 4: Construction Concept Stormwater Management Plans (Stage 1 – Early Works) has been prepared in accordance with Environmental Authority conditions and in particular the collection, treatment and disposal of all contaminated storm water run-off. Section 7.4.2 Drainage Control describes the prevention of incident stormwater water and storm water run-off from contacting wastes of contaminants. 7.4.4 Sediment Control describes the collection, treatment and disposal of all contaminated storm water run-off.
F1	**Erosion and Sediment Control Plans**	**-**	**-**
F1	An Erosion and Sediment Control Plan must be developed and implemented for all stages of the petroleum activities and which has been certified by a Certified Professional in Sediment and Erosion Control, or a professional with appropriate experience and or qualifications accepted by the administrating authority.	7.2 Construction Concept SMPs (Stage 1 – Early Works) and ESCPs 7.5 Summary of Environmental Control Measures	A Stormwater Management Plan incorporating (erosion and sediment control) has been prepared. A Certified Professional in Sediment and Erosion Control, or a professional with appropriate experience and or qualifications accepted by the administrating authority will certify the plans described in 7.2 Construction Concept SMPs (Stage 1 – Early Works) and ESCPs. Section 7.5 Summary of Environmental Control Measures states this requirement.
F2	Appropriate measures to achieve compliance with condition (F1) for the petroleum activity must be described in the EM plan and include:	-	-

EA Ref.	Requirement	SMP Ref.	Comment
F2(1)	Diverting uncontaminated stormwater run-off around areas disturbed by petroleum activities or where contaminants or wastes are stored or handled that may contribute to stormwater.	Appendix 4 7.4.2 Drainage Control 7.5 Summary of Environmental Control Measures	Appendix 4: Construction Concept Stormwater Management Plans (Stage 1 – Early Works) has been prepared to divert uncontaminated stormwater run-off around areas disturbed by petroleum activities or where contaminants or wastes are stored or handled that may contribute to stormwater. Section 7.4.2 Drainage Control describes the prevention of incident stormwater water and storm water run-off from contacting wastes of contaminants. This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.
F2(2)	Contaminated stormwater runoff and incident rainfall is collected; and treated, reused, or released in accordance with the conditions of this environmental authority.	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.
F2(3)	Roofing or minimising the size of areas where contaminants or wastes are storage or handled.	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures. In addition, the Bechtel (2010) Construction Environmental Management Plan includes a Contaminated Soil Plan (Attachment F of CEMP) which describes in detail the prevention of soil and water contamination.
F2(4)	Using alternate materials and or process (such as dry adsorbents) to clean-up spills that will minimise the generation of contaminated waters.	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures. In addition, the Bechtel (2010) Construction Environmental Management Plan includes a Contaminated Soil Plan (Attachment F of CEMP) which describes in detail the prevention of soil and water contamination.
F2(5)	Erosion and sediment control structures are placed to minimise erosion and sediment control measures especially during the wet season months from December to March.	7.5 Summary of Environmental Control Measures 7.4.4 Sediment Control Section 7.2 Construction Concept SMPs (Stage 1 – Early Works)	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures. Section 7.4.4 Sediment Control describes sediment control structures. Section 7.2 Construction Concept SMPs (Stage 1 – Early Works) and ESCPs describes how control structures will be incorporated and Appendix 3 provides Construction Concept SMPs (Stage 1 – Early Works).
F2(6)	An inspection and maintenance program for the erosion and sediment control features.	8 Monitoring, Inspection & Auditing 7.5 Summary of Environmental Control Measures	Section 8 Monitoring, Inspection & Auditing describes the inspection and maintenance program for the erosion and sediment control features. This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.
F2(7)	Provision of adequate access to maintain all erosion and sediment control measures especially during the wet season months from December to March.	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.
F2(8)	Identification of remedial actions that would be required to ensure compliance with the conditions of this environmental authority.	8 Monitoring, Inspection & Auditing	Section 8 Monitoring, Inspection & Auditing identifies remedial actions (corrective actions) that would be required to ensure compliance with the conditions of this environmental authority.
F3	Erosion protection measures and sediment control measures must be	7.5 Summary of Environmental	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control

EA Ref.	Requirement	SMP Ref.	Comment
	implemented and maintained to minimise erosion and the release of sediment and contamination of stormwater.	Control Measures	Measures.
BC3	In addition to Part A, Condition (C1), the only contaminant(s) permitted to be released directly to any waters from the petroleum activities authorised on the petroleum facilities licence are the following releases to Port Curtis: Stormwater via discharge points SW1, SW2, SW3, SW4, SW5, SW6 and SW7 to Port Curtis, Appendix 2 – Figure 3: Plan C Air and Water Discharge Points Port Curtis Island Australia during Stage 1 – early works Uncontaminated stormwater via discharge points SW1, SW2, SW3, SW4, SW5, SW6 and SW7 to Port Curtis, Appendix 2 – Figure 3: Plan C Air and Water Discharge Points Port Curtis Island Australia during Stage 2 – construction works	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.
BC7	The release of contaminants to waters must only occur from the release points specified in Schedule BC – Table 1: Contaminant Release Points. *Macmahon Note: No discharges to the stormwater / creek systems from site without prior written approval from the PEMR (who will liaise with Bechtel). Discharge from the sediment pond will be in accordance with the approved levels of discharge.*	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.
BC8	The release of contaminants to waters must not exceed the release limits stated in and monitored at the locations specified in Schedule BC – Table 3: Stormwater Release Limits (excluding stage 2 – construction works).	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.
BC18	The holder of this environmental authority must ensure that sediment and erosion control is conducted and implemented in accordance with the Stormwater Management Plan and the Erosion and Sediment Control Plans developed in accordance with Conditions (BC13), (BC14), (BC15), (BC16), Part A - (A11) and Part A - (F1) and (F2).	-	Noted
BC19	Water velocities through temporary diversions around the works area must not be increased above pre-work velocities during such diversions, and must be re-instated once petroleum activities are completed.	-	Noted
BC20	The release of contaminants from the stormwater discharge points to waters must be monitored at the locations and for each quality characteristic and at the frequency specified in Schedule B – Table 3: Stormwater Release Limits (excluding stage 2 construction works).	8 Monitoring, Inspection & Auditing	Section 8 Monitoring, Inspection & Auditing describes how sediment and erosion control is conducted and implemented in accordance with the Stormwater Management Plan and the Erosion and Sediment Control Plans developed in accordance with Conditions (BC13), (BC14), (BC15), (BC16), Part A – (F1) and (F2).
BC23	The monitoring point selected to determine the background turbidity in accordance with condition BC 22 must	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.

EA Ref.	Requirement	SMP Ref.	Comment
	be the monitoring point most representative of the receiving environment (i.e. China Bay) and not affected by dredging activities.		
BC24	The holder of the environmental authority must maintain records of the data used in calculation of background turbidity and make available to the administering authority upon request.	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.
BC25	The Erosion and Sediment Control Plan required by Part A – Conditions (F1) and (F2) must include but not necessarily be limited to: (a to i).	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.
BC26	Notwithstanding Part A – Conditions (F1) and (F2) and Part B – Condition (BC24), Stage 1 – Early works and Stage 2 - Construction works must include the implementation and maintenance of erosion protection measures and sediment control measures, including but not necessarily limited to: (i to ix)	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.
BC27	Notwithstanding Part A – Conditions (F1) and (F2) and Part B – Condition (BC25), Stage 1 – Early works and Stage 2 - Construction works must include the stabilisation of slopes and areas of high erosion potential by implementing and maintaining measures including but not limited to: terracing; geotextile; geo-matting; surface roughening; mulch; and promoting vegetation growth.	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.
BC28	During Stage 1 – Early works and Stage 2 - Construction works vehicle access to salt marshes, mudflats, mangroves and riparian zones is prohibited unless authorised under a separate approval. Note: A separate approval would include a Prescribed Tidal Works Approval or Marine Plants Disturbance Approval.	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.
BC29	During Stage 1 – Early works and Stage 2 - Construction works inlet and outlet filters must be installed and maintained to prevent the clogging of existing stormwater drains and to prevent the release of gross pollutants.	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.
BC27	Notwithstanding Part A – Conditions (F1) and (F2) and Part B – Condition (BC25), Stage 1 – Early works and Stage 2 - Construction works must include the stabilisation of slopes and areas of high erosion potential by implementing and maintaining measures including but not limited to: terracing; geotextile; geo-matting; surface roughening; mulch; and promoting vegetation growth.	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.
BC30	During Stage 1 – Early works and Stage 2 - Construction works must include the installation and maintenance of erosion control measures to prevent scouring at outfall locations, including but not limited	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.

EA Ref.	Requirement	SMP Ref.	Comment
	to pipes, culverts and sediment basins. Erosion control measures are to include but not, necessarily be limited to: matting; gravel check dams; and rock armouring.		
BC31	Degraded sediment control structures and stormwater control devices are to repaired and replaced immediately upon identification in the monitoring and maintenance program required by Part B – Condition (BC25).	8 Monitoring, Inspection & Auditing	Section 8 Monitoring, Inspection & Auditing identifies remedial actions (corrective actions) that would be required to ensure compliance with the conditions of this environmental authority.
BC32	Sediment basins must be designed and maintained in accordance with the guideline “Best practice erosion and sediment control, International Erosion Control Association 2008” and supporting documentation as updated from time to time.	7.5 Summary of Environmental Control Measures	This requirement is referenced in Table 4 in Section 7.5 Summary of Environmental Control Measures.

EPBC No 2008/4057 Ref.	Requirement	SMP Ref.	Comment
23	Before commencement the proponent must prepare a Construction Environmental Management Plan (CEMP). The CEMP may be submitted in stages (Staged CEMP) in which case commencement of a stage covered by the staged CEMP cannot commence until submitted and approved by the Minister.	n/a	This Stormwater Management Plan (Stage 1) is a sub-plan of the Environmental Compliance Plan prepared in accordance with the Construction Environmental Management Plan (Bechtel).
24	The CEMP must address, but not necessarily be limited to, an identification of all activities with potential to have an adverse impact on MNES proposed to be undertaken during the construction of LNG facilities, including the construction camp and supporting facilities. The CEMP must include:	n/a	This Stormwater Management Plan (Stage 1) is a sub-plan of the Environmental Compliance Plan prepared in accordance with the Construction Environmental Management Plan (Bechtel).
	design plans showing the type and extent of the works proposed;	Appendix 4	Appendix 4: Construction Concept SMPs (Stage 1 – Early Works) shows type and extent of the works proposed.
	a construction schedule and methodology, including plans and maps showing discharge points and emission controls for all construction stages;	Section 7.2 Construction Erosion & Sediment Control Plans (ESCP's)	Section 7.2 Construction Erosion & Sediment Control Plans (ESCP's) (Stage 1 – Early Works) shows the extent of the works as well as discharge points and emission controls for Stage 1 – Early Works.
	an environmental monitoring and a sampling program which details baseline data collection and provides the basis for ongoing monitoring of specified parameters for the construction and operational phases, including appropriate triggers for mitigation and cessation of works;	Section 8 Monitoring, Inspection & Auditing	Section 8 Monitoring, Inspection & Auditing describes environmental monitoring and a sampling program.
	any potential impacts or effects of the proposed works on the environment during both the construction and operational phases and the means by which adverse impacts will be avoided or mitigated.	Section 6 Construction Activities & Potential Impacts	Section 6 Construction Activities & Potential Impacts describes potential impacts or effects of the proposed works on the environment.

Note: The Australian Government, Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) Approval EPBC No 2008/4057 contains specific conditions addressed by this Stormwater Management Plan.[2]

[2] The SEWPaC Approval letter dated 21 March 2011 states:

"Consistent with condition 23, I have decided to approve a staged approval process for the CEMP. I have decided to approve the CEMP, and its related documents referenced in Attachment A, as having partly fulfilled the requirements of condition 24 of the approval for EPBC 2008/4057.

This approval applies only to the site clearance and preparation stages of the construction of the LNG Facility. The approval covers all components of condition 24, except in relation to:

the adequacy of the revised Stormwater Management and Erosion and Sediment Control Plan in relation to the requirements of clauses (a) to (d) inclusive of condition 24 of EPBC 2008/4057; and

the adequacy of the LNG Facility Receiving Environment Monitoring Program against the requirements of condition 24 (c) of EPBC 2008/4057.

I note that these documents are subject to revision to meet Queensland Government requirements. I expect Santos to provide a revised CEMP, which will address the full requirements of condition 24, before approval of the next stage of this plan. These revisions should include any further requirements of the Queensland Government relating to the construction of the LNG Facility. Santos' submission of the revised CEMP should allow sufficient time for the Department's consideration in parallel with Queensland processes."

Appendix 9: Stormwater Discharge Points

Figure 5: Original Contour and Natural Drainage Line Plan

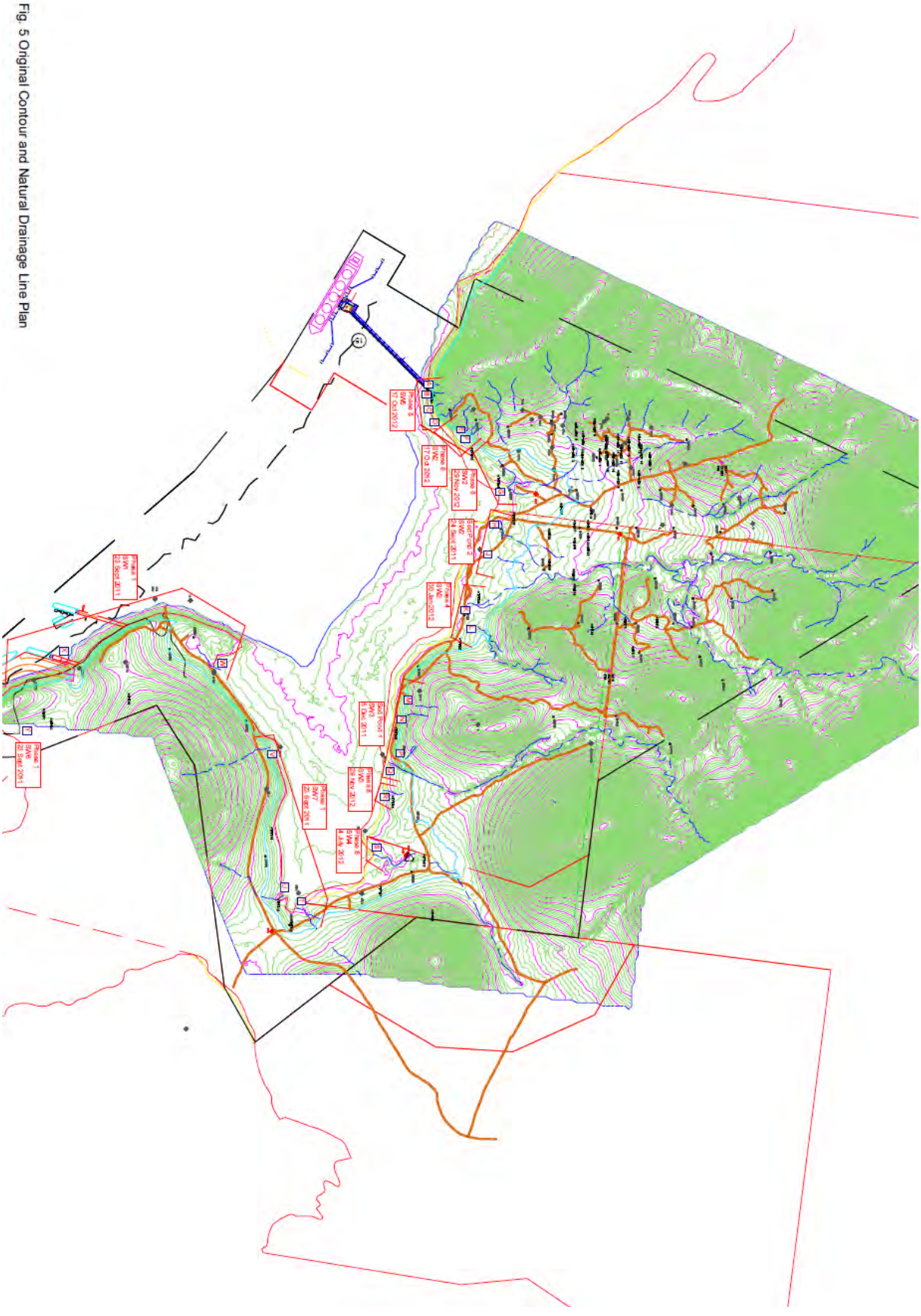


Table 7-1: Coordinates of Stage 1 Early Works Stormwater Discharge Points (±25 m)

Note: letters I and O have been skipped to avoid possible confusion.

Stormwater (SW) Monitoring Point (see Fig. 5)	Easting	Northing	Ultimate Discharge Point	Date of Diversion to Ultimate Discharge Point
A	317067.0	7368846.0	SW5	17 Oct 2012
B	317090.0	7368842.0	SW5	17 Oct 2012
C	317136.0	7368847.0	SW5	17 Oct 2012
D	317164.0	7368857.0	SW5	17 Oct 2012
E	317214.0	7368947.0	SW2	17 Oct 2012
F	317226.0	7368959.0	SW2	17 Oct 2012
G	317393.0	7369073.0	SW2	29 Nov 2012
H	317494.0	7369052.0	SW2	24 Sept 2011
J	317610.0	7369043.0	SW2	24 Sept 2011
K	317758.0	7368949.0	SW2	30 Jan 2012
L	317831.0	7368981.0	SW2	30 Jan 2012
M	318079.0	7368787.0	SW3	5 Dec 2011
N	318107.0	7368760.0	SW3	5 Dec 2011
P	318246.0	7368756.0	SW3	5 Dec 2011
Q	318257.0	7368702.0	SW3	5 Dec 2011
R	318346.0	7368683.0	SW3	29 Nov 2012
S	318547.0	7368652.0	SW4	4 July 2012
T	318716.0	7368411.0	SW7	23 Sept 2011
U	318675.0	7368372.0	SW7	23 Sept 2011
V	318211.0	7368328.0	SW7	23 Sept 2011
W	317966.0	7368175.0	SW1	23 Sept 2011
X	317942.0	7367743.0	SW1	23 Sept 2011
Y	318150.0	7367530.0	SW6	23 Sept 2011

TRUE NORTH

PREVAILING WIND

SW7
23 Sept 2011
318999.500E
7368208.180N

SW4
4 July 2012
318562.540E
7368775.607N

DIVERSION DITCH (EAST)

DIVERSION DITCH (EAST) OUTLET

MODULE HAUL RD DRAINAGE OUTFLOW

1000 YR = 4.69 AHD

OUTFALL

SEDIMENT BASIN #3

SW3
5 Dec 2011
318176.123E
7368747.469N

MOF AREA DRAINAGE OUTFLOW

SW6
23 Sept 2011
318166.414E
7367490.450N

MOF AREA LAYDOWN DRAINAGE OUTFLOW

SILT FENCE (SEE NOTE 3)

SILT FENCE (SEE NOTE 3)

SW1
23 Sept 2011
317916.61E
7367744.96N

SW2
24 Sept 2011
317540.726E
7369064.424N

OUTFALL

SEDIMENT BASIN #2

SW5
17 Oct 2012
317064.956E
7368840.929N

HYDRO TEST WATER POND

SEDIMENT BASIN #1

DIVERSION DITCH (WEST)

DIVERSION DITCH (WEST) OUTLET

EL 26.0 EL 16.0 EL 16.0 EL 16.0 EL 23.0 EL 15.25 EL 15.25 EL 15.25 EL 15.25 EL 16.0 EL 28.0 EL 23.0 EL 11.0 EL 10.0 EL 11.0 EL 20.0 EL 10.0 EL 10.0

0 100 200 300 400 500 600
METERS

THIS DRAWING WAS PREVIOUSLY ISSUED AS 25501-100-CG-0000-00009, REV 0

NO.	DATE	REVISION	BY	CHK'D	APP.	PEM	CLIENT ACC.
0							
1							
2							

NO.	DATE	REVISION	BY	CHK'D	APP.	PEM	CLIENT ACC.

Fig. 7-2 Final Stormwater Drainage Point Locations

GLNG PROJECT — CURTIS ISLAND, AUSTRALIA

GLNG DWG NO.	REV.
[illegible]	2
SCALE: 1:5000	
DRAWING NO.	REV.
	2

Attachment B: Stormwater Management Plan For Stage 2 - Construction

GLNG

STORMWATER MANAGEMENT PLAN FOR STAGE 2 - CONSTRUCTION

0	01-Aug-2013	Issued for CEMP	For ER	SP	BF			
A	30-Nov-12	Issued to GLNG for Submission	MCC	RJF/ RR	---	--	BT	
REV	**DATE**	**REASON FOR REVISION**	**BY**	**CK'D**	**Const Mgr**	**APE**	**PM**	

BECHTEL OG&C INC.		**JOB NO. 25577**	
	STORMWATER MANAGEMENT PLAN FOR STAGE 2 – CONSTRUCTION	**DOCUMENT NO.**	**REVISION**
		100-G01-GHX-00044	**0**
		GLNG Doc No. 3310-BTH-3-3.3-6844	

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Acronyms, Abbreviations, and Definitions

ANZECC	Australian and New Zealand Environment and Conservation Council
ARI	Average Recurrence Interval
ASS	Acid Sulphate Soils
BMP	Best Management Practices
Buffer zone	A significant area of healthy long grass down-slope of the disturbed area. The buffer must not contain any drainage channels, swales or spoon drains that may concentrate flow.
CAR	Corrective Action Request
CECP	Construction Environmental Control Plan
CEMP	Construction Environmental Management Plan
Clay-based soil	Soil that contains at least 10% clay
Clayey soil	Soil that contains at least 20% clay. These are fine grained soils that usually feel very smooth and sticky when wet, are very difficult to shovel and break-up when compacted, readily form a clod when compressed in the hand, and are usually poorly drained soils.
Clean water	Waters that either have not been 'contaminated' by the uptake of sediments or contaminants due to construction activities; or that have been treated by the nominated control measures to a level of acceptable discharge.
DEHP	Department of Environment and Heritage Protection
DERM	Department of Environment and Resource Management
Dispersive soils	Structurally unstable soils, which readily disperse into their constituent particles (clay, silt, sand) when placed in water. Highly dispersive soils are normally highly erodible and are likely to give problems relating to tunnel erosion.
doc.	document
EIR	Environmental Inspection Report
EIS	Environmental Impact Statement
EM	Environmental Manager
EMP	Environmental Management Plan
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
ESC	Erosion and Sediment Control
Filter cloth	Filter cloth is a non-woven geotextile fabric primarily used to separate soils or rock of different texture or grain size. It may also be used to filter sediment from water.

