The **Coordinator-General**

Yarwun Coal Terminal

Terms of reference for an environmental impact statement

July 2012

Queensland Government

Contents

Introduction

Tenement to Terminal Limited (3TL) proposes to develop the Yarwun Coal Terminal, which has been declared a 'significant project' by the Coordinator-General. The project components to be assessed include:

- a 14-kilometre (km) rail line from east of Mount Larcom to the proposed terminal site in the Gladstone State Development Area
- a rail in-loading facility, stockyards, conveyor and loading terminal
- two new berths and associated dredging
- out-loading wharf and jetty facilities and associated coal transport and materials handling infrastructure
- associated power and water infrastructure.

These terms of reference (TOR) set out the requirements, both general and specific, that the proponent should address in preparing the EIS. The TOR has been prepared by the Coordinator-General having regard to comments and submissions received on the draft TOR released for public comment over the period of 26 May 2012 to 25 June 2012.

The document is divided into two parts:

(a) About the project

(b) Contents of the EIS

The TOR must be read in conjunction with *Preparing an environmental impact statement: Guideline for proponents*, which explains the following:

- the target audience for the EIS
- stakeholder consultation requirements
- document format
- copy requirements.

The guideline is available from the EIS project manager (refer to page 5 for contact details) or from the office of the Coordinator-General website **www.projects.industry.qld.gov.au**

Part A. About the project

1. Project summary

The proposed coal terminal will export up to 50 million tonnes per annum (mtpa) of thermal, pulverised coal injection and coking coals and will comprise rail infrastructure, coal stockyard, out-loading wharf facility and associated coal transport and materials handling infrastructure.

It is proposed that coal will be transported to the terminal by train, via a new rail line and offloaded into stockpiles and then loaded onto conveyors. An out-loading jetty conveyor will travel out from the coal stockyard to offshore berths, where the coal will be loaded onto vessels ranging from Handymax to Cape class.

The proposed Yarwun Coal Terminal is located on the south-western shoreline of the Port of Gladstone, west of the proposed Wiggins Island Coal Export Terminal (WICET) and south of Fishermans Landing precinct. The Gladstone–Mt Larcom Road (Hanson Road) reserve is adjacent to the proposed rail line and located to the west of the proposed stockpile site.

The proposed stockyard and rail line sites are within the Yarwun Precinct of the Gladstone State Development Area (GSDA) and the Gladstone Regional Council (GRC). The offshore infrastructure (jetty and berths) will be situated within the Gladstone Port Corporation port limits and not located on Strategic Port Land.

The terminal will be developed in stages. Stage 1 will provide a 25 mtpa facility with late stages increasing capacity to 50 mtpa. Construction is scheduled to commence in early 2015 and commissioning of Stage 1 is planned for the first quarter of 2017.

A construction workforce of 600 and an operational workforce of 200 are estimated for the project.

The provision of rail infrastructure will allow coal to be sourced from the southern Bowen Basin, Surat Basin and the Galilee Basin.

Further information on the project can be viewed at:
www.projects.industry.qld.gov.au

2. Project proponent

The proponent, 3TL, is a privately owned Brisbane-based infrastructure development company and has acquired from the state government waterfront land at Yarwun in the Port of Gladstone for the purpose of building a coal export terminal.

The contact details for the proponent are:

Michael Schaumburg
Managing Director
Tenement to Terminal Limited
Level 7, Emirates House
167 Eagle Street
Brisbane Qld 4000

Tel +61 7 3236 3480
Email mschaumburg@3tltd.com.au

3. Legislative framework

On 18 May 2012, the Coordinator-General declared the project to be a 'significant project' under section 26(1)(a) of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act). This declaration initiated the statutory environmental impact assessment procedure of Part 4 of the SDPWO Act, which requires the proponent to prepare an EIS for the project.

The declaration of the project as a 'significant project' does not indicate support for or approval of the project by the Coordinator-General or the Queensland Government. Rather, it is a requirement for the project to undergo a rigorous EIS process.

On 15 May 2012, the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities determined the project may have a significant impact upon matters of national environmental significance (MNES) (reference number EPBC 2012/6348). The minister is conducting a separate assessment process under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act). This TOR does not cover MNES.