FSM	Field Subcontracts Manager
GLNG	Gladstone Liquefied Natural Gas liquefaction and export facility on Curtis Island
GPC	Gladstone Ports Corporation
Highly erodible material	Highly erodible material means material that can readily wash from a stockpile or building site, or can discolour stormwater during regular storm events.
HSSE	Health, Safety, Security and Environmental
IECA	International Erosion Control Association of Australasia
MNES	Matters of National Environmental Significance
MOF	Materials Offloading Facility
no.	number
NTU	Nephelometric Turbidity Units
Sandy soil	A soil that contains at least 50% sand. It is very difficult to form a clod when sandy soils are compressed in the hand.
Sediment barrier	A control device (such as a filter medium of aggregate or fabric, or a buffer zone) used to filter, trap or settle sediment from stormwater runoff.
Sediment control measures	Devices used to filter, trap or settle sediment from stormwater or waste water.
Sediment control zone	Area of a work site located up-slope of an effective sediment barrier.
Sediment deposits	Gravel, sand, silt, clay, soil or mud deposited in an area from where it did not originate.
Sediment fence (Silt fence)	A purpose-made, woven or non-woven, geotextile fabric constructed as a vertical fence. Sediment fences must not be formed from shade cloth or filter cloth.
Sediment runoff	The movement by water of gravel, sand, silt, clay, soil or mud.
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
Sheet flow	Water flowing at a thin, near uniform depth that is much smaller than the width of flow.
Short-term stockpile	A stockpile that is located on-site or off-site for less than 24 hours.
SM	Site manager
Soil erosion	The process whereby wind, water and physical action detach soil particles

	and cause them to be transported.
Steep slope	A site where the predominant ground slope is greater than 10% (i.e. 10H:1V) when measured perpendicular to the contour.
SMP	Stormwater Management Plan
Stormwater	Rainfall that runs off hard surfaces such as compacted soil, roofs and car parks or off ground that has become saturated.
Stormwater inlet	An inlet to a stormwater pipe, including grated (field) inlets installed level with, or near the ground.
SSC	Suspended sediment concentration
Temporary erosion and sediment controls	Control measures specifically intended for the management of risk associated with construction and related activities, within the duration of the construction period and defect liability period.
TSS	Total Suspended Solids
TWAF	Temporary Worker Accommodation Facility
Waste water	Water run-off from processes such as, water-cooled cutting equipment, run-off from the washing of tools, surfaces or equipment, and water containing cement residue.
Waters	Any water body whether natural or constructed, including creeks, wetlands, marine waters or groundwater.

1 Scope

The purpose of the Stormwater Management Plan for Stage 2 (SMP) is to ensure that the management of stormwater during the construction phase meets and fulfils the requirements described the EPBC Approval 2008/4057, the Environmental Authority (EPPG00712213) and also additional legal and other requirements as outlined below. As such, this plan will provide a strategy to enable the quality of stormwater generated from the site to meet the water quality release limits identified in the Environmental Authority (EPPG00712213) (Schedule BC – Table 3: Stormwater Release Limits) prior to release, and does not cause any adverse environmental impacts to the surrounding environment.

This SMP applies to the construction phase scope of work on Curtis Island (GLNG Stage 2), and will be in effect once the permanent stormwater infrastructure (such as diversion ditches, drainage ditches, catchment basins and sediment ponds) are fully constructed and operational. Until then, the Stormwater Management Plan: Stage 1 – Early Works (Bechtel doc. no. 25577-100-V13-CG00-00047, GLNG Base no. 3310-BTH-3-3.3-95790-47) will apply.

Stages 1, 2, and 3 are described below in Section 3.1.2.

This SMP has been developed to be consistent with the relevant principles in the:

- Construction Environmental Management Plan (CEMP, Bechtel doc. no. 100-G01-GHX-00017; GLNG doc. no. 3310-BTH-3-3.3-6817)
- Stormwater Management and Erosion and Sediment Control Plan (CEMP, Attachment O, Bechtel doc. no. 100-G01-GHX-0003; GLNG doc.no. 3310-BTH-3-3.3-6833)
- IECA Best Practice Erosion and Sediment Control Guidelines

In addition, it has also been designed to meet and fulfill the legal and other requirements identified in:

- Section 5 of this plan
- Coordinator Generals Evaluation Report
- GLNG Environmental Impact Statement Supplement (SEIS)
- GLNG Environmental Impact Statement (EIS) (URS, 2009)
- Australian Government, Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) Approval EPBC No. 2008/4057
- Environmental Authority (Department of Environment and Resource Management (DERM) Permit Number EPPG00712213)

It may be noted that on 30 March 2012 the Queensland Government announced changes in department functions; the Department of Environment and Heritage Protection (DEHP) now provides functions that

were formerly delivered by DERM, and some DERM functions will now be performed by other departments.

2 Plan Objective

The management objectives of this SMP are to provide mitigation measures to minimise and/ or prevent adverse impacts to Matters of Environmental National Significance (MNES) and to ensure that operations on-site are in accordance with all legislative and other conditions including the EPBC Approval 2008/4057 and Environmental Authority (EPPG00712213).

This SMP has been developed to identify environmental values that may potentially be impacted by storm water, mitigation strategies to be used to prevent/ minimise environmental harm, monitoring and reporting requirements and the management of environmental incidents/ corrective actions.

The SMP is consistent with the requirements in the Environmental Authority (Part B – Condition (BC12) and includes but is not limited to:

- Environmental Values
- Performance Criteria and Objectives
- Mitigation Strategies
- Reporting and Auditing
- Corrective Actions

This SMP should be read in conjunction with the latest versions of the Construction Environmental Management Plan (CEMP) for the Project (GLNG Doc No. 3310-BTH-3-3.3-6817).

3 Project Background

3.1 Project Description

Santos GLNG Pty Ltd (Santos) and its joint venture partners PETRONAS, Total, and KOGAS are developing their Queensland coal seam gas resources in the Bowen and Surat Basins as feed gas for a liquefied natural gas (LNG) and export facility on Curtis Island, Gladstone, Queensland. The LNG facility will have an initial capacity of 3 – 4 million tonnes per annum (Mtpa) with the potential for later expansion to a nominal 10 Mtpa.

The project, known as the Gladstone LNG project (GLNG Project) has the following major components:

- Coal seam gas fields
- Gas transmission pipeline
- LNG liquefaction and export facility (LNG facility)

Other components of the project include supporting marine infrastructure, and channel dredging.

For a full description of the Project refer to the GLNG draft and supplementary Environmental Impact Statements (EIS), which can be accessed, online at www.glng.com.au.

3.1.1 LNG COMPONENT

The LNG facility site permit comprises a total area of approximately 172 ha. The LNG facility will include a Product Loading Facility (PLF), including a jetty, for loading LNG onto tanker ships and a Material Offloading Facility (MOF) for handling shipments of construction material. There is a heavy haul road for transferring plant, equipment, and personnel from the MOF to the construction site. A Temporary Worker Accommodation Facility (TWAF) will be provided on the site for much of the construction workforce.

3.1.2 Stages of Construction

Stage 1 – Early Works: Stage 1 site preparation and civil works has been undertaken by the site civil subcontractor.

The site civil subcontractors have been responsible for establishing required temporary stormwater management controls in their work areas and providing stormwater management plans during the early works phase. Initial works included vegetation clearing and extensive cut/ fill earthworks. The topography of the site has been extensively altered by raising the elevation to protect the site from seaward events (e.g., storm surge, tsunami).

During this initial phase eight (8) stormwater discharge points have been constructed to release stormwater from drainage channels and sediment basins during the bulk of construction of the facility and will continue to function once the LNG facility is operational. The Stormwater Management Plan: Stage 1 – Early Works (25577-100-V13-CG00-00047) applies for this stage which will be effective until all major stormwater control infrastructure is constructed (15 January 2013).

Any works that are not completed by the proposed date will still be considered under the existing Stage 1 Plan until those works are completed. This is likely to apply to the completion and connection of the sites perimeter ditches. Controls in place where works are not completed include capture and containment of stormwater and treatment with flocculent to ensure that discharges from site meet the standards within the EA.

Stage 2 – Construction Works: The proposed work during Stage 2 includes the construction of the bulk of the LNG facility. Major earthworks will typically be excavations for foundations and underground utilities. The Stage 2 stormwater system (including ditches, drains, and sediment basins) will be in place and discharging all site stormwater via eight (8) designated discharge points as discussed earlier. Discharge point aprons along the shoreline, directing stormwater runoff from catchments areas, will be rock armoured. The stormwater system will be routinely inspected and maintained, and the eight (8) discharge points routinely monitored.

This Stage 2 SMP applies to the Construction phase of the works, commencing on 15 January 2013, and expected to reach completion on 15 June 2015.

Stage 3 – Operation Works: Operational works begins following commissioning and start-up of the facility and successful production of LNG (15 June 2015). Extensive secondary containment and berms will isolate potential contaminants from entering the stormwater system. The stormwater system will continue to be in use with routine monitoring / maintenance of the eight (8) stormwater discharge points.

As such, temporary buildings , construction equipment and facilities will be removed and portions of the site that are administered by the Gladstone Ports Corporation (GPC) (e.g., MOF and some of the roads) will potentially be returned to GPC control once plant operation begins. Areas disturbed by construction that do not have permanent works will be restored or stabilised and construction equipment and excess material will be removed from site.

GLNG Operations will develop the Operational Stormwater Management Plan (OSMP) for Stage 3.

3.1.3 Schedule

This Plan applies to the construction phase of the works, which will begin on 15 January 2013, and end in the second quarter of 2015.

Commencement of Stage 2 is defined by the completion of major site civil works, the use of eight (8) stormwater discharge points and the completion of the three (3) sediment basins and two (2) perimeter ditches.

The following table summarises key schedule activities and dates; where applicable:

Step	Activity Description	Timing
Stage 1 – Early Works		
1	Start of Site Prep (MOF & Heavy Haul Road)	2Q 2011
2	Start of Site Prep (RG Tanna & Auckland Point)	1Q 2011
3	Civil works, Foundation & structures Permanent Plant	4Q 2011
Stage 2 - Construction		
4	Start Mechanical/Electrical Installation (main plant)	1Q 2013
5	Start Module Installation (main plant)	2Q 2013
6	System Strength and Integrity Testing (Hyrdrotesting)	4Q 2013
7	Energisation of Power Generation	3Q 2014
8	Start Process Commissioning	3Q 2014
Stage 3 - Operational		
9	1st Production of LNG	2Q 2015

3.2 Stormwater Collection Overview

The final site drainage is divided by geographic location and final topography. Site drainage will be managed by an array of drains, ditches, and underground conveyance structures. Intermediate and final sediment basins will capture site stormwater prior to discharge to Port Curtis Harbour (also known as Gladstone Harbour) through the eight (8) outfall locations specified in DEHP (formerly DERM) Permit Number EPPG00712213. Locations of release points are detailed in **Table 1**.

Table 1: Stormwater Outfalls Discharging to Port Curtis (Summarized from Schedule BC, Table 1, DERM Permit Number PEN101623910) that are Applicable to GLNG Construction and Operations.

Release Point	Latitude or northing (GDA94)	Longitude or easting (GDA94)	Monitoring Point	Receiving Waters Description
SW1	N7367745	E317917	SW1 – MOF	Port Curtis
SW2	N7369034	E317596	SW2 – Sedimentation Basin 2	Port Curtis
SW3	N7368738	E318308	SW 3– Sedimentation Basin 3	Port Curtis
SW4	N7368776	E318563	SW 4 – Diversion Ditch Outfall – East	Port Curtis
SW5	N7368844	E317060	SW 5 – Diversion Ditch Outfall – West and Sedimentation Basin 1	Port Curtis
SW6	N7367490	E318166	SW 6 – MOF area drainage outfall	Port Curtis
SW7*	N7368365*	E318760*	SW 7 – Heavy haul road drainage outfall	Port Curtis
SW8	N7369052	E317117	SW8 – Sediment Basin 1	Port Curtis
Release points are accurate to +/- 25m				

*The location of SW7 has been moved from the east side of the Module Haul Road to its west side, at approximately N7368372, E318747.

SW8 is the outlet from Sedimentation Pond 1, which discharges into a stilling basin, and ultimately to the West Perimeter Ditch and release point SW5. Therefore, unlike the other seven release points, SW8 does not discharge directly to the harbour.

Key features of the stormwater management system include:

Interceptor Ditches - Eastern and western interceptor ditches drain (via perimeter ditches) to the harbour at SW4 and SW5, respectively. These ditches intercept incoming runoff from catchments external to the GLNG footprint, and direct it around the LNG facility into Port Curtis Harbour. The interceptor ditches are designed to handle flows resulting from a 5-year ARI rainfall event. Overflows from the interceptor ditches are captured by the perimeter ditches that are located below them. As such, catchment areas external to the site that discharge to the interceptor ditches may be disturbed independent of LNG construction works which may potentially impact the water quality in the interceptor ditches.

Perimeter Ditches – Eastern and western perimeter ditches also drain to the harbour at SW4 and SW5, respectively. These ditches collect runoff from the cut slopes between the interceptor ditches and the LNG facility, and direct it around the LNG facility and into Port Curtis Harbour. They are approximately parallel to the interceptor ditches, but at lower elevations. The perimeter ditches are designed to handle flows resulting from up to a25-year ARI storm. Taken together, the interceptor and perimeter ditches protect the LNG site from runoff generated from areas external to the LNG boundary. Runoff generated within the LNG boundary is handled by the site drainage system, which directs flow to three (3) sediment basins as described below:

Sediment Basin#1– Collects stormwater from the developed western side of the site, with a catchment area of approximately 22.0 ha. Basin#1 discharges via SW8 to a stilling basin that drains through a culvert to the west perimeter ditch, which then discharges to the harbour at SW5.

Sediment Basin#2– Collects stormwater from the central site development, with a catchment area of approximately 29.7 ha. Basin#2 discharges to Port Curtis Harbour at SW2.

Sediment Basin#3 – Collects stormwater from the developed eastern side of the site, including the Temporary Worker Accommodation Facility (TWAF). The contributing drainage area to Basin #3 is approximately 41.3 ha. Basin#3 discharges to Port Curtis Harbour at SW3.

Materials Offloading Facility (MOF) and Quarantine Area– This area is located south of the main LNG facility, and has a separate stormwater drainage system consisting of drains, ditches, and underground conveyance structures. It includes a perimeter ditch along the hill slope parallel to the module haul road. The MOF area stormwater drainage system discharges to the harbour at three (3) locations: SW1, SW6, and SW7.

3.3 Environmental Values

During 2008 and 2009, GLNG prepared an Environmental Impact Statement (EIS) and a Supplementary Environmental Impact Statement SEIS to identify Matters of National Environmental Significance (MNES) which will potentially be impact by the construction and operation of the project. The following MNES have the potential to be impacted subsequent to works:

- World Heritage (Great Barrier Reef World Heritage Area)
- National Heritage Places (Great Barrier Reef Marine Park)
- Listed Threatened Species and Communities
- Listed Migratory Species (Rainbow bee-eater – *Merops omatus*, Eastern curlew – *Numenius madagascarienisis*, Whimbrel – *Numenius phaeopus*)

The tidal flats, shoreline, and marine environment in Port Curtis Harbour including The Narrows also provide aquatic habitat to a variety of fauna and flora including shore birds, dugong, sea turtle, fishes, and aquatic grasses. The Port is also home to a variety of marine creatures such as dugongs, turtles and dolphins and has an extensive supporting sea grass and mangrove habitat.

3.4 Climate and Rainfall

The Gladstone region has a sub-tropical climate with a mean annual rainfall of approximately 900mm, based on the period of record annual means of 886mm and 911mm reported for the nearby Gladstone Radar and the Southend Curtis Island stations, respectively (Bureau of Meteorology; data accessed May 2012). The heaviest rainfall occurs during summer (November to March) in the tropical monsoon season. **Table 2** shows the rainfall intensities for various durations and average recurrence intervals (GLNG Doc No. 3310-BTH-3-3.3-0011-PDF).

Table 2: Rainfall Intensity (mm/hr) for Various Durations and Average Recurrence Intervals for Hamilton Point, Curtis Island.

Duration	Average Recurrence Interval, years							
	1	2	5	10	20	25	50	100
5-minute	110	143	184	209	243	252	290	327
6-minute	103	134	173	197	229	237	273	308
10-minute	85	110	142	162	188	194	224	252
20-minute	63.3	81.7	105	118	137	142	163	183
30-minute	52	67	85.5	96.9	112	116	133	149
1-hour	35.3	45.6	58.5	66.4	77.1	80	91.5	103
2-hour	22.8	29.6	38.4	43.9	51.2	53	61.3	69.2
3-hour	17.3	22.6	29.7	34.1	40	41	48.1	54.5
6-hour	10.8	14.2	19	22.1	26.1	27	31.8	36.3
12-hour	6.78	9	12.4	14.6	17.5	18	21.5	24.8
24-hour	4.33	5.82	8.28	9.95	12.1	12	15.2	17.8
48-hour	2.72	3.72	5.54	6.82	8.49	9	10.9	13
72-hour	2	2.76	4.22	5.28	6.66	7	8.7	10.4

4 Impacts to Environmental Aspects

Potential impacts have been identified in Section 8 of the GLNG Environmental Impact Statement (URS, 2009) and in particular Section 8.3 Land and Section 8.5 Surface Water.

Key impacts including activities with potential to have an adverse impact on Matters of National Environmental Significance (MNES) proposed to be undertaken during the construction of LNG facilities relating to Stage 2 – Construction are summarised in the sections below.

Inadequate stormwater management onsite can influence environmental values by adversely impacting, but not being limited to:

- Water quality

- Vegetation including aquatic vegetation
- Habitat/ biota diversity

Due to the proximity of the site to World Heritage (Great Barrier Reef World Heritage Area) and National Heritage Places (Great Barrier Reef Marine Park) in particular, adverse impacts on environmental values can potentially have exacerbated effects.

These potential impacts have been identified in Section 8 of the GLNG Environmental Impact Statement (URS, 2009) and in particular Section 8.3 Land and Section 8.5 Surface Water.

However, key activities with potential to have an adverse impact on Matters of National Environmental Significance (MNES) proposed to be undertaken during the construction of LNG facilities relating to Stage 2 – Construction are summarised in the sections below.

4.1 Earthworks and Erosion and Sediment Mobilisation

The proposed GLNG Stage 2 works may influence water quality, particularly:

- Earthworks undertaken immediately prior to rainfall periods
- Work areas that have not been stabilised
- Maintenance of environmental control measures
- Time taken for the rehabilitation of disturbed areas

Potential impacts from erosion and sediment transportation can influence environmental values by adversely impacting, but not being limited to:

- Water quality
- Stream beds
- Aquatic vegetation
- Aquatic habitat/biota diversity
- Plankton and aquatic plant growth

In particular the following water quality parameters can be affected:

- Turbidity - The turbidity or 'muddiness' of water is caused by the presence of suspended particulate and colloidal matter consisting of suspended clay, silt, phytoplankton and detritus. The suspended material may reduce light penetration and have adverse effects on fish due to mechanical and abrasive impairment of gills in addition to smothering benthic organisms and their habitats;
- pH - Changes to pH may affect the physiological functioning (e.g., enzymes, membrane processes) of biota and mobilize metals bound within the sediments;

- Dissolved Oxygen (DO) - Low DO concentrations can result in adverse effects on many aquatic organisms (e.g. fish, invertebrates and microorganisms) which depend on oxygen for their efficient functioning. Low dissolved oxygen levels may allow the mobilisation of nutrients, such as phosphorus, in soluble forms from the sediments; and
- Temperature - Ecosystem functioning is very closely regulated by temperature. Temperature of water is usually significant because it affects the amount of dissolved oxygen in the water. The amount of oxygen that will dissolve in water increases as temperature decreases.

4.2 Management of Top Soil

The management of topsoil stockpiles directly affects the potential for erosion from factors such as wind and water. Excessive erosion of top soil can impact on landscape rehabilitation programs due to unsuitable topsoil and/or lack of topsoil. The presence of dust and heavy sediment loads in the stormwater system are indicators that topsoil stockpiles are not being managed effectively.

Poor topsoil management can potentially result in:

- Sediment deposition destroying fish spawning beds
- Reduction of storage volume in sediment basins
- Transportation of toxins
- Reduce light penetration and plant photosynthesis altering the waterways ecology

Many environmental impacts from sediment are cumulative, and the ultimate results and costs may not be evident for years.

On-site erosion and sedimentation can cause costly site damage and construction delays. The effectiveness of maintenance measures directly influences the likelihood of unauthorised discharge(s) and potential impacts on aquatic flora and fauna.

4.3 Earthmoving Activities and Works Adjacent to Drainage Lines

The movement of sediment and potential erosion may be exacerbated from the construction of the LNG Facility and vehicle crossings of drainage features (URS, 2009).

4.4 Contaminant Mobilisation and Pollution

The use of fuels and chemicals including diesel and other hydrocarbon based products introduces a risk of these substances being mobilized into the receiving environment. Potentially contamination may result from the spillage and/or leakage of hydrocarbons or oils from handling and/ or storage on-site.

Impacts from spills and/or leaks of hydrocarbon based products may include:

- Contamination of land and waters
- Increased risk of flammable and explosive hazards

- Create acute and/or chronic toxic hazards
- Reduction of habitat values

5 Legal and Other Requirements

Construction activities shall be planned and implemented in accordance with all relevant legal and regulatory requirements. Appropriate mitigation measures will be employed to manage environmental aspects to demonstrate operational compliance and best practice stormwater management on-site. The applicable legislation and standards the project will adhere by are listed below:

5.1.1 Statutory Requirements

- *Coastal Protection and Management Act 1995*
- *Environmental Protection Act 1994 (EP Act)*
- *Environment Protection and Biodiversity Conservation Act 1999*
- *Environmental Protection (Water) Policy 2009 (Water EPP)*
- *Environmental Protection Regulation 2008*
- *Fisheries Act 1994*
- *Great Barrier Reef Marine Park Act 1975*
- *Water Act 2000*

5.1.2 Guidelines

- ANZECC/ARMCANZ *(2000;Australian and New Zealand Guidelines for Fresh and Marine Water Quality)* Guidelines*;*
- Australian Water Quality Guidelines for Fresh and Marine Waters
- *Best Practice Erosion and Sediment Control,* International Erosion Control Association (IECA) Australasia (2008)
- Department of Environment and Resource Management (DERM)*, Queensland Water Quality Guidelines (2009)*
- Queensland Government *Queensland Water Quality Guideline (2006)*

5.1.3 Permits and Approvals

- Australian Government, Department of Sustainability, Environment, Water, Population and Communities (2010); Approval, Development of a Natural Gas Liquefaction Park associated with the Gladstone LNG Project – EPBC No 2008/4057
- Environmental Authority (Permit Number PEN101623910) issued by DERM. Under Section 310M of the Environmental Protection Act 1994 the permit is issued to Santos GLNG Pty Ltd, PAPL (Downstream) Pty Limited, and Total GLNG Australia

5.1.4 GLNG Project Documentation

- Bechtel (2011). Stormwater Management & Erosion & Sediment Control Plan (GLNG Document Number: 3310-BTH-3.3.3.6833) (Bechtel Document Number: -100-G01-GHX-00033, Rev. 1)
- Queensland Government (2010). Coordinator-General's evaluation report for an environmental impact statement, Gladstone Liquefied Natural Gas, GLNG Project under Part 4 of the State Development and Public Works Organisation Act 1971 , May 2010
- URS (2009). GLNG Environmental Impact Statement Supplement
- URS (2009). GLNG Environmental Impact Statement
- GLNG Environmental Policy

6 Performance Criteria

The following performance criteria and objectives apply to stormwater, erosion, and sediment management for Stage 2 – Construction at the GLNG site and are in accordance with the relevant conditions/ commitments as identified by the EPBC Approval 2008/4057, Environmental Authority (EPPG00712213) and the CEMP.

1	Appropriate measures must be implemented that will ensure that there are no unacceptable impacts on the Great Barrier Reef World Heritage Area, Great Barrier Reef National Heritage Place, EPBC listed threatened species or migratory species
2	Prevent/ minimise the likelihood of environmental harm
3	Ensure controls are in place to prevent/ minimise the release of contaminants to groundwater or unauthorised release of stormwater
4	Explosives, hazardous chemicals, corrosive and toxic substances, gases, dangerous goods and flammable and combustible liquids must be stored and handled in accordance with the relevant Australian Standard
5	Spillages of wastes, contaminants or other materials must be cleaned up as quickly as practicable using dry methods to minimise the release of wastes, contaminants or materials to stormwater drainage systems or waters and disposed of appropriately
6	Erosion protection and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment causing contamination of stormwater
7	Acid sulfate soils must be managed in accordance with the *Queensland Acid Sulfate Soil Technical Manual, Soil Management Guidelines 2002* such that contaminants are not directly or indirectly released to any water or the bed or banks of any waters
8	All construction facilities/ activities must be designed/ maintained in accordance with the guideline "Best Practice Erosion and Sediment Control, International Erosion Control

	Association 2008" and supporting documentation as updated from time to time
9	An environmental monitoring program shall be maintained which details ongoing monitoring of water quality for the construction phase in accordance with the EPBC Approval and the Environmental Authority (see section 8)
10	All stormwater discharged from the site is to comply with the release limits identified in the DEHP (formerly DERM) Environmental Authority (EPPG00712213)conditions
11	The stormwater and erosion and sediment control conditions of the EPBC Approval 2008/4057 and the Environmental Authority (EPPG00712213) will be audited, documented and corrective actions implemented for any non-conformances or potential non-conformance with site conditions

7 Mitigation Strategies and Implementation

7.1 General Management Strategies

The Project shall incorporate Best Management Practices (BMPs) in accordance with the International Erosion Control Association (IECA) guideline that meets the requirements of the EPBC Approval 2008/4057, Environmental Authority (EPPG00712213) and the CEMP:

1	All hazardous materials and flammable and combustible liquids stored on site that have the potential to cause environmental harm must be stored in an effective containment system that is impervious to the materials stored and managed to prevent the release of liquids to waters or land in accordance with the relevant Australian Standard. Where no relevant Australian Standard is available, the following must be applied: (a) storage tanks must be bunded so that the capacity of the bund is sufficient to contain at least 110 percent of a single storage tank or 100 percent of the largest storage tank plus 10 percent of the second largest storage tank in multiple storage areas; and (b) drum storages must be bunded so that the capacity of the bund is sufficient to contain at least 25 per cent of the maximum design storage volume within the bund.
2	All stormwater management devices must be installed and maintained to ensure they are working properly at all times
3	Any accidental release of contaminants directly or indirectly to waters: must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum or litter.
4	Appropriate spill kits shall be supplied to areas onsite that have a high risk of spillages of waste, contaminants or other materials to minimise the release of wastes, contaminants

	or materials to any stormwater drainage system, roadside gutter or waters.
5	All monitoring required to be undertaken on-site shall be done by suitably qualified, experienced and competent person(s)
6	All analyses and tests required to be conducted in a laboratory, shall be carried out by a laboratory that has NATA certification for such analyses and tests, except as otherwise authorised by the administering authority
7	All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this authority shall be calibrated, appropriately operated and maintained
8	The release of contaminants from the stormwater discharge points to waters shall be monitored at the locations and for each quality characteristic specified in Schedule BC - Table 3: Stormwater Release Limits
9	Contingency plans and emergency procedures have been developed and implemented for non-routine situations to deal with foreseeable risks and hazards including corrective responses to prevent and mitigate environmental harm
10	Accurate records will be maintained substantiating all activities associated with or relevant to approval conditions and are available on request to the Department to verify compliance with the approval conditions
11	Environmental incidents will be managed according to the Incident Reporting Procedure and investigated/ reported according to the requirements identified in the approval conditions. As such, triggers have been established to ensure incident reviews are undertaken if required and corrective actions managed appropriately in accordance with the Environmental Incident Reporting Procedure
12	Additional stormwater management measures will be employed if existing controls are not adequate as identified through regular inspections, internal/ external audits, complaints and/or incident reporting

7.2 Stormwater

The following strategies and controls will be implemented to minimise potential impacts on receiving waters in accordance with the International Erosion Control Association (IECA) guideline that meets the requirements of the EPBC Approval 2008/4057, Environmental Authority (EPPG00712213) and the CEMP:

Stormwater Management	
1	All management controls including plant and equipment necessary to ensure compliance with the conditions of Environmental Authority (PEN101623910) will be implemented and maintained in a proper and efficient condition and operated in a proper and efficient manner
2	Stormwater collection and control systems will be designed and constructed to ensure stormwater discharged to Port Curtis Harbour is compliant with the water quality release limits identified in site conditions (Environment Authority EPPG00712213)
3	Permanent stormwater drainage channels on site will be designed to convey up to the 1 in 25 year Average Recurrence Interval (ARI) storm (in compliance with design criteria)
4	External stormwater runoff will be directed around the facility site via perimeter diversion ditches to be discharged to the harbour at the easternmost and westernmost boundaries through grass/rock lined ditches with riprap aprons at the discharge points
5	Stormwater from the site is channeled to sediment basins to allow sediment to settle. See Section 3.2 for a discussion of the sedimentation basins.
6	The release of contaminated stormwater from the main plant site will be prevented by ensuring that all stormwater is directed to drainage channels and sediment basins prior to discharge
7	Surface drains will be maintained in accordance with approved design and any blockages/ sediment build-up removed as required
8	Access shall be maintained adjacent to internal site drainage to allow access for machinery to conduct maintenance on the stormwater system
9	Stormwater drains and sediment control devices will be used throughout construction. Interim measures, such as the use of silt fences, check dams or similar temporary measures will be implemented to reduce suspended solids in the stormwater discharge prior to the permanent stormwater drains and infrastructure installation or when existing permanent controls are inadequate due to inclement weather events.
10	Erosion and Sediment Control measures shall be maintained in accordance with the Erosion and Sediment Management Plan for Stage 2 – Construction Works

11	All construction works must include the implementation and maintenance of erosion protection measures and sediment control measures, including but not necessarily limited to: (i) rock check dams; (ii) silt fences installed in accordance with the IECA guidelines around soil and stockpile sites; (iii) silt fences installed in accordance with IECA guidelines between construction areas and surface waters and wetlands; (iv) drainage ditches; (v) diversion channels around disturbed areas; (vi) rapid stabilisation of exposed areas; (vii) mechanical compaction of graded areas; (viii) controlled flows through stormwater drains and temporary basins; and(ix) rock armouring drainage discharge points
12	Hardstand areas shall be maintained to minimise the potential for erosion and ponding on-site
13	Long-term spoils stockpiles will be stabilised to minimise erosion. This may include benching of the stockpile, the installation of diversion drains, installing batter slope protection and other such measures deemed appropriate to manage the risk of erosion and sediment control onsite
14	Temporary stockpiles will be managed to minimise erosion and contaminants entering the stormwater system by installing temporary drainage works (channels and bunds) where required around storage areas. Other controls may also be used such as sediment fencing, stockpile covers and stockpile profiling
15	Temporary trenches will be left open only for the periods necessary to install pipelines, cables or equipment
16	Works in the vicinity of a watercourse or drainage line will be subject to a layout/design plan approved by the EM before works start
17	Contaminated soils (if identified) will be stockpiled in an appropriately lined, bunded area on-site with a separate stormwater catchment system to allow treatment of the stormwater prior to discharge
Sediment Basin Management	
19	Ensure that sediment basins are desilted as required to maintain the settling zone as designed, minimise the likelihood of overflow events, and to assist in meeting water quality release limits in accordance with the IECA guidelines
Monitoring	
20	All stormwater management controls will be monitored visually on a weekly basis and after significant rain events to verify that they are functioning effectively and check for require maintenance

21	Water quality monitoring of the water storage areas will be undertaken at the locations and for each quality characteristic as specified in the Environmental Authority EPPG00712213 (Schedule BC – Table 3: Stormwater Release Limits). Required monitoring under the Environmental Authority shall be undertaken by a suitably qualified, experienced and competent person(s)
22	Inspection checklists include details about the observations, the responsible party, and if anon-compliance or potential non-compliance is identified, when the situation shall be mitigated. These inspections shall be documented on an Environmental Field Report. In the event of a non-compliance, a Corrective Action Report shall be completed detailing the issue, responsible party, recommended corrective action and a schedule for completion
23	A weather station will be located on Curtis Island to collect on-site wind, precipitation and other weather data for use in assessment of various environmental data
Reporting and Notification	
24	If an overflow event or an unauthorised release of waters occurs an Environmental Incident Report shall be filed and the Environmental Management team notified as soon as practicable
25	Report any water quality exceedances and reportable incidents in accordance with reporting requirements identified in the relevant approvals
26	Spills of contaminants (including but not limited to hydrocarbons) of the following volumes: (a) release of any volume of contaminants to water; (b) releases of volumes of contaminants to land greater than 200L of hydrocarbons; or (c) any other release not authorised under the Environmental Authority which has caused, or has the potential to cause serious or material environmental harm will be reported accordingly
27	Electronic copies of all required environmental documents shall be submitted to the Document Control department and electronically filed and accessible
28	Records of all Bechtel inspections shall be maintained by the Bechtel Environmental Manager. Subcontractors shall be required to maintain copies of their inspection reports for the life of the project. The Bechtel Environmental Manager shall periodically check subcontractors' records to verify that records are being maintained
29	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 in accordance with the Environmental Incident Procedure
30	Reporting, investigation and management of corrective actions associated with environmental events (will be conducted in accordance with the CEMP (construction) and Project EMP (operations)

Hazardous, Flammable and Combustible Materials	
31	Vehicle maintenance and wash-down areas, waste storage areas, and other areas with potential contaminants will be designed in accordance with appropriate Australian standards and will contain waste water separate of the stormwater system
32	Areas that may be contaminated such as where engines, oil and chemicals are stored or used will be contained and drains will be directed to an isolated collection sump for collection by vacuum truck, or oily-water separator for free oils removal prior to discharge to the stormwater collection system
33	Spill kits will be provided and placed where required on site as appropriate to an activities level of risk.
34	An appropriate spill kit, personal protective equipment and relevant operator instructions/emergency procedure guides for the management of wastes and chemicals associated with the activities shall be kept and maintained at the site
35	Prior to bringing a hazardous material on-site, subcontractors shall request in writing approval from Bechtel to use the material on-site. The request shall include the name of the material, quantity and type, MSDS and CAS number of the material, plus the quantity of spill prevention and response materials that will be brought on-site in case of a spill. Bechtel HSEM will review and approve only those materials that are allowed
36	Regulated waste bins are provided on-site for the disposal of materials used to clean up spills, including dry absorbents. This waste is disposed of by a registered operator to an appropriately licensed facility

7.3 Sediment Basins

The sedimentation basin design follows the best practice guidelines, as recommended by IECA and is suitable to manage stormwater onsite in compliance with the Environmental Authority (EPPG00712213) conditions. The basins used for Stage 2 construction are 'Type D' basins, designed according to the volumetric criterion. The volume for the basins has been determined by using the 1-year 1-day rainfall intensity in accordance with IECA guidelines.

The basin volume consists of a settling zone and a storage zone. The storage zone is estimated using the Revised Universal Soil Loss Equation (RUSLE) such that the estimated sediment volume is retained within the basin storage zone before planned cleaning.

The current design assumes outflow via pumping after flocculent treatment of the stored water to ensure that it meets the 66NTU turbidity limit identified in the Environmental Authority EPPG00712213. Emergency spillways are designed to convey runoff from the 1 in 50-year ARI storm. Monitoring point locations and receiving waters descriptions are identified in Table 1 Stormwater Outfalls Discharging to

Port Curtis (Summarized from Schedule BC, Table 1, Environmental Authority (EPPG00712213) that are Applicable to GLNG Construction and Operations (page 11)

The sedimentation basins are designed to operate as stormwater storage areas, allowing treatment of stored water, if necessary, prior to release through pumping.

In case of rainfall beyond the design of the basin, an authorised emergency spillway will allow discharge to the harbour. Even when the basin is full of water, sediment-laden stormwater runoff continues to be directed through the basin for continued settlement of particles.

The sediment basins are designed to produce high quality outflows that will meet the 66 NTU limit for the 1 in 1 year ARI120 hours (5-day) storm (Condition BC20 in DEHP Permit Number EPPG00712213). If the prescribed turbidity limit of 66 NTU is exceeded, flocculent will be added to enable compliance with the discharge criteria.

Sediment basins will be maintained as necessary by water pumping or removal of sediment to meet required retention volumes. A minimum settling zone of 600mm (or L/200 for basins longer than 120m, where L = effective basin length) shall be maintained along with a freeboard of 300mm to top of berm or as identified in the IECA guidelines.

In selected instances flocculent chemical may be added to stormwater to aid settling of suspended sediment. Flocculent may be used in ditches, tanks, sediment basins, or other situations where removal of suspended sediment is necessary. The site Environmental Manager shall determine when, where, and how much flocculent to use. A record of flocculent used on-site will be maintained.

If an overflow event occurs, an Environmental Incident Report will be filed and the environmental management team notified. Further notifications will be escalated in accordance with the Environmental Incident Reporting Procedure.

If required an incident investigation will be undertaken to determine the root cause and necessary corrective actions to prevent and/ or minimise the likelihood of further overflow events.

7.4 Erosion and Sediment Control Measures

Erosion and sediment control shall be conducted and implemented as per the Stormwater Management Plan and the Erosion and Sediment Control Plans developed in accordance with the Environmental Authority (EPPG00712213). Details and drawings of other erosion and sediment control measures to be used are provided in CEMP Attachment A for:

- Rip-rap aprons at the outlets of sediment basins
- Gravel/rock check dams at the drainage ditches
- Placement of silt fencing and other sediment catchments on-site
- Inlet protection measures
- Stabilised construction access roads

Fugitive dust generated during construction either directly by construction activities or indirectly by wind erosion effects on areas where soil disturbance has occurred or on stockpiles can have detrimental effects on sensitive receptors. Additional mitigation measures to be implemented for the control of sources of construction fugitive dust are provided in the 'Air Quality Management Plan'.

7.5 Reconstruction of Slopes

Steep slopes will require stabilisation during construction, particularly batter slopes, slopes for sediment basins, soil disposal areas, new roadside ditches or channels, and areas with potentially wet soils. Terracing, geotextile, or erosion control matting shall be used where required, in combination with riprap seeding and mulching, wherever possible.

7.6 Riparian Zones near Wetlands/Streams/Sensitive Areas

Buffer strips of vegetation will be left intact, wherever possible, between construction works and wetland and/or stream boundaries to help protect water quality. Where possible, a riparian zone will be left undisturbed to allow a natural filter between exposed soils, wetland areas and other known sensitive areas.

7.7 Silt Fences at Streams and Wetlands

Silt fences shall be installed where needed between construction areas and existing water bodies to provide protection against sedimentation. Silt fences shall be installed as per design details to intercept and detain the flow of sediment laden runoff. The condition and functionality of these silt fences shall be monitored as part of the regular inspections. Maintenance shall include repairing/replacing damaged silt fence and removal of sediment if necessary.

7.8 Road Drainage and Inlet/Outlet Filters

Drainage ditches will be constructed as designed to effectively drain adjacent construction areas. Inlet and outlet filters shall be installed where necessary to protect storm drains from becoming obstructed and to maintain runoff water quality consistent with required conditions. Outfall locations shall be protected with erosion control matting or rock rip-rap to prevent scouring.

7.9 Dewatering

Measures will be implemented so that dewatering of construction excavations does not result in erosion. If dewatering of foundation excavations is required, extracted water will be managed through the on-site sediment basins or utilized for dust suppression. Extracted water will be tested and treated and/or diluted as appropriate to ensure compliance with water quality requirements prior to being discharged.

An Environmental Management representative must be alerted prior to dewatering construction excavations or drainage channels to assess water quality.

7.10 Revegetation

Disturbed areas will be revegetated as soon as practicable after the completion of works in accordance with the *Environmental Authority (EPPG00712213)*. Permanent stockpile areas will be rehabilitated after the completion of works as identified in permit / licensing conditions. In the interim these areas will be managed using the discussed stormwater management controls identified in this plan in addition to the identified controls in the 'Erosion and Sediment Control Plan for Stage 2 – Construction'.

Areas which have been disturbed subsequent to civil works will be stabilised using the discussed controls to minimise erosion and sediment mobilisation into internal site drainage. This will potentially involve stabilisation using vegetative controls.

8 Monitoring

8.1 Construction Monitoring

8.1.1 Stormwater Monitoring

In accordance with the Environmental Authority EPPG00712213 (Schedule BC – Table 3: Stormwater Release Limits) water quality monitoring will be undertaken when the sediment basins will actively discharge. Monitoring accounts for diurnal, seasonal and annual variation as monitoring will be undertaken whenever there is a rain event which requires the stored sediment basin water to be discharged into the receiving environment.

All water quality monitoring will be undertaken by suitably qualified, experienced and competent person(s) in accordance with the conditions outlined in Environmental Authority EPPG00712213 and reported accordingly.

The water quality and testing program has been developed in accordance with condition BC20 of the Environmental Authority EPPG00712213 and is designed to enable compliance with the EPBC Approval 2008/4057. Release of contaminants from the stormwater discharge points to waters must not exceed the release limits stated in Schedule BC – Table 3: Stormwater Release Limits for each quality characteristic. The presence of hydrocarbons, metals and all other parameters will be sampled by an approved third party and analysed by a NATA certified laboratory.

Other stormwater monitoring that will be undertaken during Stage 2 – Construction Works includes:

- Stormwater control devices will be inspected throughout the duration of the project. Control devices found to be not effective or requiring maintenance shall be replaced or repaired.
- Inspections during periods of rainfall shall be conducted to evaluate the effectiveness of the controls and to identify if additional controls are required.
- Discharge locations shall be visually inspected during and after heavy rainfall events to verify that upstream stormwater management measures are functioning effectively and operational.

8.1.2 Weather Station Data

Rainfall measurements are taken and recorded through the use of two (2) weather stations onsite. This information is reported both internally and to the client. Data gathered from the weather stations is also used within Environmental Incident Reporting when required.

8.2 Operational Monitoring

LNG operational environmental plans and procedures are not addressed in this plan.