3.1. Coordinator-General's report

At the conclusion of the EIS process, the Coordinator-General will prepare a report evaluating the EIS (Coordinator-General's report). If the report states conditions under the following Queensland Acts, the Coordinator-General is required to provide the responsible minister(s) with a copy of the report:

- *Mineral Resources Act 1989*
- *Environmental Protection Act 1994* (EP Act)
- *Petroleum and Gas (Production and Safety) Act 2004*
- *Greenhouse Gas Storage Act 2009*.

4. Contact information

For information about the EIS process for the project, contact:

The Coordinator-General
c/- EIS Project Manager—Yarwun Coal Terminal
Significant Projects Coordination
PO Box 15517
City East Qld 4002
tel +61 7 3225 8892
fax +61 7 3225 8282
email YCT@coordinatorgeneral.qld.gov.au
web www.projects.industry.qld.gov.au

Part B. Contents of the EIS

The EIS should follow the format and content outlined in this TOR. Discuss any proposed change to the overall structure of the EIS documents with the EIS project manager (refer to page 5 for contact details).

1. Executive summary

The executive summary should convey the most important aspects and options relating to the project to the reader in a concise and readable form. It should use plain English, avoid jargon, be written as a stand-alone document and be structured to follow the EIS. It should be easy to reproduce and distribute on request to those who may not wish to read or purchase the whole EIS.

The executive summary should include:

- project title
- proponent's name and contact details
- a discussion of any relevant projects previously undertaken by the proponent, if applicable, and the proponent's commitment to effective environmental management
- a concise statement of the aims and objectives of the project
- the legal framework for the project, decision-making authorities and advisory agencies
- an outline of the background and need for the project, including the consequences of not proceeding with the project
- an outline of the alternative options considered and reasons for selecting the proposed development option
- a brief description of the project (pre-construction, construction, operation and decommissioning) and the existing environment, using visual aids where appropriate
- an outline of the principal environmental impacts predicted and the proposed environmental management strategies and commitments to minimise the significance of these impacts
- a discussion of any cumulative impacts arising from the project's construction and operation phases in conjunction with other significant infrastructure projects approved or proposed for the regions affected by the project
- detailed maps of the proposed project location and any other critical figures.

2. Glossary of terms

Provide a glossary of technical terms, acronyms, abbreviations and references.

3. Introduction

Clearly explain the function of the EIS, why it has been prepared and what it sets out to achieve. Include an overview of the structure of the document.

3.1. Project proponent

Provide details of the company including structure and ownership.

Describe the proponent's experience, including:

- the nature and extent of business activities
- experience and qualifications
- environmental record, including a list of any breach of relevant environmental laws during the previous ten years.

Provide detail of the proponent's environmental, health, safety and community policies.

3.2. Project description

Briefly describe the key elements of the project with illustrations or maps. Summarise any major associated infrastructure requirements. Provide detailed project descriptions in Part B, Section 4 (refer to page 15).

3.3. Project rationale

Describe the specific objectives and justification for the project, including its strategic, economic, environmental and social implications, technical feasibility and commercial drivers. Discuss the status of the project in a regional, state and national context. Explain the project's compatibility with relevant policy, planning and regulatory frameworks.

3.4. Project alternatives

Describe feasible alternatives including conceptual, technological and locality alternatives to the proposed project and the consequences of not proceeding with the project. Detail the criteria used to determine the alternatives and provide sufficient detail to enable the reader to understand why certain options or courses of action are preferred and why others are rejected (including the 'no action' option). Discuss the interdependencies of project components, particularly in regard to how any infrastructure requirements relate to the viability of the project.

Consider alternatives to the project including coal export through existing, expanded or currently planned new coal export facilities located at or near the proposed terminal.

This information is required to assess why the scope of the project is as it is and to ensure that the environmentally sustainable design principles and sustainable development aspects were considered and incorporated during the scoping of the project.

3.5. Relationship to other projects

Describe how the project relates to other infrastructure projects (of which the proponent should reasonably be aware) that have been, are being undertaken or that have been proposed or approved in the area potentially affected by the project.

As a result of this assessment, there may be opportunities to co-locate existing or proposed infrastructure, enabling efficiency gains and mitigating environmental and property impacts. Where co-location may be likely, outline opportunities to coordinate or enhance impact mitigation strategies. Discuss the opportunities in sufficient detail to enable the reader to understand the reasons for preferring certain options or courses of action and rejecting others.

3.6. The environmental impact assessment process

3.6.1. Methodology of the EIS

Provide an outline of the environmental impact assessment process, including the role of the EIS in the Coordinator-General's decision making process. Include information on relevant stages of EIS development, statutory and public consultation requirements and any interdependencies that exist between approvals sought. The information in this section is required to ensure:

- relevant legislation is addressed
- readers are informed of the process to be followed
- stakeholders are aware of any opportunities for input and participation.

3.6.2. Objectives of the EIS

Provide a statement of the objectives of the environmental impact assessment process. The structure of the EIS can then be outlined and used to explain how the EIS will meet its objectives. The purpose of the EIS is to:

- provide public information on the need for the project, alternatives to it and options for its implementation
- present the likely effects of the project on the natural, social and economic environment
- demonstrate how environmental impacts can be avoided, managed or mitigated and the offsets for any residual impacts
- provide information to formulate the project's environmental management plan (EMP).

3.6.3. Submissions

Inform the reader how and when properly made public submissions on the EIS will be addressed and taken into account in the decision-making process. Indicate points in subsequent approval processes for the project (e.g. 'material change of use' (MCU) applications under SPA) where submitters may have appeal rights. The EIS project manager can assist with preparing information on the submissions process.

3.7. Public consultation process

Overview

The public consultation process should provide opportunities for community involvement and education. It may include interviews with individuals, public communication activities, interest group meetings, printed material and other mechanisms to encourage and facilitate active public consultation. The public consultation processes (community engagement) for all parts of the EIS should be integrated.

Consultation with advisory agencies should be the principal forum for identifying legislation, regulations, policies and guidelines relevant to the project and EIS process.

Consultation plan

Develop and implement a comprehensive and inclusive consultation plan with the stakeholder groups identified in section 3.2 of *Preparing an EIS: Guideline for proponents*.

The consultation plan should identify broad issues of concern to local and regional community and interest groups and address issues from project planning through commencement, project operations and decommissioning. The consultation plan should identify:

- the stakeholders to be targeted
- the types of consultation and communication activities to be undertaken
- timing of activities
- how consultation activities will be integrated with other EIS activities and the project development process
- consultation responsibilities
- communication protocols
- reporting and feedback arrangements
- how results of consultation will be considered by the proponent and integrated into the EIS process.

Public consultation report

Include, as an appendix, a public consultation report detailing how the public consultation plan was implemented, and the results. It must include:

- a list of stakeholders identified, including the Australian and Queensland governments, and local government agencies. Consideration should be given to affected parties, as defined by the EP Act, in identifying stakeholders (including Gladstone Ports Corporation Limited (GPCL))
- criteria for identifying stakeholders and methods used to communicate with them
- details of the activities conducted to date and the future consultation strategies and programs, including those during the operation phase of the project (also outlined and included in the EMP)

- a summary of the issues raised by stakeholders and the means by which the issues have been addressed
- details of how consultation involvement and outcomes were integrated into the EIS process
- details of how consultation outcomes will be integrated into future site activities (including opportunities for engagement and provision for feedback and action if necessary).

3.8. Project approvals

3.8.1. Relevant legislation and approvals

List and describe Australian, state and local legislation, approvals and plans relevant to the planning, approval, construction and operation of the project.

Identify all approvals, permits, licences and authorities that will need to be obtained for the proposed project. Outline the triggers for the application of each of these and identify relevant approval requirements.

Australian Government legislation

Relevant Australian Government legislation may include, but is not limited to:

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1994*
- *Environment Protection (Sea Dumping) Act 1981*
- EPBC Act
- *Great Barrier Reef Marine Park Act 1975* (GBRMP Act)
- *Maritime Transport and Offshore Facilities Security Act 2003*
- *Native Title Act 1993.*

Australian Government obligations

Identify and outline relevant Australian Government obligations such as:

- protection of World Heritage values
- migratory animals (China–Australia Migratory Bird Agreement (CAMBA), Japan–Australia Migratory Bird Agreement (JAMBA), Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA) and Bonn Convention)
- biodiversity (Convention on Biological Diversity)
- climate
- wetlands of international importance (Ramsar)
- ecologically sustainable development (National Strategy for Ecologically Sustainable Development)
- *National Assessment Guidelines for Dredging* (Commonwealth of Australia 2009) (incorporates sea dumping (London Protocol)).