9 Responsibilities

9.1 Owner/Operator–GLNG

- Liaise with Australian Government authorities, as required
- Support Bechtel and other entities in the implementation of this Plan

9.2 Prime Contractor – Bechtel

9.2.1 Site Manager (SM)

- Provide necessary resources and personnel for the execution of this plan
- Communicate with all project personnel and contractors regarding construction stormwater use strategies
- Communicate surface use strategies with relevant stakeholders and the client
- Immediately notify the Bechtel Environmental Manager (EM) if significant matters pertaining to surface water use activities or management arise

9.2.2 Environmental Manager (EM)

- Act as the primary point of contact for the Project regarding surface use management and conservation matters
- Use “stop-work” authority with regards to construction activities that are in breach of the standards specified by this Plan (i.e. the un-approved abstraction of surface water)
- Provide the Project with technical and regulatory compliance support regarding this Plan
- Supervise and conduct inspection/monitoring of surface water use activities
- Review and evaluate contractor surface water use plans and provide recommendations for improvements, as needed
- Ensure water quality monitoring is undertaken in accordance with licensing/ permit conditions and reported accordingly

- Coordinate with Project Management staff, Environmental staff and other functions (e.g.,Legal) on surface use compliance issues, which may include notices of violation, potential fines, or other penalties
- Document complaints and liaise with the Field Subcontracts Manager (FSM) on these issues. Initiate the complaints handling procedure where appropriate
- Communicate the need for corrective actions to the SM and FSM
- Interact with contractors and visiting agency and authority representatives, as directed by the SM, for environmental compliance issues
- Update and amend this Plan as required

9.2.3 Field Subcontracts Manager (FSM)

- Verify that Subcontractors perform their scope of work in accordance with their subcontract
- Document construction surface use compliance, corrective actions and notifies the SM or EM, as necessary
- Liaise with Subcontractors and the EM for construction surface water use issues
- Coordinate contractor construction non-compliance issues and problem resolution with the EM and Superintendents, as required

9.2.4 Subcontractors

- Implement all provisions of this Plan and the CECP related to their scope of work
- Install temporary erosion and sediment control measures where required during works
- Provide training and promote awareness of construction surface water use planning and activities with staff
- Conduct field inspections and maintains documentation
- Report and investigate any incident associated with stormwater management on-site and report to the Environmental Management team
- Promote construction stormwater use best practice and procedure/equipment innovation

10 Other Water Uses

If deemed suitable stormwater will be reused for dust control and soil compaction to optimise the use of this resource and reduce the need for stormwater releases to the harbour.

Water will also be required at the project site for the purposes of:

- Potable water

- Soil compaction/ Dust suppression
- Wash downs
- Hydrotesting of pipes and tanks
- Sanitation
- Miscellaneous other purposes

This SMP has been developed for the management of stormwater only. Waste water from hydrotesting, sanitation and other purposes will be managed according to their relevant management procedures which are not included in this SMP.

11 Training

11.1 Training and Communication

- An overview of the relevant requirements in this Plan will be provided as a component of the project induction program
- On-site advice will be provided by the Environmental Management team
- 'Tool box' training and environmental bulletins will be provided to raise awareness of onsite environmental management issues relating to surface water use
- Issues raised by the community will be addressed through the EM
- Specialty training will be provided to selected crews (e.g., erosion control, spill response, hazardous material handling, etc.)
- Records will be retained of completed training

12 Reporting and Auditing

12.1 Site Inspections

Regular site inspections will be undertaken for the purpose of identifying required maintenance on stormwater / erosion and sediment controls, verifying on-going compliance and best management practices in accordance with the CEMP with additional inspections being undertaken when active construction activities are taking place.

Notice will be given to any Subcontractor or Bechtel direct hire for all non-conformances or potential non-conformances with site management plans and licensing/ permit conditions (including maintenance requirements). Notifications of non-compliance shall specify the type(s) of non-compliance, the

corrective actions needed, whether Bechtel or subcontractors are responsible for the action, and a time schedule for implementing corrective actions.

The EM or their delegate may also undertake inspections of "critical activities", which have been defined as potentially having a significant impact on stormwater use. As a result of these inspections, a Corrective Action Report identifying non-conformances for correction will be maintained.

12.2 Records and Reporting

The following environmental records shall be maintained:

- Inspection reports
- Internal/ External audit reports
- Environmental Incident Reports, Corrective Actions (resulting from inspections, incidents and any deficiencies identified by the monitoring program)
- Records of monitoring, including calibration records and records of quantities of releases

Non-compliance and reported incidents will be investigated according to the 'Environmental Incident Reporting Procedure' if required and closed-out.

12.3 Review

The EM is responsible for an annual review of the GLNG Stormwater Management Plan – Stage 2 and the overall CEMP and related documentation. Review of this Plan may also be undertaken:

- In accordance with the Environmental Authority EPPG00712213 requirements
- When there is a relevant change in Bechtel's scope of the Project
- After changes to relevant legislative and/ or other requirements
- Following a major environmental incident
- When there is a need to improve performance in an area of environmental impact

The review will consider the following issues:

- Related environmental incidents
- The extent of compliance with environmental performance objectives and targets
- Changes to guidelines, standards or legislation
- Any changes in the type and scope of works which has an impact on the environmental requirements of the project
- The appropriateness and ease of use of the Plan

- Notices, Tool Box Talks, or other educational means will be used to advise workers and staff of any changes to this Plan as a result of its review

The significance of revisions will be assessed by the EM, who will refer the revised document for review and approval. The EM will have the authority to call for a review of any document, should it be considered that a review is required, based on an environmental incident or other such relevant event.

13 Notification

Notification of emergencies or environmental incidents will be in accordance with the actions (including timeframes) identified in Schedule K of the Environmental Authority (EPPG00712213) and the CEMP.

If an incident occurs the environmental management team must be immediately notified verbally and an incident report must be filed within 24 hours of the event occurring. Notification procedures are then determined dependent upon the incident category level and incident type in accordance with the Environmental Incident Reporting Procedure.

14 Corrective Actions

In the advent that remedial or mitigation actions are required to ensure compliance or to prevent potential noncompliance both immediate and long term corrective actions will be applied where necessary.

Corrective actions are identified through the use of Environmental Inspection Reports, Environmental Incident Reports, and Environmental Surveillance Observations. These reports include details about the event, required temporary and long-term corrective actions, the responsible party, and time frames for the close out of corrective actions.

An Environmental Management team member will initiate corrective actions via a Corrective Action Request, noting any actions necessary to maintain environmental compliance. All CARs will be entered into the action tracking database maintained by the Environmental Manager, and the status of open actions will be tracked. A copy of the database will be provided to the SM each quarter. Open actions will be reviewed in weekly progress meetings to help promote timely closeout.

If necessary, “stop work” orders will be issued if construction activities are not in accordance with the applicable environmental requirements and/ or activities cause adverse impacts to MNES. If such conditions exist, the EM will take appropriate action to halt and correct the problem as soon as practicable followed by the immediate notification of the SM and the Construction Superintendent, as appropriate.

The construction activity in question will not resume until corrective actions have been applied and the risk of reoccurrence is prevented and / or minimised to an appropriate level.

GLNG

SURFACE WATER AND GROUNDWATER MANAGEMENT PLAN

(Attachment P to CEMP)

3	05-Dec-13	Issued for Update	ER	PN	BF	HH	BT
2	11-Apr-13	Updated for Issue	RJF	SMP	BF	RR	BT
1	1-Nov-11	Updated for Publication	RW	RR	BF	BT	AP
0	19-May-10	Issued for Use	RW	RRR	BF	CJK	BT / AP
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A	21-Jul-10	Issue for Review	RW	MD	JJM	CJK	ABP
REV	**DATE**	**REASON FOR REVISION**	**BY**	**CK'D**	**Site Mgr**	**APE**	**PM**

BECHTEL OG&C INC.		**JOB NO. 25576**
	SURFACE WATER AND GROUNDWATER MANAGEMENT PLAN	**DOCUMENT NO.** / **REVISION**
		100-G01-GHX-00034 / **3**
		GLNG Doc No. 3310-BTH-3-3.3-6834

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1 INTRODUCTION

This Surface Water and Groundwater Management Plan is Attachment P of the Construction Environmental Management Plan (CEMP) for the Gladstone LNG Project and shall be read and interpreted in conjunction with the CEMP (ref. 25576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617), in particular section 1.1.

This Plan addresses management of surface water and groundwater by the Project during construction and commissioning on Curtis Island. The project site has no recognised naturally occurring permanent surface water bodies (ponds, springs, or streams) and so all surface water is either flowing/retained stormwater, discharge of hydrotest waters, water from flushing activities or sea water. Groundwater is present at the site, at depths that will not generally be encountered by project construction. The site borders the Port of Gladstone and circumstances where sea water may interfere with construction activities, such as from extremely high tides or storm surges, are addressed here.

Management issues include:

- uses of surface water for, dust control, or other purposes;
- prevention of contamination of surface waters from concrete and other washout facilities;
- dewatering stormwater, sea water, and groundwater; and
- groundwater monitoring, pumping, and contamination.

Two separate plans, Spill Prevention, Control, and Countermeasures Plan (CEMP, Att. N) and the Stormwater Management and Erosion and Sediment Control Plan (CEMP, Att. O), address elements of surface water and groundwater management that will not be repeated in this Plan. Management of surface water and groundwater during plant operation and decommissioning are beyond the scope of this plan.

1.1 General Management Strategy

The Project shall implement applicable standards and legislative requirements as detailed in the CEMP. The objective of surface and groundwater management during construction and commissioning is to verify that water use by the Project is conducted in a sustainable manner, such that potential negative impacts to the surface and groundwater systems are avoided or minimized.

1.2 Environmental Impact Statement (EIS) Requirements

The EIS includes two Environmental Management Plans (LNG Facility and Marine) and the Coordinator General's Evaluation Report that describe specific measures the Project will employ for management of surface water and groundwater during construction. These are described below:

1.2.1 Surface Water

The following strategies will be implemented to minimise potential impacts on receiving surface waters:

- Preparation and implementation of a site-specific construction erosion and sediment control plans in accordance with the Institution of Engineers Australia – Erosion and Sediment Control Guidelines (1996), the Australian Best Practice Erosion and Sediment Control (International Erosion Control Association Australasia, 2010, 3 volumes, 710 pp), and the Queensland Urban Drainage Manual, Volume 1, Second Edition 2007 (Department of Natural Resources & Water, Institute of Public Works Engineering Australia, Queensland Division Ltd. and Brisbane City Council, 430 pp;
- Installation of temporary drainage works (channels and bunds) in areas required for sediment and erosion control and around storage areas for construction materials;
- Where appropriate, installation of temporary sediment basins to capture sediment-laden runoff from site;
- Stabilise cleared areas not used for plant infrastructure with vegetation or appropriate surface treatments as soon as practicable following earthworks, to minimise erosion;
- Provision of appropriate storage areas for fuels and dangerous goods with bunding and spill response equipment, and ensuring that relevant personnel are trained in appropriate handling of such materials and spill prevention;
- Restricting vegetation clearance to the smallest area necessary;
- Diversion channels and silt fences will be constructed around the topsoil stockpiles to prevent erosion and loss of topsoil. Seeding of long-term topsoil stockpiles will be carried out with an appropriately designed seed mix to limit stockpile erosion. The topsoil will be respread prior to revegetation of areas to be rehabilitated at completion of construction;
- Topsoil stockpiles will be located in areas outside drainage lines, and will be protected from erosion. Prior to the re-spreading of topsoil, the ground

surface will be prepared to assist with binding of the soil layers, water penetration, and revegetation;

- All hazardous materials will be managed in accordance with the Workplace Health and Safety Act 2011 and relevant Australian Standard as required, including but not limited to AS1940 – The storage and handling of flammable and combustible liquids. In order to minimise the potential for contamination of stormwater runoff from the site. Refuelling will occur under the supervision of the person refuelling the equipment who will ensure that spill control measures are in place;
- All transfers of chemicals will be controlled and managed to prevent spillage outside bunded areas; and
- Water quality monitoring will be undertaken prior to site dewatering activities to ensure that elevated levels of turbidity, pH or presence of hydrocarbons is subject to appropriate treatment or management controls before discharge.

1.2.2 Groundwater

- Fuel, chemical and industrial waste storage areas, workshop areas, vehicle and equipment wash-down areas, and equipment and machinery repair areas will be designed to the appropriate Australian Standards and contain spill response equipment as appropriate;
- All decanting of fuels, oils and other hazardous substances will be controlled and managed to prevent spillage outside bunded areas;
- Spills will be reported and immediately contained, removed or remediated as required; and
- Chemical and fuel storage areas will be bunded in accordance with AS1940 and AS3780 to prevent the seepage of any contaminants into the groundwater system.

2 WATER MANAGEMENT

Direct impacts on surface and groundwater may result from Project construction activities, such as:

- Abstracting water from stormwater channels or sediment control basins for Project use;
- Impoundment of surface water on-site for Project use;
- Intermittent release of hydrotest and flushing waters to the internal drainage system;
- Diversion of waterways to avoid structures, or to drain into water retention facilities; and
- Dewatering construction excavations that contain stormwater, groundwater, or sea water.

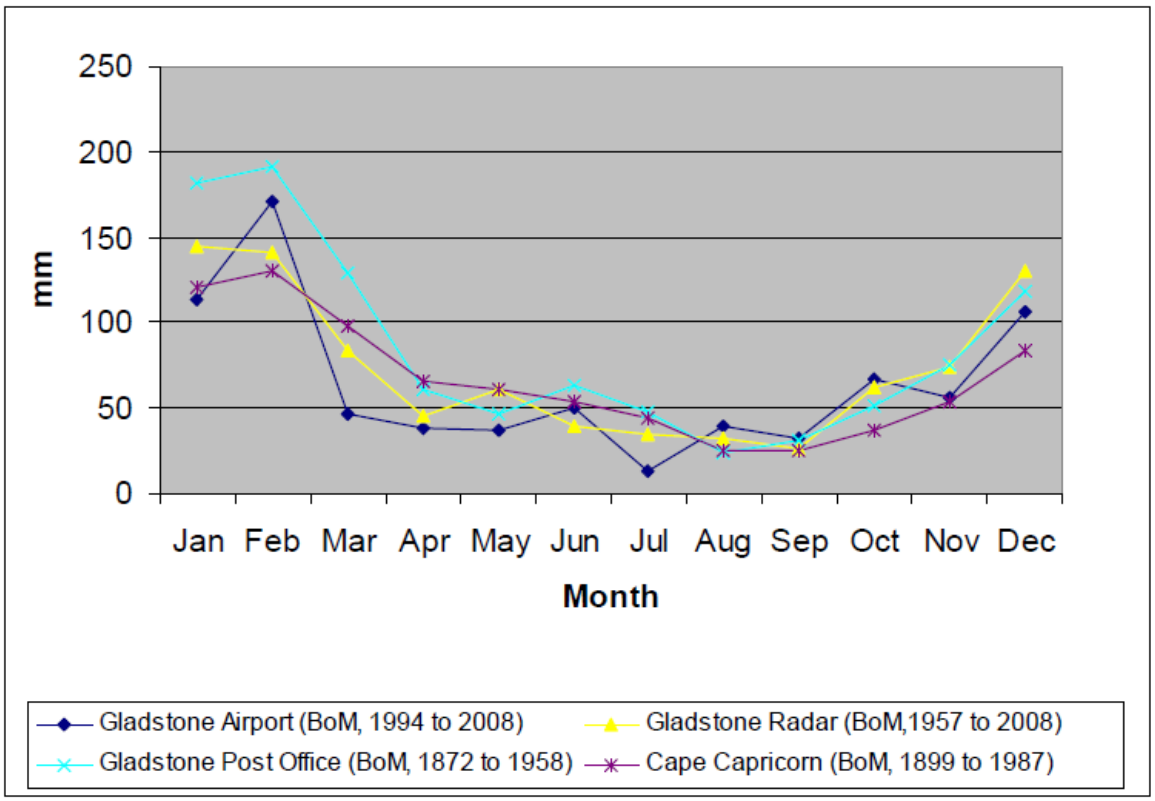
When carried out in conjunction with the mitigation measures outlined below, these impacts shall be minimized or avoided.

2.1 Existing Water Resources

2.1.1 Surface Water

There are no known naturally occurring perennial watercourses or springs within the project site. There are several ephemeral channels, some nearly 15 meters wide and three (3) meters deep that are actively eroding during intense runoff events. These channels only flow during/after rainfall. There are two (2) impoundments, each about 0.25 hectare surface area and less than two (2) meters deep, which were constructed many years ago to collect stormwater runoff for livestock watering. These impounds may become completely dry during non-rainy periods.

All precipitation at the project site occurs as rainfall with the mean annual rainfall for the area being 865 mm. There are distinctive wet and dry seasons with January and February being the wettest months and July being the driest. The following figure, from the GLNG Environmental Impact Statement, shows average annual rainfall amounts by month (note, Cape Capricorn is a lighthouse station on the northeast side of Curtis Island about 25 km from the project site):



The area is prone to cyclones, particularly from February to May, which can produce heavy rainfall events of hundreds of millimetres per day.

2.1.2 Groundwater

Groundwater depth varies from approximately one (1) to four (4) meters below ground level in alluvium substrates (confined to the drainage lines), and two (2) to 22 meters below ground level in the bedrock aquifer. Groundwater sampling undertaken during the EIS indicated that the groundwater is brackish in the deeper weathered and fractured rock aquifers and brine in the shallow alluvium aquifers. Based on hydrochemistry the groundwater is unsuitable for domestic use and should be tested and characterized before discharge into the fresh or marine water environments (see the GLNG EIS for details regarding naturally occurring pollutants in Curtis Island groundwater). The groundwater can, however, be used for livestock watering.

During the EIS no seeps or springs were identified on the project site. Following earthwork on steep slopes areas will be inspected for possible groundwater springs and the water managed for discharge per Queensland standards. Subsurface runoff

of stormwater may occur during the rainy season and this water will be discharged via the stormwater system.

2.1.3 Sea Water

A portion of the project will be constructed in nearshore areas of the Port of Gladstone. Tides, including 'king' or exceptionally high tides, and/or storm surges may deposit sea water in construction works that shall require dewatering.

2.2 Water Sources and Uses

Water will be required at the project site for the purposes of:

- potable water;
- soil compaction;
- dust suppression;
- wash downs;
- hydrotesting of pipes and tanks;
- commissioning flushing activities;
- sanitation; and
- other purposes.

Sources of water for these uses are described below.

2.2.1 Delivered Water and Sea Water

The initial source of potable and other water at the project site was fresh water brought from the mainland via ferry. The project's primary source of fresh water for construction and commissioning is produced by desalination of sea water using a reverse osmosis plant.

Under emergency conditions, sea water may be used for firefighting.

2.2.1 Surface Water

Where possible, rainwater harvesting shall be employed. Water tanks, including earthen basins and impoundments, may be used for storage of captured rainwater. Rainwater captured and stored in this way may be utilized for a variety of purposes, such as for dust suppression.

2.2.2 Groundwater

Groundwater is of low beneficial use and as such there is no plan to use groundwater for construction or commissioning purposes. Where groundwater or surface water collects in excavations, it will be appropriately characterised and, if suitable, may be used for soil compaction, dust control, hydrotesting, or other construction purposes, excluding potable, sanitary or firewater use. Refer to the section on "Dewatering" below.

2.2.3 Dewatering

Dewatering activities may be necessary during construction to remove shallow groundwater, stormwater, or sea water from site excavations and work areas. Dewatering should be a short-term, localized activity.

Care is taken during dewatering to not move water pollutants, including sediment, from contaminated to clean water bodies. If dewatering water is not polluted it can generally be discharged to the Port of Gladstone through the project's stormwater system, or, subject to suitability used for compaction or dust control.

Water is characterized by field inspection, field testing, or laboratory testing. If water contains sediment pollution this is treated by passing the water through the stormwater sediment basins or utilizing other sediment control management practices (e.g., filter bags, settling tanks, flocculants) prior to discharge. Chemical pollution will require water treatment or disposal off the island.

The following are general principles for dewatering:

- Dewatering sea water directly back into the sea is allowed as long as adverse environmental impacts are mitigated;
- Stormwater pumped during dewatering may be used for dust control;
- Dewatering should not be onto non-project lands (i.e., adjacent areas on Curtis Island), but controlled through the project's water discharge system;
- Water may be discharged into the sanitary treatment system. Check first regarding sediment/other contaminant levels and quantities of water to be treated;
- Attention must be given to providing proper pump sizes and outlet devices so pumped water does not cause erosion at the discharge point; and
- Water may be disposed on the mainland at approved disposal/treatment facilities.

All water derived from dewatering shall be adequately characterised prior to discharge or disposal.

All dewatering operations will be closely inspected and monitored. Dewatering operations should be discussed with the environmental team to determine necessary measures.

2.3 Concrete Washouts

Unless subcontractors prepare a plan that is in accord with the Gladstone Regional Council Pollution Solutions – Concrete Batching, Operator's Environmental guide for Environmentally Relevant Activities 62, July 2001 and approved by Bechtel, concrete washout shall be performed in accordance with the following:

Definition and Purpose

These are procedures and practices that are designed to minimize or eliminate the discharge of concrete waste materials to the storm drain systems or watercourses.

Appropriate Applications

- Concrete waste management procedures and practices are implemented on construction projects where concrete is used as a construction material or where concrete dust and debris result from demolition activities;
- Where slurries containing portland cement concrete (PCC) or asphalt concrete (AC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition;
- Where concrete trucks and other concrete-coated equipment are washed on-site; and
- Where mortar-mixing stations exist.

Standards and Specifications

Education

- Educate employees, subcontractors, and suppliers on the concrete waste management techniques described herein; and
- The Bechtel Environmental Manager (EM) shall oversee and enforce concrete waste management procedures.

Concrete Slurry Waste Management and Disposal

- PCC and AC waste shall not be allowed to enter storm drainage systems or watercourses;

- A construction supervisor shall monitor on-site concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure proper methods are implemented;
- Residue from saw cutting, coring and grinding operations shall be cleaned up as soon as practicable. Residue shall not be allowed to flow across the pavement and shall not be left on the surface of the pavement for extended periods;
- Slurry residue shall be disposed in accordance with project Waste Management standards. Slurry residue shall be temporarily stored in a facility or within an impermeable containment vessel or bin approved by the Bechtel Environmental Manager;
- Collect and dispose of all residues from grooving and grinding operations in accordance with project waste management standards; and
- Any residual water coming from the concrete washout facility shall not be allowed to enter storm drainage systems or watercourses. Residual waters must be collected and reused on site where possible; disposal of the water can be done at the sewage treatment plant on site or at an appropriately licensed facility.

Maintenance and Inspection

- The EM shall monitor on-site concrete waste storage and disposal procedures at least weekly or as directed by the Site Manager;
- The EM shall monitor concrete working tasks, such as saw cutting, coring, grinding and grooving daily to verify proper methods are employed or as directed by the Site Manager; and
- Concrete washout facilities shall include removing and disposing of hardened concrete and returning the facilities to a functional condition. Hardened concrete materials shall be removed or reused.