Australian Government approvals

Identify and outline requirements for Australian Government approvals required under the EPBC Act and other approvals. These may include but are not limited to:

- approval of the proposed action for each of the applicable controlling provisions—under sections 131(1) and 133 of the EPBC Act (responsibility of the Department of Sustainability, Environment, Water, Population and Communities—SEWPaC)
- permission for activities in the Great Barrier Reef Marine Park (GBRMP)—under the GBRMP Act) (SEWPaC responsibility)
- permit to dispose of material in Australian waters—under the Environment Protection (Sea Dumping) Act (SEWPaC responsibility).

Queensland legislation

Relevant Queensland legislation may include, but is not limited to:

- *Aboriginal Cultural Heritage Act 2003*
- *Building Act 1975*
- *Coastal Protection and Management Act 1995* (Coastal Act)
- *Disaster Management Act 2003*
- Environmental Protection (Waste Management) Regulation 2000
- EP Act
- *Fire and Rescue Service Act 1990*
- *Fisheries Act 1994*
- *Forestry Act 1959*
- *Greenhouse Gas Storage Act 2009*
- *Land Act 1994*
- *Land Protection (Pest and Stock Route Management) Act 2002*
- *Local Government Act 2009*
- *Marine Parks Act 2004*
- *Maritime Safety Queensland Act 2002* and Regulations
- *Mineral Resources Act 1989*
- *Nature Conservation Act 1992*
- *Petroleum and Gas (Production and Safety) Act 2004*
- *Plumbing and Drainage Act 2002*
- *Queensland Heritage Act 1992*
- *Sustainable Planning Act 2009* (SPA)
- SDPWO Act
- *Strategic Cropping Land Act 2011* (SCL Act)
- *Transport Infrastructure Act 1994* (TI Act)
- *Transport Operations (Marine Pollution) Act 1995* and Regulations
- *Transport Operations (Marine Safety) Act 1994* and Regulations
- *Transport Operations (Road Use Management) Act 1995* (TORUM Act) and Regulations
- *Transport Planning and Coordination Act 1994*
- *Transport Security (Counter Terrorism) Act 2008* and Regulations

- *Vegetation Management Act 1999* (VM Act)
- *Water Act 2000*
- *Water Supply (Safety and Reliability) Act 2008*
- *Work Health and Safety Act 2011.*

Queensland approvals

Key Queensland approvals required, and to be addressed by the EIS, may include but are not limited to:

- entitlements to use state land and state resources—Land Act
- development approval for tidal works (includes a dredge management plan (DMP))—Coastal Act
- development approval for operational work within a coastal management district, that is:
  - disposal of dredged spoil or other solid waste material in tidal water—Coastal Act
  - reclaiming land under tidal water—Coastal Act
  - development permit for tidal works—Coastal Act
- allocation of quarry material—Coastal Act
- development approval for operational work that is the removal, destruction or damage of a marine plant—Fisheries Act
- development permit for operational work that is the construction or raising of a waterway barrier work—Fisheries Act
- development approval for MCU within the Gladstone State Development Area—SDPWO Act
- development approval for MCU of a premises for an environmentally relevant activity (ERA)—EP Act:
  - ERA16: Extractive and screening activities (dredging)
  - ERA 17: Abrasive blasting
  - ERA 18: Boilermaking or engineering
  - ERA 38: Surface coating
  - ERA 43: Concrete batching
  - ERA 50: bulk materials handling involving loading or unloading bulk materials in connection with operations at a port at a rate of 100 tonnes or more a day; and stockpiling bulk materials in connection with operations at a port
  - ERA 63: Sewage treatment
- development approval for vegetation clearing—VM Act
- road impact assessment (including transport impact assessment) and road-use management plan for development on land not contiguous to a state-controlled road—TI Act
- licence or permit for clearing of native plants or interference with the breeding place of a native animal—NC Act
- development approvals for operational works to take or interfere with water and removal of quarry material in a watercourse—Water Act

- riverine protection permits to destroy vegetation, excavate or place fill in a watercourse, lake or spring and/or allocation of quarry material in a watercourse—Water Act
- potential works in a declared fish habitat area—Fisheries Act
- carrying out works including dredging—Marine Parks Act.