2.4 Water Conservation

The following water conservation measures shall be employed on the Project to meet the management strategies outlined in this Plan:

- Provision of Environmental Awareness Training (EAT) to Project personnel ;
- Capture rainwater from project structures wherever practicable, and divert overflow to stormwater ponds or other storage;
- A monitoring program for both surface and groundwater flows/levels and quality will be conducted during the early works phase;
- Compare daily water use per employee in the camp facility to existing benchmarks, taking into consideration the primary uses at the facility, and investigate ways to improve conservation practices if required;
- To the extent practicable operate dishwashers and laundries on full loads, and only when needed;
- Regularly maintain and promptly repair all equipment and fixtures to minimize water wastage; and
- To the extent practicable install self-closing taps, automatic shut-off valves, spray nozzles, pressure reducing valves, and water conserving fixtures (e.g., low flow shower heads, taps, toilets, urinals; and spring loaded or sensor activated taps) and monitor water usage to identify unusual or unexpected trends.

3 MONITORING

Monitoring will be undertaken in accordance with Project permits and approvals. Attachment H of the Construction Environmental Management Plan (CEMP) for the Gladstone LNG Project describes the monitoring program and shall be read and interpreted in conjunction with the CEMP (ref. 25576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617).

Monitoring plays a key role in any water management system. The project's Environmental Monitoring Plan (CEMP, Att. H) describes the types and frequencies of monitoring that will be performed for environmental resources.

Regular site inspections will be undertaken to monitor compliance and management practices. Notice will be given to any subcontractor or Bechtel crew for all non-conformances or rectification requirements.

GLNG

UNANTICIPATED DISCOVERIES PROCEDURE

(Attachment Q of CEMP)

REV	DATE	REASON FOR REVISION	BY	CK'D	Site Mgr	APE	PM	
3	05-Dec-13	Issued for Update	ER	PN	BF	HH	BT	
2	12-Apr-13	Issued for Annual Review and Update	RJF	SMP	BF	RR	BT	
1	1-Nov-11	Updated for Publication	RW	RR	BF	BT	AP	
0	19-May-10	Issued for Use	RW	RRR	BF	CJK	BT / AP	
B	17-Aug-10	Client comments incorporated; Issued for Permit	RW	CJK	JJM	CJK	BT / AP	
A	22-Jul-10	Issue for Review	RW	MD	JJM	CJK	ABP	

BECHTEL OG&C INC.		JOB NO. 25576	
BECHTEL	UNANTICIPATED DISCOVERIES PROCEDURE	DOCUMENT NO.	REVISION
		100-G01-GHX-00041	3
		GLNG Doc No. 3310-BTH-3-3.3-6841	

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1 PURPOSE

This Unanticipated Discoveries Procedure is Attachment Q of the Construction Environmental Management Plan (CEMP) for the Gladstone LNG Plant Project and shall be read and interpreted in conjunction with the CEMP (ref. 25576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617), in particular section 1.1.

The purpose of this Environmental Procedure is to provide guidance for protecting the health and safety of project personnel and the environment when an unanticipated discovery is made during the GLNG Plant Project.

2 SCOPE

During Project activities, especially during excavation, a possibility exists for unanticipated discoveries. This Environmental Procedure focuses on the most common unanticipated discoveries that may be encountered at the GLNG Plant Project sites. Some examples include:

- Contamination;
- Hazardous material or waste;
- Unexploded munitions;
- Buried tanks or utilities; and
- Cultural resources, including archaeological material.

This procedure presents guidelines for identifying and implementing actions and notifications following an unanticipated discovery.

This procedure does not cover all the possible legal, regulatory or contractual requirements that may apply to an unanticipated discovery at the Project sites.

3 WORK PROCESS

3.1 Step 1 – Stop Work

When an unanticipated discovery is made at a Project site, Bechtel personnel and subcontractors' employees will immediately stop work in the vicinity of the discovery. In general, the most common types of unanticipated discoveries include:

- Underground obstructions, such as buried structures, vessels, piping or debris;
- Suspected contaminated materials (e.g., contaminated soil) or unexploded ordnance or other explosive device;

- Potential cultural materials, which are any sites, structures, or objects created by humans that are of value for its archaeological, prehistoric, historic, religious, scientific, or ancestral significance;
- Paleontological objects (e.g. fossilized remains); and
- Human remains, as well as the personal items and funerary objects associated with the remains.

3.2 Step 2 – Secure Area

Once construction activities have been halted, and unless directed otherwise by Customer, secure the area in the immediate vicinity of the discovery to prevent further disturbance. Flag or fence the discovery area to create a visual/physical barrier and control access.

3.3 Step 3 – Perform Initial Notifications

Immediately after an unanticipated discovery, the Bechtel environmental manager shall be notified of the discovery. The Site Manager (SM) will also be notified so that notification can be made in accordance with the contract and subsequent coordination with GLNG and other outside stakeholders can be initiated. The Bechtel environmental manager shall advise the SM on additional notifications that may be required under applicable permits or regulations, and on the need to notify Bechtel legal of the unanticipated discovery as required.

3.4 Step 4 – Prepare Discovery Documentation

The appropriate Bechtel representative (e.g., environmental manager, Environmental Staff, Construction Superintendent) at the site of the discovery will prepare a Discovery/Incident Report (see CEMP, Att. B, Forms)
The report shall include information such as:

- The time and place of the discovery;
- The nature of the discovery;
- Actions taken in response to discovery;
- Notifications.

A Bechtel representative shall take photographs of the discovery (as necessary) and attach them to the report, if possible.

3.5 Step 5 – Discovery Characterization & Notifications

Actions taken to further characterize or in any way treat or process the discovery may be undertaken by:

- Customer employees or their designated contractors/representatives;
- Project archaeological team;
- Indigenous/Traditional Owner representatives; and
- Regulatory or law enforcement personnel.

Bechtel's responsibilities for unanticipated discoveries are limited to stopping work, securing the area unless otherwise directed by Customer, performing initial notifications and preparing discovery documentation, as described in Steps 1 – 4 (above).

3.6 Step 6 – Follow Up and Documentation Finalization

Follow up actions due to an unanticipated discovery are classified as "Customer Responsibilities". Bechtel personnel may assist GLNG or other appropriate personnel in any follow-up actions, but shall not undertake removal, treatment or further disturbance of any discoveries without explicit written instructions provided through Bechtel project management (i.e. Project Manager, Site Manager).

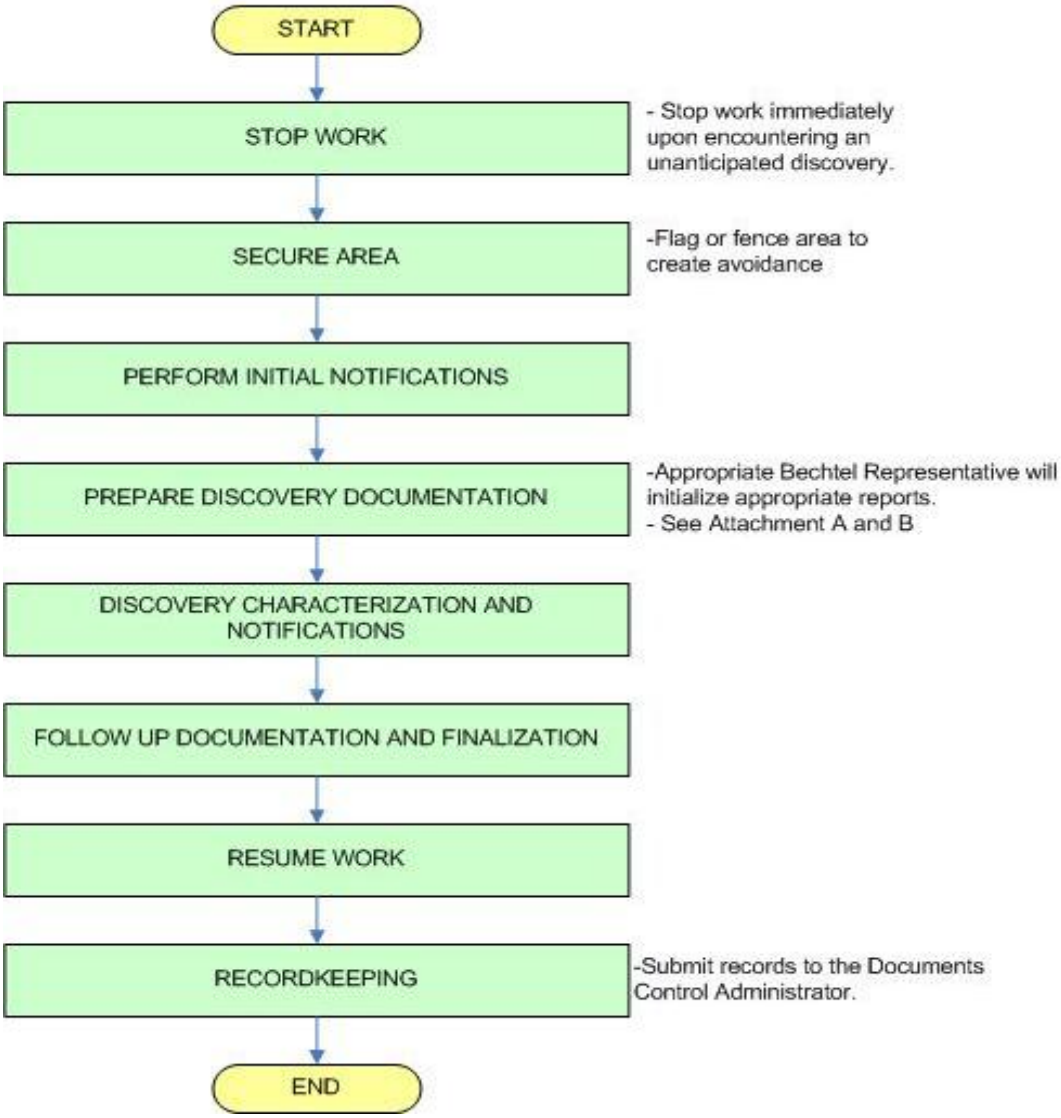
3.7 Step 7 – Resume Work

Bechtel personnel and subcontractors shall not resume work in the immediate area of any unanticipated discovery until written notification to do so has been provided through Bechtel project management. Any additional actions to be taken by Bechtel or subcontractors in protecting the initial find or dealing with subsequent finds in the area shall be included in the notification to resume work. Bechtel personnel and subcontractors shall be made aware of any additional actions required for personal protection prior to resuming work.

3.8 Step 8 – Recordkeeping

Attachment B of the CEMP provides templates for the proper documentation of unanticipated discoveries. All reports, testing results, and other documentation should be submitted to the Document Control Administrator to be included in project records. Certain discovery documentation may be subject to privilege and shall not be released to third parties without Bechtel project management direction.

UNANTICIPATED DISCOVERY FLOW DISAGRAM



GLNG

WASTE MANAGEMENT PLAN

(Attachment R of CEMP)

REV	DATE	REASON FOR REVISION	BY	CK'D	Site Mgr	APE	PM
4	05-Dec-13	Issued for Update	ER	PN	BF	HH	BT
3	12-Apr-13	Issued for Annual Review and Update	RJF	SMP	BF	RR	BT
2	18-May-12	Issued for Update	RF	RR	BF	---	BT
1	1-Nov-11	Updated for Publication	RW	RR	BF	BT	AP
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C	11-Jan-11	GRC comments incorporated; Issue for Permit	RW	CJK	JJM	CJK	BT / AP
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A	21-Jun-10	Issue for Review	RW	MD	JJM	CJK	BT / AP

BECHTEL OG&C INC.		JOB NO. 25576	
BECHTEL	WASTE MANAGEMENT PLAN	DOCUMENT NO.	REVISION
		100-G01-GHX-00037	4
		GLNG Doc No. 3310-BTH-3-3.3-6837	

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1 INTRODUCTION

This Waste Management Plan is Attachment R of the Construction Environmental Management Plan (CEMP) for the Gladstone LNG Plant Project and shall be read and interpreted in conjunction with the CEMP (ref. 25576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617), in particular section 1.1.

This Plan addresses waste management during construction and commissioning of the LNG facility and has been developed in accordance with relevant Project permits and approvals and governing legislative requirements including, but not limited to, the conditions identified in the Coordinator General's Report Schedule E – Waste Management and the Environmental Authority Schedule BE – Waste.

Bechtel will use a Waste Management Services subcontractor (WMS) during construction and commissioning for solid waste and selected liquid wastes generated on the mainland and Curtis Island. The WMS will be responsible for providing materials and equipment, labour, supervision, technical and professional services, and to perform all operations necessary and required to provide services for waste management for the project. The WMS will have authority to transport wastes from site and will be responsible for disposing of waste at the Gladstone Regional Council waste facilities or other appropriately licensed facilities.

The WMS will be responsible for managing waste in a proper and efficient manner in accordance with legislative requirements and providing recycling services. All wastes generated at the Project location will be classified according to the waste type. Project subcontractors are responsible for determining and informing Bechtel and the WMS what wastes they will generate during the performance of their scope of work on the Project. While the WMS is responsible for determining how the waste should be treated and/or disposed, Bechtel in conjunction with GLNG will approve disposal/treatment locations for such wastes. Further, the Bechtel Environmental Manager will assist the WMS with waste characterization, as required.

Bechtel and the WMS will implement and actively practice waste minimization/recycling to reduce the volume of waste being disposed of at landfill (Section 6, Waste Minimization).

A separate Environmental Training Outline (CEMP Att. J) and Spill Prevention, Control, and Countermeasures Plan (CEMP Att. N) specify various actions to support the proper management of project generated waste. In addition, the project will have an inspection and audit program to monitor compliance with this Plan conducted by the Bechtel Environmental Manager. Regular inspections of site waste storage/handling areas and activities, compilation of waste transport manifests and disposal records, and coupled with audits of the WMS, will verify project compliance. Instances of non-compliance will be corrected by modifying

waste collection/handling procedures, re-training site personnel, or re-scoping the WMS's activities.

Waste generated during the project will be segregated on-site prior to being taken to an appropriately licensed facility, no regulated wastes will be disposed of on site. Where possible, the WMS will make every effort to recycle or reuse project generated waste. Alternate final disposal methods will include disposal at recycling facilities or an appropriately licensed facility including an off-site landfill. The WMS will be responsible for transportation of waste to the landfill as well as determining the permits needed to utilize the facilities. Based on the quantities of waste generated, the WMS will also determine how often items are to be transported off-site for disposal.

The project shall document the types and quantities of wastes generated and/or received and/or disposed. For a preliminary list of project waste, treatment options, and disposal options refer to Table 1. Note, all references to 'landfill' refer to off-site landfills; there will be no project landfill for waste disposal on Curtis Island. The future use of a potentially recyclable/reusable waste depends on the potential recycling opportunities, identified end users and risks associated with the disposal/reuse/re-sale. The alternative disposal options will be evaluated by the WMS and with approval from Bechtel in conjunction with GLNG, on a situation by situation basis during the construction and commissioning phase of work.

Table 1: Preliminary Waste Summary

Waste Type	Waste Classification	Preferred Treatment Alternatives	Final Disposition Alternatives	Transportation
Acetic Acid Flushing media	Hazardous	On or Off-site treatment/ Landfill	On or Off-site treatment/ Landfill	Transported by truck/boat
Aerosol Cans	Non Hazardous	Recycle/Disposal	Recycle/Off-site treatment	Transported by truck/boat
Air Emissions (dust, combustion pollutants)	Non Hazardous	Discharge to Air	Discharge to Air	None
Air Filters	Hazardous	Disposal	Landfill	Transported by truck/boat
Associated Water	None will be produced during facility construction			
Batteries (also see Used Lead Acid Batteries)	Hazardous	Recycle/Disposal	Recycle/Disposal	Transported by truck/boat
Biohazard Medical Waste	Hazardous	Off-site treatment	Off-site treatment	Transported by truck/boat
Brine	Non Hazardous	Discharge to Sea	Discharge to Sea	Effluent discharge Line

Camp Rubbish	Non Hazardous	Off-site Landfill	Landfill	Transported by truck/boat
Camp Rubbish/Food Waste	Non Hazardous	Reduce/Recycle/ Landfill	Landfill	Transported by truck/boat
Concrete	Non Hazardous	Reuse on-site	Reuse on-site	Truck
Dredge spoil (after ASS treatment, if required)	Non Hazardous	Disposal at the East Banks sea disposal site	Disposal at the East Banks sea disposal site	Barge
Dunnage	Non Hazardous	Reuse/Recycle/ Landfill	Landfill	Transported by truck/boat
Electric and Fibreoptic Scraps	Non Hazardous	Recycle/Disposal	Recycle/Landfill	Transported by truck/boat
Empty Drums	Non Hazardous	Reuse/Recycle/ Disposal	Reuse/Recycle/ Landfill	Transported by truck/boat
Empty Paint/Metal and Plastic Buckets and/or cans	Non Hazardous	Recycle/Disposal	Landfill	Transported by truck/boat
Empty Plastic Totes	Non Hazardous	Reuse/Disposal	Reuse/Landfill	Transported by truck/boat
Engine coolant	Hazardous	Land Farmed on-site or off-site treatmenttreatment	Off-site treatment	Transported by truck/boat
Fluorescent light ballasts	Non Hazardous	Recycle/Disposal	Recycle/ disposal	Transported by truck/boat
Fluorescent Tubes (no mercury)	Hazardous	Stabilized Disposal	Landfill	Transported by truck/boat
General Construction Rubbish	Non Hazardous	Recycle/ Disposal	Recycle/Landfill	Transported by truck/boat
General Inert Construction Debris	Non Hazardous	Recycle/Disposal	Recycle/Landfill	Transported by truck/boat
Glass & plastic	Non Hazardous	Recycle/Disposal	Recycle/Landfill	Transported by truck/boat
Hydrotest Water	Non Hazardous	Treated in STP if necessary/ Discharge to Sea	Effluent Discharge Line to Sea	Effluent discharge line
Insulation	Hazardous	Disposal	Landfill	Transported by truck/boat
Medical waste	Hazardous	Dispose off-site	Dispose off-site	Transported by truck/boat
Metal (aluminium, copper, steel, etc.)	Non Hazardous	Recycle/ Disposal	Recycle (Re-Sale)/Landfill	Transported by truck/boat
Oil Contaminated Soil	Hazardous	Land Farmed on-site or off-site disposal	Reuse/Disposal	Transported by truck/boat
Oil Contaminated Water	Hazardous	Treat in Oil-Water Separator and	Treat in Oil-Water Separator and	Effluent discharge line

		Discharge to Sea/Irrigate to Land	Discharge to Sea/Irrigate to Land	
Oil Filters	Hazardous	Drain/Recycle	Recycle/Landfill	Transported by truck/boat
Oil/Oily Waste	Hazardous	Recycle/Disposal	Recycle/Landfill	Transported by truck/boat
Operational Waste	None will be produced during facility construction			
Other Hazardous Waste	Hazardous	Disposal	Processing and disposal at Off-site facility	Transported in sealed container by boat/truck
Paint residue	Hazardous	Evaporate Dry Paint	Landfill	Transported by truck/boat
Paper & cardboard	Non Hazardous	Recycle/Disposal	Recycle/Landfill	Transported by truck/boat
Plastic Oil Containers	None will be produced during facility construction			
Potash	Hazardous	On or Off-site treatment/ Landfill	On or Off-site treatment/ Landfill	Transported by truck/boat
Quarantine area wash down		Oily Water Separator/STP/ Disposal	Off-site treatment	Tank and transport by truck
Sanitary Waste	Hazardous	Treat in STP/Discharge to Sea/Irrigate to Land	Treat in STP/Discharge to Sea/Irrigate to Land	Effluent discharge line
Sealant Metal Containers	Non Hazardous	Disposal	Landfill	Transported by truck/boat
Sludge (sanitary)	Hazardous	Landfill	Landfill	Transported in boat/truck that provides secondary containment
Used Lead Acid Batteries	Hazardous	Recycle/Disposal	Drain/ Neutralize/ Recycle/Off-site Disposal	Transported by truck/boat
Used Tyres	Non Hazardous	Shredder/ Recycle/ Disposal	Landfill	Transported by truck/boat
Vegetation (wood chips)	Non Hazardous	Chip/Re-use	Chip/Disposal off-site	Transported by truck/boat
Vehicle wash down	Hazardous	Oily Water Separator/STP/ Disposal	Effluent Discharge Line for Treated Effluent	Transported by truck/boat
Wastewater (from STP)	Non Hazardous	Discharge to Sea/Reuse	Discharge to Sea/Reuse	Effluent discharge line
Welding Rod Tips	Hazardous	Landfill	Landfill	Transported by truck/boat
Wood (lumber, etc.)	Non Hazardous	Reuse/Recycle	Reuse/Recycle/ Landfill	Transported by truck/boat

2 WASTE TYPES AND MANAGEMENT

Waste types and management strategies for major waste streams are described below. A listing of waste streams, management alternatives and final disposal options is provided in Table 1.

Table 2 contains estimated waste volumes during construction. Quantities of these wastes will become better defined as project designs are completed and specific subcontractors and their work processes are engaged. Note that 'Regulated Waste' refers to special items such as lead acid batteries (estimated waste quantity 60/yr), used motor oil (estimated waste quantity 7,000 l/yr), as listed in Schedule 7 of the *Environmental Protection Regulation 2008*. All Regulated Waste will receive treatment and disposal, including recordkeeping and reporting, as required by Queensland regulations.

Table 2: Waste Disposal by Estimated Volume

Waste Type	Estimated Quantities For Construction	Unit of Measure (CM = cubic meter; TE = 1,000 kg)
Waste Types		
Sewage Sludge (compost or landfill)	850	CM
Dredge spoil	70,000	CM
Paper Products (possibly recyclable)	230	TE
Plastics (possibly recyclable)	75	TE
Glass (possibly recyclable)	35	TE
Wood (dunnage & carpentry waste) (possibly recyclable or reusable on-site)	28,000	CM
Metals (recyclable)	150	TE
Waste to Landfill		
Food Wastes	500	TE
Other Domestic Wastes	300	TE
General Construction Waste	40,000	TE
Waste to Special Treatment		
Regulated Waste (i.e., medical waste, used oil, chemicals, batteries)	5,000	TE
Sewerage Waste to Council WTP		
Sewage effluent from portable toilets	12,000	CM

2.1 Waste Storage and Disposal Facilities

Waste will be accumulated in a variety of ways based on the type of waste, e.g., used oil will be stored in drums and dredge spoil will be placed on a barge. Certain waste streams, such as dredge spoil or chemical flushing wastes are one-off and handling and disposal will be completed within a matter of weeks. Other waste streams are persistent throughout construction and commissioning such as construction waste or kitchen waste, and removal and disposal will be on-going until construction and commissioning is completed.