Identify the relevant approval agency for each approval required.

Detail any proposed or potential changes to land tenure or designation, and the effect of such changes on approval requirements, and applicable legislation, policy, or code provisions.

Local laws and policies

Relevant Gladstone Regional Council laws and policies may include but are not limited to:

- Works on Roads Local Law
- Pavement Impact Assessment Policy.

3.8.2. Relevant plans and policies

Outline the project's consistency with the existing national, state, regional and local planning framework that applies to the project location. Refer to all relevant statutory and non-statutory plans, planning policies, guidelines, strategies and agreements.

These include, but are not limited to:

- GSDA Development Scheme
- relevant local government planning schemes
- Queensland Coastal Plan (Department of Environment and Resource Management 2011d)
- State Policy: Coastal Management (Department of Environment and Resource Management 2011f)
- State Planning Policy 3/11: Coastal Protection (Department of Environment and Resource Management 2011e)
- Queensland Coastal Contingency Action Plan (Department of Transport and Main Roads 2011a)
- *Standards for Hydrographic Surveys within Queensland Waters* (Department of Transport and Main Roads 2007)
- *Standard for Marine Construction Activities within Gladstone Harbour* (Department of Transport and Main Roads 2011b)
- environmental protection policies (EPPs, subordinate to the EP Act) including:
  - EPP (Noise) 2008
  - EPP (Air) 2008
  - EPP (Water) 2009
- relevant state planning policies and their supporting guidelines
- Queensland Biosecurity Strategy 2009–14 (Department of Primary Industries and Fisheries 2008)

- Queensland Local Industry Policy (Department of Employment, Economic Development and Innovation 2010)
- Queensland Skills Plan 2008 (Department of Education, Training and the Arts 2008)
- Gladstone Port Corporation's *50 Year Strategic Plan* (Gladstone Ports Corporation 2008)
- plans and policies applicable to the Great Barrier Reef (including the Reef Water Quality Protection Plan 2009 (Department of the Premier and Cabinet 2009)).

4. Project description

Describe the project through its lifetime of pre-construction, construction, operation and potentially decommissioning. The project description also allows further assessment of which approvals may be required and how they may be managed through the life of the project.

4.1. Overview of the project

Provide an overview of the project to put it into context. Include:

- a rationale explaining the selection of the preferred options, including details such as cost, summary of key environmental impacts, and the operational efficiencies of each option
- a description of the key components of the project including the use of text and design plans where applicable
- a summary of any environmental design features of the project
- the indicative cost, expected timing, and overall duration of the project, including details of and justification for, any staging of the development.

4.2. Project location

Describe, using maps at suitable scales, the regional and local context of the project and all associated infrastructure. Provide real property descriptions of the project. Maps should show the precise location of the project area, in particular the:

- location of the project
- location, boundaries and area of current or proposed land tenures that the project area is or will be subject to, and details of the ownership of that land
- location, boundaries and area of the project footprint, including easement widths and access requirements
- location in relation to nearby existing and approved development
- location and areas of any proposed buffers surrounding the project area (for construction and operation)
- location of the reported Highest Astronomical Tide (HAT) in relation to all terrestrial works, and structures in relation to any declared fish habitat areas
- State and Commonwealth marine parks and declared fish habitat areas within or adjacent to the project site

- location of infrastructure relevant to the project, including but not limited to, the state-controlled road network, local roads and railways, marine infrastructure (such as navigational aids), channel construction and dredging activities and ship-sourced pollution management facilities/infrastructure
- location of natural features such as waterways (including rivers, streams, creeks, other water bodies and wetlands), shorelines and navigation channels
- location of any proposed site offices and workforce accommodation site (temporary and/or permanent)
- views to and from the coal stockpile and wharf structure, especially from significant areas.

4.3. Construction phase

Provide a detailed staging plan and approximate timeframes for the project's construction activities.

Provide an estimate of permanent, full-time, part-time and contract workers (including sub-contractors) employed at each stage of the project.

Provide the following information on the pre-construction, construction and commissioning of the project, including detailed plans, drawings and maps.

Discuss potential impacts of interaction with construction vehicles/vessels associated with other land and marine-based projects in Gladstone.