2.1.1 On-site Satellite Accumulation Areas

Waste disposal by the WMS will be a daily activity on working-days with some waste containers, such as kitchen waste, being collected more than once per day. Some types of persistent waste, such as used motor oil, will be accumulated over time in a Satellite Accumulation Area (SAA) until the storage container(s) is full, at which time it will be collected and disposed.

SAAs may consist of a single container, but every waste container, such as found in a mess hall or office is, not an SAA. SAAs are used to collect certain wastes and are for the convenience of the workers so they learn to consistently place waste material in proper containers that are readily available. For example, rather than have many types of containers scattered over a working area to collect waste paint, one or more drums may be placed in a safe centralized area that is signed, has a stable surface, bunded and/or covered (as necessary), and regularly inspected and managed. No waste is stored on the ground that could potentially contaminate groundwater and stormwater runoff is rigorously controlled. SAAs have proven to be an effective means of managing construction waste so that waste is properly segregated, tracked, regularly collected, and properly disposed.

The size, location and number of SAAs is flexible and depends upon the dynamic needs of construction and commissioning. Certain locations, such as the mechanics shop where waste such as used oil and used oil filters will be consistently derived, will continuously have a SSA in use, whereas other areas of construction and commissioning will have SAAs installed and moved as is most convenient for waste disposal and safety of workers. Typically a construction site of this size may have numerous SAAs at any time. Installation and movement of SAAs is always performed by the construction team with the approval of the Environmental department.

Waste from SAAs will be removed and disposed by the WMS when the containers are full; some SAAs may be emptied daily while others may accumulate for several weeks before emptying, for example, used motor oil is often stored in a designated

tank of several hundred litres and it may take several weeks before the tank is ready to empty.

There will be a central waste accumulation area where initial processing or sorting of inert wastes (such as concrete waste and wood) will occur that is easily accessible to the WMS transport trucks. This area will be used each working day by the WMS and extra empty waste containers and waste processing equipment (e.g., bobcat tractor) are kept. Waste will be managed appropriately within this area, depending on the east type, so as not to have adverse environmental impacts.

The precise locations of SAAs and the central waste accumulation area will be established once construction begins. See section 3.2 for additional information regarding SAAs.

2.1.2 Disposal Facilities

Construction and commissioning waste, including kitchen, medical, and regulated waste, will be disposed by the contracted WMS. Specific disposal locations will be selected after the WMS contract is awarded.

The regional landfill near Benaraby is the only landfill planned to receive landfill-bound waste. Other potential disposal facilities include:

Cardboard/paper	Gladstone agent, such as Amcor, who typically bale and ship to Brisbane
Glass/plastic	Regional recycling facility in Rockhampton
Sewage treatment plant solids	Compost, such as with GG Organics near Gracemere, or special burial at landfill
Scrap metal	Gladstone metal merchants, such as Sims Metals. Aluminium cans may be donated locally, e.g. youth sports programs, for recycling.
Oils & hydrocarbons	Consolidated locally, such as Transpacific depot in Gladstone, and transported to Brisbane recycling facility
Tyres	Local used tyre agent, such as Mikam Tyres, or landfill
Medical waste	Ship to Brisbane for treatment/disposal
Potash	Exploring commercial uses for potassium. Special burial in landfill.

2.2 Temporary Water Treatment Plant

The temporary site Water Treatment Plant (WTP) will be designed to provide site water requirements including water for soil compaction, potable water, concrete batch plant, service water for wash down, and hydrotest water during the construction and commissioning period. Seawater desalination using Seawater Reverse Osmosis (SWRO) technology will be used. Seawater for the plant will be sourced from Port Curtis via seawater intake pumps. The major users are civil site works, potable water use and hydrotest water. Reject stream from the desalination plant, comprised of blowdown from pre-treatment units and brine from SWRO membranes, will be discharged to Port Curtis.

2.2.1 Discharge Rate

The temporary site WTP will produce a reject stream that will be discharged to Port Curtis via a seawater outfall equipped with diffusers. Reject from pre-treatment units include clarifier blowdown and media filter backwash water. SWRO technology uses pump pressure over and above the seawater osmotic pressure to force relatively salt free product water to flow across a semi-permeable membrane and rejecting concentrated stream for discharge. The technology essentially concentrates the seawater by the design recovery rate through the membranes. Including pre-treatment units, overall system recovery is estimated to be about 35% (65% of seawater intake flow will be discharged back to sea). Therefore based on maximum plant capacity of 3,000m^3/day, approximately 5,600m^3/day of reject will be discharged back to Port Curtis.

2.2.2 Discharge Location

The Construction WTP outfall is located near the Material Offloading Facility (MOF) (refer drawing CF11 in Attachment A of the CEMP). The WTP and Sanitary Treatment Plant (STP) treated effluent combine to a single discharge point prior to being diffused to Port Curtis

2.2.3 Discharge Water Quality

SWRO technology essentially concentrates the intake seawater by the design recovery rate through the plant. Therefore background concentration of all seawater constituents will be concentrated by a factor of up to 1.7 in the WTP reject water. The RO pre-treatment technology will use a coagulant to remove colloidal solids from seawater that will increase suspended solids concentration of WTP reject by an additional 50 mg/L (an additional 25 NTU turbidity).

2.2.4 WTP Monitoring and Recordkeeping

The following instruments will be provided to monitor and control the performance of the temporary WTP.

- Seawater influent flow transmitter
- Seawater influent pH transmitter
- Seawater influent Temperature transmitter
- Seawater influent Turbidity transmitter
- Seawater influent Conductivity transmitter
- Desalination Plant RO brine Flow transmitter
- Desalination Plant effluent Flow transmitter
- Desalination Plant effluent pH transmitter
- Desalination Plant effluent Chlorine transmitter
- Desalination Plant effluent dissolved oxygen and percent saturation transmitter
- Desalination Plant effluent Temperature transmitter
- Desalination Plant effluent Turbidity transmitter
- Desalination Plant effluent Conductivity transmitter

Accurate testing and analysis of potable water is a major part of compliance and quality control. This data is used to compile regular reports for issuance to governmental agencies as well as supporting operations. Samples will be sent to NATA accredited laboratories for analyses required by contract or regulation, where reasonably available. In cases where a NATA laboratory is not reasonably available, Bechtel will consult with Client and regulatory agencies to agree an acceptable alternative.

Laboratory information management system will be set up to track samples and manage analytical data and compile reports of all testing where required.

2.3 Temporary Sanitary Treatment Plant

The temporary site sewerage facilities will be sized to treat the maximum camp population including commuting personnel from the mainland. Treated sewage effluent will be discharged to Port Curtis. The maximum capacity of the sewerage facilities is 22.5 m^3/hr, (24 hour average flow).

The STP will produce excess biological waste sludge mixed with chemical sludge (from chemical phosphorus removal) that will be aerobically digested followed by centrifugal dewatering. The dewatered cake will be transported to mainland for disposal by a licensed waste disposal contractor. A polyelectrolyte feed system will be provided to improve solids capture efficiency of the centrifuge.

During the transition from commissioning to operations the temporary STP will be decommissioned and the permanent sewage line to the Gladstone Sewage Treatment Plant will be connected for operations. There may be a short changeover period where sewage waste will need to be transported off the site via vacuum truck however the amount will be minimal due to the smaller employee numbers on site during this time. All sewage waste to be taken off site will be transported via a licenced contractor and will be disposed of at an appropriately licenced facility. The permanent sewage line will be addressed in the Operational Environmental Management Plan (OEMP)

2.3.1 Discharge Rates

During peak construction activities when the site workforce population is at a maximum, the 24-hour average flow will be 22.5 m^3/hr. A lift station will be used to pump the treated effluent to seawater outfall that will operate automatically on level controls. Since treated effluent is pumped using an automatic lift station, the instantaneous flow, which is the capacity of lift station pump, will be approximately 45 m^3/hr.

2.3.2 Discharge Locations

The temporary STP outfall is located near the MOF (refer drawing CF11 in Attachment A of the CEMP) and is common to the temporary WTP effluent outfall.

2.3.3 Discharge Water Quality

Sewage from the temporary STP will receive tertiary treatment to achieve discharge water quality as per Contract, such that when the discharge is diffused at the seawater outfall after it combines with the temporary WTP effluent, it will not cause adverse environmental impacts.

2.3.4 STP Monitoring and Recordkeeping

The following instruments will be provided to monitor and control STP performance:

- Flow transmitter for treated effluent
- pH transmitter for treated effluent
- Dissolved oxygen transmitter for treated effluent

Accurate testing and analysis of wastewater effluent being discharged or recycled is a major part of compliance and quality control. This data is used to compile regular reports for issuance to governmental agencies as well as supporting operations. Composite samples will be collected in accordance with accepted industry practice, sent to NATA accredited laboratories under strict chain-of-custody procedures for analyses required by contract or regulation, where reasonably available. In cases where a NATA laboratory is not reasonably available, Bechtel will consult with Client and regulatory agencies to agree an acceptable alternative.

A laboratory information management system will be set up to track samples and manage analytical data and compile reports of all testing.

2.4 Permanent Water Treatment Plant

The permanent water treatment plant for the site will be operating for a time during the commissioning period. The water treatment plant produces potable water and utility water (including demineralised water) from the Gladstone Area Water Board (GAWB) pipeline. The water generated will be used in the permanent plant process.

The Water Treatment Plant consists of a reverse osmosis/electro-deionisation (RO/EDI) system that uses membranes to remove dissolved salts from the pre-treated water. This produces demineralised water which is stored in a tank before being sent to be used in certain parts of the permanent plant.

Potable water also passes through an UV cell to supplement chlorine disinfection before distribution to users. Service water is stored in the firewater tank before being pumped to end-users. Waste streams from the water treatment plant are pumped to diffuser WW1.

The total quantity discharged is continuously recorded and readings are displayed in LNG plant's control room. The discharge from the water treatment plant mixes with discharge from the oily water treatment and the combined stream is discharged via seawater outfall diffuser, WW1, equipped with a refrigerated composite sampler; these samples are sent to a NATA accredited laboratory for testing. The monitoring

point will also contain a continuous pH and hydrocarbon analyser with the sample information displayed in the LNG Plant's control room.

2.5 Condensate Water

Moisture condensed from air in the turbine inlet air chilling unit is sent to a Condensed Water Collection Tank from where it is recycled to the water treatment plant to supplement supply from the GAWB pipeline, the condensate production rate can be up to 45m3/h however the volumes varies greatly depending on the weather conditions. During dry, low humidity weather, insignificant quantity of water will condense but during high humidity and high temperature conditions, it is expected that entire water demand of the LNG plant can be satisfied from this source. Condensed water will have characteristics similar to rainwater. Excess water if any will be discharged to surface drainage leading to a sedimentation basin, the condensate water is able to be sampled however it will not be contain contaminants other than those in the ambient air.

2.6 Stormwater

Stormwater will be managed per the Stormwater Management and Erosion and Sediment Control Plan (CEMP, Att. O).

2.7 Hydrostatic-Test Water

Hydrostatic-test water may be drawn from the temporary WTP, collected rainwater or seawater as dictated by user. This water will be used to pressure test sections of piping or tanks to determine their integrity. The hydrostatic-test water (a.k.a., "hydrotest water") may contain chemical additives as well as minute amounts of oil and dirt that accumulate within the piping during the construction process. For purposes of this Waste Management Plan, hydrostatic-test water will be tested after its use and managed as a non-hazardous discharge if it meets the project's water discharge requirements. Hydrotest water will be discharged to either the site sediment basins or returned to Gladstone Harbour where applicable.. Hydrostatic-test water will be treated, if necessary, to meet applicable standards prior to discharge to the receiving environment.

2.8 Flushing Activities

During the commissioning phase of the project system flushes must be performed to confirm that piping and equipment does not contain foreign matter which may have the potential to damage equipment during the commissioning phase. Flushing media can be fresh water, oil, air blows, acetic acid or potash solution.

Flushing waters will be discharged via the sediment basin system once the water has met the project permit requirements. Other flushing media which are considered hazardous waste will be disposed of off-site by a licensed subcontractor.

2.9 Oily Water Treatment Plant

The Oily Water Treatment Plant is designed to remove free phase and emulsified hydrocarbons (oil) and suspended solids from process wastewater and potentially contaminated stormwater from leaks of lubricants that can wash off during a rain event. The Oily Water Treatment Plant has the capacity to treat water at a rate of 58 m^3/h and comprises of three units, including:

- Corrugated Plate Interceptor (CPI) oil/water separator:
  - Separator tank
  - Separator plates
  - Recovered oil compartment
  - Treated effluent compartment
  - Oil transfer pumps
  - Sediment transfer pumps
  - Sediment holding tank with mixer
- Dissolved Air Flotation (DAF) separator:
  - Tank with skimmer and sludge collector
  - De-emulsifier and flocculation system
  - Air Saturation system
- Multi-media pressure filtration:
  - Filters
  - Backwash system including storage tank and air scour system

In the Corrugated Plate Interceptor (CPI), separation of oil, water and solids will occur and solids and sediment will accumulate at the bottom of the separator. Solids and sediments at the bottom of the separator will be sluiced to loosen the sediment and then pumped to a sludge holding tank which will be periodically disposed off-site. The separated oil will then be pumped to a storage tank before being disposed off-site.

Treated water from the CPI separator will be pumped to the Dissolved Air Flotation (DAF) separator where dispersed and emulsified oil and fine suspended solids are removed. Oil and suspended solids will float to the top of DAF, be skimmed off and sent to storage for off-site disposal. Settled solids at the bottom of the tank will be periodically removed for off-site disposal.

Treated water from the DAF may contain residual oil and suspended solids that are too fine to remove in the DAF. The DAF effluent will be polished in multi-media filters

to remove the residual contaminants to ensure that the treated effluent is suitable for discharge via seawater outfall WW1.

The Oily Water Treatment Plant will be started using non-potable water during LNG plant's Construction (commissioning) phase however there will not be any contaminants to treat until all the process units are in operation producing LNG.

Process controls include alarms initiated upon pump/blower failures, high levels in tanks and flows outside the control range of process equipment. The Oily Water Treatment Plant is operated and maintained using the Vendors operating and maintenance manuals, supplemented by SOP's and maintenance protocols and documentation.

A dedicated sampling point is provided to sample discharge from oily water treatment plant. From the oily water plant filtered wastewater is pumped to WW1. The total quantity discharged is continuously recorded and readings are displayed in both the oily water plants control panel and LNG plant's control room. The discharge from the oily water treatment plant mixes with discharges from the water treatment and process area sumps and the combined stream is discharged via seawater outfall diffuser, WW1, equipped with a refrigerated composite sampler these samples are sent to a NATA accredited laboratory for testing.

2.10 Hot Oil and Amine Sumps

Part of the permanent plant process requires hot oil and amine to be run through the facility via various pipelines. Although these systems will be utilised during the commissioning process it is unlikely the sumps will be used in this time rather in the operations period, use of these systems during the operations will be addressed in the OEMP.

Should maintenance be required on these systems during commissioning the hot oil and amine systems are drain to their respective 'sump drums' which is a holding tank for the substance until such time the system has is back online and the substances are pumped back to the system to be reused.

Each sump drum is contained with a sealed concrete sump should the sump drum leak for any reason. Whilst the sump drums are in use operators will inspect the concrete sump through an inspection pipe for any leaks in the sump drum. If a sump drum has leaked into the outer concrete sump, the operator will organise to have the substance manually pumped from the outer sump by a vacuum truck to be taken off site for disposal at a licenced facility.

2.11 Project Temporary Worker Accommodation Facility Refuse

The Project Temporary Worker Accommodation Facility (TWAF) refuse/rubbish (i.e., living area trash, kitchen waste, cafeteria waste, cleaning waste) will be considered non-hazardous and will consist of the various wastes generated by the people who

live at the Temporary Worker Accommodation Facility and from the waste generated by the kitchen and cafeteria operations. The kitchen crews and the camp management will be responsible for making sure that camp generated refuse is properly managed. Effective housekeeping actions must be employed throughout the life of the Project to avoid unhealthy conditions.

Personal trash, rubbish, and food waste generated by the TWAF will be accumulated in "waste bins" that will be located adjacent to the kitchen area, yet far enough away to limit odour and insect problems. Waste bins will have covers to protect against refuse blowing away and to eliminate the potential of animals and vectors getting into the refuse. Containers with food waste will be emptied on a regular schedule to protect against odours. Recyclable materials will be collected and recycled to the extent practicable.

2.12 Project Refuse

During the life of the Project, various non-hazardous wastes (e.g., trash, rubbish, packing materials, spent PPE, used tyres, cardboard, paper wrapping) will be generated as part of the construction process. This waste will not pose a hazard to workers. Effective housekeeping actions must be employed throughout the life of the Project to verify proper segregation, treatment and final disposal. Disposal to an appropriately licensed facility will be undertaken by the WMS as described in Table 1.

Used tyres (only minor quantities are anticipated) and toner cartridges will be disposed according to EHP regulations by the WMS. Tyres may also be saved for equipment storage and stacking, for selling, beneficial reuse, or may be disposed of directly in an off-site landfill.

2.13 Inert Waste

Inert waste consists of excess soil, unsuitable soil, rock, cutoff piles, broken concrete, and hardened concrete washout debris. These types of waste will either be reused or disposed of to an off-site landfill.

2.14 Scrap Metal

Throughout the life of the project, scrap metal will be generated at variable rates. In some cases, this scrap will be damaged parts that will have to be re-fabricated. In other cases, it will be the excess metal that is generated during the fabrication process. In addition, there may be metal tie-straps and other packing materials.

Scrap metal is considered non-hazardous and will be re-used or recycled or off-site.

2.15 Project Dunnage and Wood

At the receiving areas and in the Project laydown areas, dunnage (i.e., wooden crating, packing materials, plastic shrink wrap, metal straps) will be generated. Often, this waste consists of plywood and timber attached to or surrounding equipment. The size varies from small pieces of scrap wood to full sheets of plywood and other timber. Crews working in these areas are responsible for maintaining housekeeping, including effective waste segregation, in those areas to avoid safety and fire hazards. Wood waste may also derive from general carpentry.

Dunnage and wood waste will generally be accumulated at the laydown areas and will be stacked in a neat, safe, and organized manner. All project generated dunnage and timber will be transported to the Waste Management Area for accumulation, and/or recycling. Useable timber, generated from the dunnage, will be collected and stacked for future use if appropriate.

Refuse, scrap from foundation forms, and dunnage generated during work activities will be segregated and stored in designated bins or other containers (e.g., 200 litre drums, bins, roll-off boxes) at strategic locations around the work area. As the Project work activities increase, additional waste containers will be placed around the jobsite as required. Waste containers will be colour coded per standards used at facilities in the Gladstone area and labelled according to the waste type.

2.16 Recyclable Waste

Bechtel (including Subcontractors) may have additional or alternative uses for various wastes that are generated by the project. Examples would include:

- Empty Material Containers – Rubbish Containers;
- Dunnage – Site Shelters and/or Barriers;
- Used Tyres – Equipment Cushions;
- Cut-Off Piles – Steel Piles; and/or
- Waste Paint – Use the paint elsewhere.

2.17 Ash

It is anticipated that little or no ash will be generated during construction. Due to strict segregation practices and adherence to the project management strategies specified in Table 1, ash is considered non-hazardous for the purposes of this plan.

Ash may be tested on a periodic basis in order to confirm its characteristics. Ash may be re-used on-site or disposed of at the off-site landfill.

2.18 Hazardous (Regulated) Waste

Small volumes of potentially hazardous waste will be generated as part of normal construction and commissioning activities. The project WMS will manage these wastes in an environmentally responsible manner and in accordance with regulatory requirements, as described in this plan and the Contract. Wastes that have been rendered non-hazardous due to biological, physical or chemical treatment will be disposed of at the off-site landfill.

Some potentially hazardous wastes that may be generated during the project include:

- Medical wastes;
- Welding rod tips;
- Engine coolant;
- Paint & Epoxy wastes;
- Solvent wastes;
- Solder and flux waste;
- Lead/acid batteries;
- Fluorescent and sodium light bulbs and fixtures;
- Waste oil and lubricants;
- Pressurized gas containers;
- Aerosol cans (insect repellent, spray paints, special coatings and lubricants);
- Waste from chemical flushing activities;
- Electronic devices (computers, etc.); and/or
- Oily waste and spill cleanup materials.

The best way to manage waste on the Project is to begin the segregation process in the field through the provision of designated waste bins for specific types of waste. The WMS will be responsible for ensuring the project waste remains segregated and recycled where possible.

All waste containers must be clearly labelled according to the waste type. Examples include “Hazardous Waste”, “Cardboard Only” and “General Waste”. All hazardous

waste will be managed according to regulatory requirements and material not considered hazardous after alternate treatment methods (as described in Table 1, below) will be transferred to an off-site landfill.

2.19 Potash

Potash (potassium carbonate, K_2CO_3) is used to clean piping in the amine system and its use is unique to the commissioning of the LNG facility. This waste will be taken off-site for disposal at an appropriately licensed facility.

2.20 Acid Sulfate Soil and Dredge Spoils

Management and disposal of Actual or Potential Acid Sulfate Soils and dredge spoils is addressed in the separate Acid/Potential Acid Sulfate Soils Management Plan (CEMP, Att. C).

3 WASTE CONTROL & TRANSFER

3.1 Waste Management Area (WMA)

The WMA is a controlled area that will be used to stage waste, segregate waste, and/or treat waste prior to disposal. The Waste Management Services subcontractor will be responsible for maintaining this facility and providing the materials needed for effective and compliant storage, treatment, transportation or disposal of project waste (hazardous and nonhazardous). As applicable, hazardous waste generated by subcontractors will be initially stored and managed in their individual SAAs. Subsequently, the WMS will dispose of this waste at an appropriately licensed facility. Subcontractor's waste that cannot be processed on-site will be the responsibility of the company generating the waste. The disposal/treatment location of such wastes will be determined by the WMS subject to Bechtel's approval.

The WMA location will be selected by the Site Manager, in consultation with the Bechtel Environmental Manager. This area should be located to minimize the threat to human health and the environment.

The WMS will be responsible for disposing the following waste:

- Non-hazardous rubbish;
- Camp and cafeteria waste;
- Waste from the medical clinic;
- Hazardous waste including but not limited to; waste oil, hydraulic fluid, brake fluid, oily rags, and used tires;

- Rigid plastic waste;; and/or
- Sludge from the temporary sanitary treatment plant.

Waste receipt records and inspection documents will be maintained at the project office. The WMS will maintain a waste register and/or log of all waste removed from the project site. This waste register/log will identify the volumes of waste and the ultimate disposal location. In addition, the WMS will maintain inventory statistics for all waste, which is to be summarized and reported annually. The WMS will also conduct inspections on the WMA and maintain inspection documents at the WMA. These inspection records will be maintained by the WMS and made available to Bechtel. Waste container design will include protection from precipitation and stormwater, and be clearly labelled. . Stormwater control at the WMA will include, as appropriate to the specific facility, upstream stormwater diversion using a berm or similar, and facility to adequately drain clean stormwater to an appropriate discharge location. Contaminated stormwater will be removed via a vacuum truck. The WMA will be secured and access will be controlled by site security, the WMS and the Bechtel Environmental Manager.

The WMS will be responsible for the proper identification, characterization, containerization, labelling, and transport of all wastes. The WMS will be required to ensure that waste remains segregated prior to disposal in accordance with Bechtel's requirements. When picking-up waste from subcontractors for transport to the WMA or removal from the island, the WMS will have to prepare a Waste Transfer Form (Form R1, CEMP Att. B) to be signed by both the subcontractor and WMS to verify the source and quantity of wastes. The WMS will arrange for on-site handling and subsequent disposal and recordkeeping for waste. Any deviation from the specified disposal options in Table 1 must be approved by the Site Manager. Tracking hazardous waste is required under Queensland environmental legislation, and should include documentation that will be in addition to the Waste Transfer Form and will be administered by the WMS with copies provided to Bechtel.

3.2 Satellite Accumulation Area (SAA)

Each subcontractor and lower tier subcontractors will be responsible for the proper identification, characterization, containerization, and segregation and labelling of all wastes generated in the course of their activities. Some wastes such as hazardous waste (e.g., waste oil, spill cleanup, solvents) must be stored appropriately in the subcontractor's Satellite Accumulation Area (SAA).

Each subcontractor and lower tier subcontractors will be required to prepare their own SAA for their waste storage, if needed. Subcontractors are responsible for designing and getting approval from the Bechtel environmental manager and the

Site Manager for a location to build the SAA. Subcontractors will provide drawings that show the location of planned storage locations for hazardous materials and wastes.

The SAA will include protection from rain, proper signage, fire extinguishers, and secondary containment in accordance with regulatory requirements, and accepted industry standards. The base of the SAA shall be impermeable with a berm and the area must be covered to minimize rain accumulation within the storage area. The SAA will be fenced or have controlled access when activities are not occurring within the SAA. The subcontractor's designated environmental coordinator will control access to the SAA. All materials and storage requirements associated with subcontractor SAAs are the subcontractor's responsibility.

At the subcontractor's SAA, waste shall comply with the following requirements:

- Stored in 200 litre containers or other appropriate containers (e.g., bins, roll-off containers);
- Stored in containers that are compatible with the waste that will be stored in it;
- Incompatible wastes will be segregated;
- Hazardous wastes will be stored within containers that have lids;
- Roll-off containers may be tarped / covered to prevent rainfall from accumulating in the container, as necessary;
- Empty hazardous material containers will be identified within storage areas with a sign that indicates that the containers are 'empty';
- If an empty container is to be used to contain a different hazardous material, the initial hazardous material and the subsequent hazardous material must be compatible;
- When hazardous material containers are empty and not being saved for future use, they will be crushed and disposed of properly;
- Hazardous waste will be stored in containers that are in good condition (e.g., no severe rusting, major dents, leaks, apparent structural defects);
- All hazardous material containers, fuel containers, and liquid hazardous waste containers must be stored within a secondary containment area or bunded in a manner that will contain a release as required;
- Waste containers are to be labelled and colour coded according to the waste type which is designated for that container;
- Waste/Used oil containers that contain oil will be labelled with the following: "USED OIL";

- Waste containers that contain waste should be closed at all times, except when adding waste;
- Hazardous waste containers should be managed in a manner that allows inspections of the containers and leak detection; and
- New materials and waste materials may be stored within the same secondary containment. However, signage and labels must indicate which containers are waste and which are new product.

Bechtel will maintain a log and each subcontractor shall advise Bechtel of hazardous waste to be disposed of.

3.3 Waste Transfer

The transfer of waste will be documented by the WMS.

In the absence of a WMS Waste Transfer Form, Form R1 (see CEMP, Attachment B) will be utilized during the course of this Project in order to track the management of different types of wastes.

A completed Waste Transfer Form will be required for all waste transfers to and from the Waste Management Area. The form will be completed as follows:

- Section A of the form must be filled out by subcontractor prior to transferring any waste to the WMA. A signature of the employee completing the form is also required.
- Section B of the form will be filled out by the WMS. Once this is completed, a copy of the form will be submitted to the Bechtel Environmental Manager.

3.4 Waste Container Colour Segregation

Where possible, waste containers used at the project site will be colour coded to assist in maintaining good waste segregation on-site (Table 33).

Table 33: Project Generated Wastes and Colour Coding*

Waste	Disposal & Storage	Container
Solid-Waste (i.e., trash, rubbish, litter) from Construction Site, Camp & Mess Hall, Office	Off-site disposal	Roll-Off Bin, Bin, 200 litre Drum, Plastic Trash Receptacle Blue Colour Band w/ Label
Biohazard Waste (including sharps, bandages, bodily fluid)	Store at medical clinic, remove for off-site treatment/disposal	Red Bag, Sharps Box, 200 litre Drum. Biohazard waste will be double bagged. Red Colour Band w/ Biohazard Insignia & Label. Utilize yellow containers with black labels per Queensland regulations.
Combustible Controlled Waste (e.g., waste oil, brake fluid, hydraulic fluid, etc.)	Off-site disposal	IBC Totes, 200 litre Drum Yellow Colour Band w/ Label
Recyclable Waste (e.g., scrap metal, copper wire, paper, etc.)	Recycle (including selling) or off-site disposal	Waste Pile, Wood Box, Roll-Off Bin Green Colour Band w/ Label
Oil/Fuel Contaminated Soil & Absorbent, Air Filters, Oil Filters (drained)	Off-site disposal	Roll-Off Bin, Bin, 200 litre Drum Orange Colour Band w/ Label
Fluorescent Tubes, Sodium bulbs, ballasts	Off-site disposal	200 litre Drum Purple Colour Band w/ Label
Used Welding Rods	Off-site disposal	200 litre Drum Purple Colour Band w/ Label
Dunnage, Scrap Wood, Cement Bags (remove nails)	Recycle, off-site disposal	Waste Pile Black Colour Band w/ Info on Sign
Sewage Sludge	Storage at Wastewater Treatment Plant, transfer to WMA	Store in lined Wood Box, Roll-Off Bin Orange Colour Band w/ Label

*Specific colour coding is subject to change on project mobilization.

4 WASTE MINIMIZATION

The actions below are to be practiced on the Project to minimize the volume of waste generated by the project:

- Reduction (avoiding use) is the primary goal of any Bechtel waste management program;
- Recycling of wastes will be encouraged throughout the life of the Project;
- Request that vendors minimize packing to later minimize dunnage waste at the project;
- Project personnel who work with hazardous materials will be trained in the proper handling and management of those materials;
- Non-hazardous wastes will not be mixed with hazardous wastes;
- Every effort should be made to minimize the quantity of a hazardous material taken into the field to perform an activity;
- Spills of hazardous materials will be prevented through careful management of the materials;
- Non-hazardous alternatives will be used when they meet the job specifications;
- Handling requirements described in the SDS must be reviewed and understood prior to handling hazardous materials;
- Lids will be promptly replaced after removal of hazardous materials to avoid spillage and evaporation;
- Hazardous materials will be fully utilized before disposal;
- Regular inspections of waste containers will be conducted to detect and replace damaged or leaking containers;
- Preventative maintenance will be performed on equipment to avoid potential spills and releases; and
- Fuel tanks and waste storage areas will have secondary containment.

GLNG

WEED AND PLANT PATHOGEN CONTROL PLAN

(Attachment S of CEMP)

REV	DATE	REASON FOR REVISION	BY	CK'D	Site Mgr	APE	PM
4	05-Dec-13	Issued for Update	ER	PN	BF	HH	BT
3	12-Apr-13	Issued for Update	RJF	SMP	BF	RR	BT
2	7 Sept 12	Updated to reference DAFF	RW	RR	BF	BT	AP
1	1-Nov-11	Updated for Publication	RW	RR	BF	BT	AP
0	19-May-11	Issue for Use	CJK	RRR	BF	CJK	BT / AP
C	9-Mar-11	SEWPaC comments incorporated; Issue for Permit	CJK	RAW	JJM	RR	BT / AP
B	17-Aug-10	Client comments incorporated; Issue for Permit	RW	CJK	JJM	CJK	BT / AP
A	22-Jul-10	Issue for Review	RW	MD	JM	CK	BT AP

BECHTEL OG&C INC.		JOB NO. 25576	
BECHTEL	WEED AND PLANT PATHOGEN CONTROL PLAN	DOCUMENT NO.	REVISION
		100-G01-GHX-00038	4
		GLNG Doc No. 3310-BTH-3-3.3-6838	

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1 INTRODUCTION

This Weed and Plant Pathogen Control Plan is Attachment S of the Construction Environmental Management Plan (CEMP) for the Gladstone LNG Project and shall be read and interpreted in conjunction with the CEMP (ref. 25576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617).

This Weed and Plant Pathogen Control Plan covers the construction and commissioning for the LNG facility on Curtis Island. Curtis Island has a diverse array of exotic flora including lantana and prickly pear. The Project's commitment regarding weeds is:

- Prevent the introduction and spread of weeds and plant pathogens;
- Minimise the risk of spreading weeds to other undisturbed areas; and
- Remove weeds and pest insects, such as fire ants, to the extent reasonable if encountered within the site boundaries.

Bechtel shall implement a comprehensive programme to control any introduction of weeds and plant pathogens due to construction-related activities at the GLNG Plant Project site. Also, when weeds/pests are discovered they shall be controlled per instructions from the Department of Agriculture, Fisheries and Forestry (DAFF), and the Queensland Department of Environment and Heritage Protection (EHP). The elements of the programme are described in this Plan and provide direction and recommendations for protecting native flora and fauna.

2 POTENTIAL SOURCES

The major potential source for introduction of exotic weeds and plant pathogens will be imported building materials and earthmoving equipment brought to the island from the mainland or from overseas. In rare instances road vehicles or site personnel may also be a carrier. Other sources include packing materials that are contaminated with live insects, soil, faecal material, prohibited or restricted seeds, other extraneous plant material and animal matter. Rice straw, straw, hay, chaff and rice hulls are prohibited packing materials which require removal and supervised destruction.

3 CONTROL METHODS

A number of measures shall be employed to control the existing declared weeds and introduction of new exotic weeds to Curtis Island and areas around the facility site:

3.1 General

- Workforce induction – workers shall be advised of the nuisance and adverse impacts associated with noxious weeds and plant pathogens to Curtis Island;
- A fence that will exclude most large mammals shall be erected on the inland boundary of the site prior to facility operation;
- Wash down of all plant and equipment - Machinery and materials shall be washed down off-site at subcontractor premises before bringing to the site to prevent the introduction of weeds and plant pathogens. Machinery and materials arriving without clearance shall either be turned away or quarantined pending wash-down;
- A designated on-site quarantine and wash-down/fumigation area shall be provided for international arrivals– refer to Figure 1. Wash down facilities for machinery/materials arriving from the mainland may be made available at Bechtel's discretion or alternatively machinery/materials may be turned away from site. Treatment shall include hosing down of earthmoving equipment and vehicles and the use of high pressure water spray for earthmoving equipment that retains soils or mud which is difficult to remove. Runoff from wash down shall be captured and treated to remove/kill pests prior to discharge;
- Access to the Curtis Island Environmental Management Precinct is prohibited without specific approval from the Site Manager on advice from the Environmental Manager. Approval may only be granted where there is a specific requirement consistent with the purpose of the Precinct, such as relocation of wildlife (including placement and monitoring of nest boxes) under the GLNG *Species Management Plan*.

3.2 Equipment & Material (Domestic & International)

- Equipment manufacturers shall be informed of quarantine requirements of DAFF. If the packing materials are found to be contaminated at the site of unpacking then they shall be removed and taken off-site to a licensed facility for disposal;
- Earth-moving equipment leaving site shall be thoroughly cleaned to remove any excess build-up of soil that may carry plant pathogens;
- Earth-moving equipment from domestic Australian sources shall arrive with a weed/seed certificate before being allowed on-site;

- Plant and equipment from international sources will be managed as follows:
    - Phase 1 (prior to direct shipment to the MOF): all international shipment will arrive at an established port (such as Port of Brisbane), where they will clear customs and quarantine. It will then be transported by road to Gladstone and across to Curtis Island as per domestic plant/equipment.
    - Phase 2 (including direct international shipment to MOF): international shipments arriving at the MOF will clear customs and quarantine per the requirements of Australian Customs and DAFF (offices for both Customs and DAFF are included in the MOF). A quarantine facility is included at the MOF to allow for quarantine and cleaning if required. A detailed Biosecurity Management Plan has been developed for Phase 2. Only direct-charter vessels will call at the MOF; routine shipments on commercial shipping lines will continue to use established ports, such as Port of Brisbane or Port of Gladstone.

3.3 Weeds & Plants

- During the site clearing operation noxious weeds, timber, and other vegetation matter shall be destroyed by felling and/or chipping. Chips or timber that is removed from the island shall be disposed per DAFF/ EHP guidelines;
- Excess cut material (if any) shall be inspected for weeds before taking for off-site disposal;
- Cleared areas that for the duration of the Project are no longer required for construction or laydown activities shall be seeded with non-weed species as required;
- If noxious weeds are found in work areas they shall be hand pulled or grubbed and disposed in piles on the island;
- If a declared weed that has not previously been on the property or a major weed infestation is noticed inside or adjacent to Project property, Bechtel's Environmental Manager shall inform GLNG's representative who will consult DAFF and/or EHP prior to treatment.
- Services of a licensed weed control company may be used by Bechtel for identification and control of weeds on the Project site.

3.4 Fire Ants & other Pests

- If fire ants are discovered on the site, Biosecurity Queensland will be notified and appropriate action initiated under the National Fire Ant Eradication Program;
- Fire ants or other insect pests may be treated chemically based on consultation with Biosecurity Queensland and other relevant agencies (such as DAFF and EHP).
- Materials to be moved off site may also require treatment prior to removal; this will be done in accordance with an approved management plan and in consultation with Biosecurity Queensland.

4 ENVIRONMENTAL INSPECTIONS AND AUDITS

Weekly environmental inspections shall be conducted (refer CEMP, section 3.4) and inspectors are required to identify and report on major pests, such as lantana and fire ants. Training for Weed and Pest species is provided in the Environmental Training Outline as per Attachment J of the Construction Environmental Management Plan (CEMP).

Audits for compliance with this plan shall be conducted as explained in the CEMP, section 3.5.2.

5 RESPONSIBILITIES

Overall responsibility for implementation of this Plan rests with the Senior Project Manager supported by the Project Management Team. The Site Manager is responsible for providing resources to implement and monitor this Plan. Supporting the Site Manager will be the Traffic & Logistics Supervisor, with primary responsibility for coordinating quarantine requirements and confirming that domestic and international shipments comply with this Plan. The Environmental Manager will be responsible for providing advice, training, reporting, and inspection.

6 ADDITIONAL DOCUMENTATION

All sightings of weeds/pests on the site after the completion of site clearing and major earthworks shall be recorded, photographed, a sample collected (if possible) and submitted to GLNG's site representative. Bechtel's Environmental Manager shall prepare a Weed/Pest Report Form (see CEMP Attachment B) of the occurrence and any control actions.

Additional details, modifications, actions, and notes of meetings conducted with government agencies relative to weed/pest management shall be incorporated into or attached to this document.

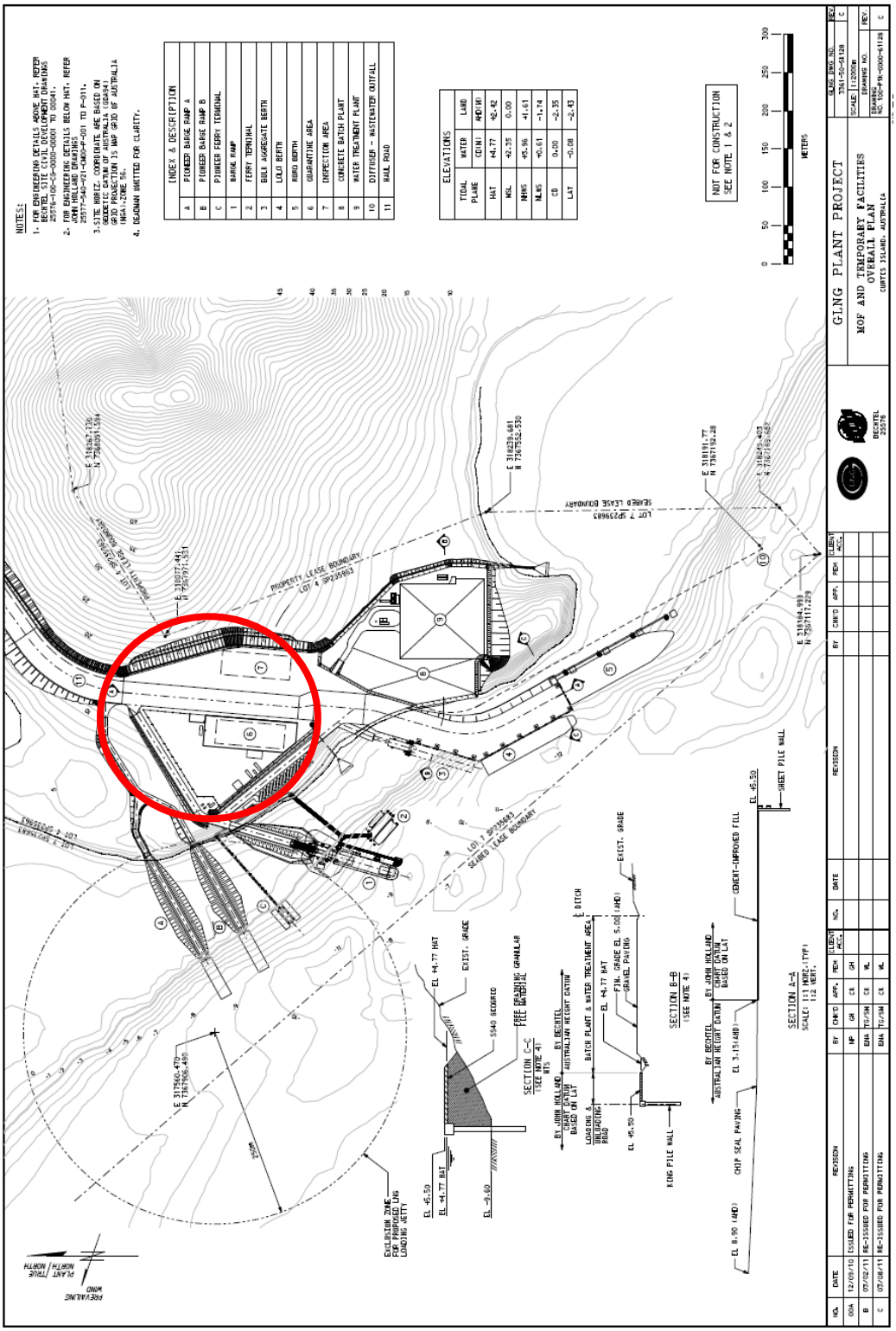

Figure 1 - Layout of MOF, showing Quarantine Facility (circled)

GLNG

WILDLIFE AND HABITAT MANAGEMENT PLAN

(Attachment T of CEMP)

REV	DATE	REASON FOR REVISION	BY	CK'D	Site Mgr	APE	PM
4	05-Dec-13	Issued for Update	ER	PN	BF	HH	BT
3	28-Jun-13	Issued for Update	SMP	EMR	BF	RR	BT
2	12-Apr-13	Issued for Annual Review and Update	RJF	SMP	BF	RR	BT
1	1-Nov-11	Updated for Publication	RW	RR	BF	BT	AP
0	22-Apr-11	SEWPaC comments incorporated; Issued for Use	CJK	RRR	JJM	CJK	BT /AP
C	09-Feb-11	Client comments incorporated; Reissued for Permit	RW	CJK	JJM	CJK	BT / AP
B	17-Aug-10	Client comments incorporated; Issue for Permit	RW	CJK	JJM	CJK	BT / AP
A	21-Jun-10	Issue for Review	RW	MD	JJM	CJK	ABP

BECHTEL OG&C INC.		JOB NO.25576	
BECHTEL	WILDLIFE AND HABITAT MANAGEMENT PLAN	DOCUMENT NO.	REVISION
		100-G01-GHX-00039	4
		GLNG Doc No. 3310-BTH-3-3.3-6839	

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1 INTRODUCTION

This Wildlife and Habitat Management Plan is Attachment T of the Construction Environmental Management Plan (CEMP) for the Gladstone LNG Plant Project and shall be read and interpreted in conjunction with the CEMP (ref. 25576-100-G01-GHX-00017; GLNG doc. 3310-BTH-3-3.3-6617).

This Wildlife and Habitat Management Plan (WHMP) describes the environmental management programs related to protection of fauna and flora (also referred to as wildlife and habitat) during the construction, and commissioning of the LNG Facility. The roles and responsibilities for wildlife and habitat management by Bechtel site personnel, subcontractors and other related staff during the construction and commissioning phases of the LNG Facility are outlined below. Management of flora and fauna impacts during operation are not included in the scope of this Plan.

Almost every aspect of the project has potential to impact wildlife and habitat. This Plan is intended to capture the key items that may directly affect wildlife and habitat while recognizing the many potential indirect effects that could occur.

The GLNG Environmental Impact Statement (EIS), Supplementary EIS and related Environmental Management Plans (EMPs), Commonwealth EPBC 2008/4057 (Natural Gas Liquefaction Park) and EPBC 2008/4058 (Marine Facilities) Development Approvals, and the statements of the Queensland Coordinator General's Evaluation Report have all identified sensitive species and habitats in the areas of proposed Project activities that would potentially be impacted and mitigation measures and execution requirements are proposed. Important habitat was qualified as areas considered important to supporting plant and wildlife species, including forest, shoreline, and marine areas. This management plan consolidates actions to avoid and/or mitigate impacts to the range of sensitive species/habitats potentially affected.

2 MANAGEMENT OBJECTIVES AND STRATEGIES

2.1 Management Objectives

The Project recognizes the significant diversity of wildlife and habitat in the vicinity of the Project site. Animals may move as conditions change or according to their needs, so it is possible there may be unanticipated wildlife encounters. The objectives of this plan are to:

- Protect and conserve the biodiversity values of the Project area;
- Summarize requirements for compliance with applicable national, state and local environmental laws and regulations, permit conditions, contractual commitments and other applicable environmental documents;

- Describe the responsibilities and actions required during the various project phases to maintain compliance with environmental requirements, commitments, and to address unanticipated wildlife discoveries;
- Develop management practices for flora and fauna protection and conservation;
- Provide a framework for inspections and monitoring to evaluate compliance of wildlife and habitat protection.

2.2 Environmental Impact Statement (EIS), Commonwealth EPBC Approvals, and Coordinator General's Evaluation Report Requirements

The EIS includes two draft Environmental Management Plans (LNG Facility and Marine Infrastructure) that describe measures the Project shall employ for management of flora and fauna during construction. The Commonwealth has also issued two Project Approvals (EPBC 2008/4057 and 2008/4058) that specify Project requirements regarding 'listed ecological communities, listed threatened species, listed migratory species, their habitat and species identified as contributing to the World Heritage and National Heritage values of the Great Barrier Reef World Heritage Area and 'appropriate measures (for example mitigation measures, performance indicators/trigger levels and corrective actions/management actions) that will ensure that there are no unacceptable impacts on the Great Barrier Reef World Heritage Area, Great Barrier Reef National Heritage Place, EPBC listed threatened or migratory species'. Of particular interest to the Commonwealth are marine mammals, sea turtles, seagrass habitat, and water quality. The Coordinator General's Evaluation Report also contained management measures that are described below. Potential effects of discharges from the project Sewerage Treatment Plant and Water Treatment Plant (reverse osmosis) on aquatic fauna shall be monitored, including methods such as direct toxicity assessment (see the Environmental Monitoring Plan CEMP, Att. H),are not discussed in this Plan.

Management measures based on the EIS (EIS Supplement LNG Facility EMP 13.16.2 and 13.16.3), include:

- Areas of vegetation to be cleared during construction shall be restricted to the minimum area required and shall be clearly delineated;
- Any clearing involving the removal of expansive stands of woodland vegetation shall be undertaken in stages to reduce disruption for fauna dispersal;
- Cleared vegetation shall be chipped and stored for use as mulch during site landscaping works and/or in surrounding vegetated areas susceptible to erosion to the greatest extent practicable. If this is not possible, vegetation shall be managed in accordance with the Queensland Department of Environmental and Heritage Protection guidelines;

- Access to the site shall be restricted to prohibit unauthorised access to the surrounding undisturbed areas. Access restrictions shall be implemented to prevent unauthorized clearing, recreational driving, unmanaged fire regimes, and the spread of introduced weed species;
- Stockpile areas and haul roads required during construction shall be clearly defined, so that weed establishment and the potential spread of plant diseases may be contained;
- Stockpiles shall be developed in previously cleared areas, with adequate open space buffers, if possible;
- An appropriate bushfire management regime shall be implemented over the site and shall consist of periodic (as appropriate) inspections of fuel load and moisture content in vegetated areas;
- A landscape plan which covers all areas disturbed during construction but not covered by built structures and infrastructure shall be prepared and implemented at the end of the construction phase. The landscape plan shall include the control of introduced weed species which can colonise disturbed areas following construction and the use of plant species native to the vegetation communities present in the region to the fullest extent possible. It shall also guide plantings to 'soften' the facility from a visual amenity perspective;
- Bushland and habitat surrounding the site shall be managed to prohibit any unauthorized disturbance so as to maintain the area's habitat values;
- Access of workers to areas outside the designated construction sites shall only be permitted with the prior approval of the LNG Facility Environmental Manager (note, for purposes of this EIS requirement the Bechtel Environmental Manager shall have this responsibility);
- Where practicable, dead trees, stags and hollow branches shall be salvaged from the areas to be cleared for construction and relocated to the surrounding undisturbed areas to create compensatory shelter;
- Hollow bearing trees shall be felled in a manner which reduces potential for fauna mortality. Felled trees shall be inspected after felling and fauna (if identified and readily accessible) shall be removed and relocated or rendered assistance if injured. After felling, hollow bearing trees shall remain unmoved over-night to allow animals to move of their own volition;
- Management measures shall be adopted to minimise impacts to fauna from noise, vibration and lighting;
- A pest species management plan will be developed and implemented for terrestrial pest fauna species of concern. This shall include a management plan for red imported fire ants including information from the National Fire Ant Eradication Program.

Strategies outlined below are based on the EIS Supplement Marine Facility EMP 14.15.4

- The proponent shall maintain a record of procedures employed during piling operations. Such records shall be auditable and shall account for all aspects of the operation as it relates to legislative approvals and regulations.

2.3 Risk Assessment

The risk of potential impacts associated with construction and commissioning activities on flora and fauna is described in Table 1.The identified construction and commissioning related activities that could potentially cause effects to flora and fauna include, but are not limited to clearing, stripping, bulk earthworks, civil works, haul and access roads, dust generating activities, waste generation, works in or near waterways, marine transport, piling, dredging, and activities related to the presence of humans on Curtis Island.

Table 1. Potential Impacts on Flora and Fauna by Habitat Type and Project Area

Aquatic Impacts
Removal of forest for road corridors, main facility, and development of ancillary infrastructure leading to altered stormwater run-off patterns
Mobilization of sediment from cleared areas entering aquatic system
Construction of structures in or near watercourses
Changes in hydrology due to construction of roads and infrastructure across water courses and extraction of water
Increased water turbidity from sediment laden runoff from cleared areas
Decreased water quality due to contamination of soil and streams from chemical pollutants
Noise from marine vessels and risk of collisions
Dredging noise, suspended sediment and entrainment
Work over water on jetty and material offloading facility
Lighting disorienting wildlife
Terrestrial Impacts
Decreased air quality primarily through the generation of dust
Contamination of soil by chemical pollution
Removal and fragmentation of forests for road corridors, main facilities, and development of ancillary infrastructure
Road traffic
Noise, light and vibration during construction and commissioning
Creation of modified habitats
Location of infrastructure in sensitive habitat

2.4 Mitigation Measures for Flora and Fauna

Bechtel and its subcontractors shall mitigate construction and commissioning impacts on flora and fauna by:

- Mandatory Project environmental awareness training for all workers and ongoing task/activity-specific training;
- Minimizing the area disturbed by construction;
- Demarcation of work zones in the field to identify areas to be impacted and protected;
- Following vegetation clearing guidelines from the EIS;
- Rehabilitating temporarily disturbed areas when construction activities are completed;
- Restricting access of vehicle traffic and workers from areas not under active construction;
- An ongoing ban on wildlife harvesting (hunting/trapping/fishing) on Project sites for all Project personnel with substantial penalties imposed on violators;
- A network of 'No Go' areas shall continue to be developed throughout the Project area and all Project personnel shall be required to comply;
- During construction works, wildlife are to be captured and relocated by qualified personnel and not killed;
- Implementing dust control measures;
- Protecting water quality by installing erosion control management practices;
- Verifying that discharges into water courses (including into Port Curtis) meet Project requirements;
- Verifying that all vehicles and equipment imported for Project use are thoroughly cleaned at their point of origin to mitigate introduction of foreign seed and soil potentially harmful to native flora and fauna;
- Following the management controls and procedures identified in this Plan;
- Environmental inspections and audits;
- Flora and fauna monitoring and evaluation;
- Monitoring construction activity and implementing additional procedures for flora and fauna protection/conservation (as necessary).

The Bechtel Environmental Manager shall emphasise minimization of impacts to flora and fauna as part of any work plan approvals, Job Hazard Analysis, and environmental compliance inspections. The construction works shall be progressive over time and consultation between the Site Manager and the Bechtel Environmental Manager shall be required prior to any new works

commencing in order to minimize and mitigate affects expected on flora and fauna.

3 FIELD PROCEDURES

Procedures for specific flora and fauna management issues are described in this section for clearing, marine dredging, pile driving, construction and commissioning of the main facility. The Construction Environmental Management Plan and its associated plans/procedures also contain measures that serve to protect wildlife.

3.1 Critical Habitat, Protected Areas and Species of Concern

Critical habitat, present in some areas that may be affected by the project, are areas with one or more of the following characteristics; high biodiversity value, habitat required for the survival of endangered or critically endangered species, areas of specific significance to endemic or restricted range species, critical sites for migratory species, areas that support globally significant concentrations of migratory species, areas with unique assemblages of species, and areas supporting biodiversity significant to local communities. Species of concern include species listed in the IUCN Red List and/or under Australian legislation.

Within the context of this Plan, critical habitat and protected areas have been determined through studies initiated by GLNG and shall be managed throughout construction and commissioning activities. The following are the most likely wildlife and habitat that the Project might encounter:

- Dolphins and whales frequent the Port of Gladstone. There is a risk of impacts with boats and they may be disturbed or disoriented by underwater noise;
- Dugongs occur in the Port of Gladstone and are endangered. Increased boat traffic associated with the Project could result in increased boat strikes on dugongs. Also, noise from boats, dredging and pile driving could disturb the dugongs and alter their natural behaviour;
- Sea turtles are common in the Port of Gladstone and may nest on beaches in the vicinity of the Project, though not at the Project site. There is a risk of impacts to swimming turtles by boats, entrainment by dredge sucking heads, and shoreline lighting can disorient turtles while laying eggs or when hatchlings crawl from nest sites to the sea;
- Mangrove vegetation occurs along the shoreline of most of the Project site and can be affected by vegetation cutting/removal or by excessive sediment deposits;
- Dead trees (snags) and hollow logs that shall be removed during site clearing are a significant habitat element for terrestrial mammals, birds, reptiles, amphibians and insects.

3.2 Procedures

The following procedures apply to management of wildlife and habitat during Project activities.

3.2.1 Site Clearing

Site clearing shall consist of removing trees by hand falling or pushing/pulling over with tractors, brush raking shrubs, and scraping/mowing grasses and low-growing vegetation. Merchantable trees may be taken for timber or woodchips and all other material shall be chipped on-site; some chips shall be stored for use in erosion control and site landscaping/rehabilitation and the others disposed. Naturally occurring logs on the ground (some hollow), from windfalls or killed by past bushfires, shall also be removed; selected hollow logs shall be stored for use during landscaping/rehabilitation and the remainder chipped.

The following measures shall be applied during site clearing to comply with Project requirements:

- All site personnel involved in clearing shall be trained as to the requirements of dealing with wildlife and habitat;
- Prior to clearing, fencing and signs shall be placed to identify and close critical habitat areas. The boundaries of site clearing shall be clearly delineated by survey markers;
- Prior to site clearing, a survey shall be conducted to identify trees that have a potential to contain wildlife, including hollow snags or trees with holes where cavity nesting/denning species might occur. The trees with potential for wildlife shall be marked;
- Marked wildlife trees shall be felled in a manner to lessen possible wildlife mortality. This method shall be determined on a case-by-case basis between a qualified biologist and Bechtel representatives;
- After felling, the potential wildlife trees shall be inspected by a wildlife officer to determine if any animals are present. If an animal is discovered:
  - If an injured animal is discovered it shall be collected by the wildlife officer and transported to a wildlife rehabilitation facility. If an injured animal is judged by the wildlife officer to have mortal injuries the wildlife officer may dispatch the animal on-site and arrange for proper disposal of the carcass.
  - If an uninjured animal is discovered the wildlife officer can determine whether to remove the animal and release it at a nearby safe location or leave the animal alone to move on its own overnight. If the animal has not moved by the next morning the wildlife officer shall remove the animal and release it in a safe location;

- After felling, all potential wildlife trees, regardless of the results of the wildlife officer's inspection, shall be allowed to remain on the ground overnight to allow wildlife to go away;
- Wildlife officers shall search and remove any yakka skinks from harm's way;
- Clearing shall be done along a consistent front to allow wildlife to escape from the moving front into undisturbed adjacent habitat.

3.2.2 Offshore Wildlife Procedure

To manage marine mammals and sea turtles the following measures shall be applied to comply with EIS requirements:

- All boat skippers, pilots, and crew shall be trained to follow Port of Gladstone speed restrictions and avoid restricted areas;
- All boat skippers, pilots, and crew shall maintain a lookout for marine mammals and sea turtles to avoid collisions;
- No fishing or crabbing shall be allowed from Project vessels or along the Curtis Island coast from Hamilton Point to near Grahams Creek;
- Dredging shall utilize management practices, such as water jets, where practicable to protect turtles;
- Per the Coordinator General's Evaluation Report 10.9.18 (p. 178), dredging will not be carried out while dugongs, turtles or other marine species of conservation significance are observed within 150 m of the dredge, or while migratory birds are observed within 25 m of the dredge. Where turtle or dugong or other marine species are observed within a 150 m radius of the dredge and likely to interact with the dredge gear, the dredging activities will temporarily cease or be relocated;
- Pile driving shall only be conducted during daylight hours, except in the event of a pile being in an unsafe state at dusk. In these circumstances work may continue until the individual pile is made safe before piling is ceased for the evening. Pile driving will not commence after daylight hours or re-commence where work has stopped after daylight hours;
- A marine mammal and sea turtle observation zone of 500m in radius from the noise emitting source will be established. During periods when pile driving is planned to occur, each morning before work begins a wildlife lookout shall inspect the marine mammal and sea turtle observation zone for 30 minutes if the work is occurring in water deeper than two (2) m. The same procedure will be followed after work has ceased for more than two (2) hours and prior to it beginning again;
- Prior to the commencement of full power pile driving, "soft start" procedures that slowly ramp up the intensity of noise emissions over a period of no less than 15 minutes will be employed. These soft start

techniques may include “fairy” taps or alternative means of alerting and dispersing marine fauna such as broadcasting noise simulations of pile driving. Noise attenuation measures such as an air bubble curtain may also be used;

- Pile driving shall not commence if a marine mammal or sea turtle is observed within 500 m. If, after pile driving has commenced (including soft start), a marine mammal or sea turtle is observed within 100m of the noise emitting source, then pile driving shall cease until the animal is seen leaving the exclusion zone or 20 minutes has passed since the last sighting (whichever is sooner);
- A daily record of wildlife observations shall be kept by the wildlife lookout;
- Lighting on shore shall be directed away from the sea or shielded, except where it is required to meet health and safety legislative requirements;
- Only sonar above 200 kHz shall be used;
- A Bechtel environmental advisor shall serve as the part time Fisheries Liaison Officer.

Inspections of vessels for marine pests shall follow guidelines and practices generally used for the Port of Gladstone.

3.2.3 Water Mouse

The water mouse is a small, rare mammal that may occur in mangrove habitat. No mangrove habitat outside the approved Project footprint should be disturbed. If the Project layout requires revision, surveys must be conducted for the water mouse by qualified wildlife officers.

3.2.4 Wildlife Encounters

The following information establishes the protocol to be followed by all site workers to avoid wildlife:

- Feeding wildlife or leaving food in a manner accessible to wildlife is not allowed on the Project site. Attracting wildlife to the Project site is dangerous to workers and the animals;
- Hunting and fishing onsite is strictly prohibited;
- Do not approach, pet or attempt to interact with any animals, including kangaroos, dogs, cats, cattle, or horses (brumby).Interacting with wild animals is dangerous and can result in severe bites and/or contraction of diseases;
- Pets are not allowed on the Project site;
- Be aware when working in heavy brush and undergrowth where you do not have a clear view of what you are walking on or into. Venomous snakes may be found in trees as well as on the ground.

If workers encounter wildlife (including horses, cattle, and pigs), the following guidelines are to be followed:

- If wildlife is discovered in the work area, including nesting birds in stored Project material, the animal should be left alone and the Bechtel Environmental Manager immediately informed to take appropriate action (a Rehabilitation Permit from Queensland Department of Environment and Heritage Protection may be required);
- If possible, take an alternative route, avoid approaching the animal altogether;
- Always avoid blocking an animal's path of movement or placing yourself between animals such as a mother and her young;
- Always remain calm, animals respond to fear. Panicking will not allow you to think clearly and will alert the animal to your fearful state;
- If the animal has become aware of your presence, back away slowly. Keep your eyes on the animal at all times. Large mammals often respond by chasing you if you turn your back and/or run;
- If an animal charges you, remain calm, do not turn and run! It is best to stand still and then continue to back away slowly;
- Once you have achieved a safe distance between yourself and the animal, be sure to alert others of the animal's presence;
- If a worker comes into contact with wildlife or is bitten by any mammal or reptile, they should be seen by medical personnel immediately.

Any animal discovered washed up on the shoreline should be avoided and immediately reported to the Bechtel Environmental Manager. Animal bones, shells, and any other animal parts should be left alone.

3.2.5 Management and Handling of Dead Animals

The following information establishes the protocol to be followed for the management and handling of deceased animals.

Site Workers and Subcontractor Responsibilities

- Employees should never approach, touch or handle dead animals. Dead animals can carry bacterial and viral infections transmissible to humans and should be avoided;
- If a dead animal is found, the Bechtel Environmental Department shall be contacted immediately;
- Environmentally trained staff shall arrange for removal of dead animals from working areas. It is important animals are handled and disposed of appropriately and in due course to prevent the potential spread of disease.

Environmental Manager Responsibilities

- Record all animal deaths in a log with location, details of dead animals (species, cause of death, etc.), and disposition of the carcass;
- If the death appears to be a result of Project activities (water contamination, road kill, etc.) investigate the incident and take further action to mitigate future occurrences;
- Avoid handling dead animals. If it is necessary to touch a dead animal, always wear latex gloves and a face mask. Always wash hands and footwear thoroughly after contact with dead animals;
- Contact local regulatory authorities for any dead species of endangered wildlife (e.g., dugong);
- If an animal must be collected for disposal, dispose of the animal as required by the Queensland Department of Environment and Heritage Protection (EHP).

3.2.6 Red Imported Fire Ant Plan

Biosecurity Queensland Control Centre (BQCC) is the Queensland government agency tasked with finding, treating and containing red imported fire ants (*Solenopsis invicta*).The Project shall control red imported fire ants by:

- Not importing soil to the job site from fire ant infested areas;
- Monitoring the site for fire ant mounds per advice from BQCC;
- Treating any fire ant mounds with chemicals per advice from BQCC;
- Contacting BQCC (telephone 13 25 23) in the event of sighting fire ants or for questions regarding fire ant management.

3.2.7 Rehabilitation and Revegetation

The Landscaping and Site Rehabilitation Plan (CEMP, Att. K) addresses the programs to be implemented during construction to reclaim and revegetate disturbed areas. Habitat disturbance shall be minimized wherever possible and temporarily disturbed areas shall be revegetated following completion of work activities. Topsoil and chipped vegetation shall be stored for later use in revegetation programs as required. To the extent possible, revegetation shall include plant species that stabilize the soil and potentially provide habitat for some wildlife species. Safety and fire prevention in the vicinity of the operating plant shall be key factors in determining what plant species may be used during revegetation. The perimeter of the operating facility shall have a security fence to prevent some wildlife species from entering the site.

4 DISCOVERY OF PROTECTED PLANT OR WILDLIFE SPECIES

In the event that a protected species of plant or wildlife not previously addressed in this Plan is discovered during construction or commissioning the following measures shall be taken:

- Work shall cease in the area of the plant/animal;
- The Bechtel Environmental Manager shall be notified immediately;
- The Bechtel Environmental Manager shall document and confirm the species occurrence by photograph, if possible;
- The Bechtel Environmental Manager shall notify the Queensland Department of Environment and Heritage Protection for instructions regarding actions to be taken;
- Work shall remain stopped in the area until the Bechtel Environmental Manager provides written approval for work to resume.

5 EDUCATION AND AWARENESS TRAINING

All site employees are required to attend general environmental awareness training upon arrival to site, which shall detail the employee's responsibility for complying with environmental regulations and Project requirements. In addition, employees shall receive ongoing classroom and on-the-job Environmental, Safety and Health training for specific job tasks with consideration to specific environmental aspects to be considered during works.

Training sessions shall address the importance of environmental awareness in the employee's everyday duties. Environmentally sensitive areas and species on and adjacent to the site and work areas, as well as construction exclusion zones, shall be identified and discussed. With regard to flora and fauna protection, the objective of training sessions shall be to verify all employees are aware of their surrounding environment and the importance of conservation of species within the area they are working.

6 INSPECTIONS AND MONITORING PROGRAMS

Regular inspections and monitoring programs for flora and fauna management follow the general site environmental inspection and monitoring programs detailed in the Environmental Monitoring Plan (CEMP, Att. H). Specific construction area inspections related to flora and fauna are described in the clearing inspection procedures to establish the presence of sensitive species/habitats and subsequent protection or relocation measures.