4.3.1. Pre-construction activities

Describe all pre-construction activities, including nature, scale and timing of:

- approvals required for this stage
- land acquisitions and land tenures (for example, leases, permits-to-occupy and easements)
- assessment of any hazardous structure or material on the site
- nature, extent and timing of vegetation clearing
- access from land and water to all constructions sites
- earthworks
- potential and preferred sources of fill material for earthworks
- interference with watercourses, floodplain intertidal areas and wetlands
- site establishment requirements for construction facilities, including access measures (include use of port facilities), movement of materials and equipment and expected size, source and management of the construction workforce accommodation, services (including water, sewerage, communication, energy, waste disposal, recreation) and safety requirements
- temporary works
- upgrade, relocation, realignment, deviation of or restricted access to roads and other infrastructure
- equipment to be used

- key road transport activities.

4.3.2. Construction

Describe all the construction elements of the project, including:

- approvals required for this stage
- an indicative construction timetable, including expected commissioning and start-up dates and hours of operation
- major work programs for the construction phase, including an outline of construction methodologies
- construction equipment to be used
- construction inputs, handling and storage including an outline of potential locations for source of construction materials
- key road transport activities
- key maritime transport operations
- major hazardous materials/chemicals to be transported, stored and/or used on site, including environmental toxicity data and biodegradability
- clean-up and restoration of areas used during construction, including camp site(s) and storage areas.

4.3.3. Tidal works—dredging and disposal

Describe and map the location, area, depth and volume of total dredging required for the project. Provide maps showing existing dredged areas, and areas currently approved for dredging, in relation to the proposed dredging.

To the extent of design completed at the EIS stage, provide details of the dredging methods including:

- the proposed dredge equipment to be used in each area to be dredged, including number and type of vessels and reasons for the proposed vessel selection
- the origin of the dredge equipment prior to this project (if known)
- the monitoring and treatment of dredged equipment for potential introduced species
- the expected duration, timing and operation hours of the dredging campaign, including the reasons for the proposed staging
- whether, where and how any blasting may be required, including the scale, frequency and duration of the blasting and proposed management measures
- expected vessel movement patterns
- how the dredged material will be managed while being loaded, including the additional or reduced contribution to sediment plume generation according to the vessel type being used as compared to alternative vessel types.

Provide details of the grading and composition of likely dredged materials, including potential contaminants and/or indurated (hardened or cemented) layers and the methods and sites for disposal via land or sea.

Describe proposed disposal methods and locations, including any offshore options for disposing of maintenance dredge spoil of possibly varying constituencies to be designated dredge spoil disposal and/or rehandling areas. For any onshore options,

describe the equipment and pipeline routes to be used and the location and nature of tail water discharge points.

Quantify the expected amount of maintenance dredging required, the expected frequency of maintenance dredging and the expected composition of dredged material.

Describe provisions for maintenance dredging in the event of a major cyclone, flood or other extreme conditions.

Detail expected timeframes for dredging and disposal works.

4.3.4. Structures

Describe and provide detailed drawings of all structures, including:

- locations and dimensions of buildings and marine infrastructure associated with the development including temporary marine infrastructure associated with the transport of modules from sea to site and the stockyards
- the likely interface of the development with currently published plans for future road, rail and port infrastructure
- the likely construction methodologies
- earthworks, including fill that may need to be imported to the project site
- pollution control methods that will be used to prevent pollution entering marine areas during the construction
- temporary infrastructure to be used for any pre-assembled modules or pre-fabricated units
- modifications that may be needed to accommodate climate change and sea level rise.

Provide maps and figures detailing where permanent or temporary loss of tidal land is likely to occur as a result of buildings and structures.

4.3.5. Commissioning

Describe the commissioning process and any monitoring and approval requirements unique to the commissioning processes.

4.4. Associated infrastructure

Detail, with the aid of concept and layout plans, requirements for the new infrastructure or upgrading and/or relocating existing infrastructure to service the project. Consider infrastructure such as transportation, water supply, power supply, telecommunications, stormwater, waste disposal and sewerage.

Explain the design and construction standards to be met (for example, waterway crossings should be designed to meet the requirements of the Fisheries Act and in consultation with Queensland Department of Agriculture, Fisheries and Forestry (DAFF)).

4.4.1. Road transport

Provide information on road transportation requirements on local and state-controlled roads for both construction and operations phases, including:

- any proposed new roads to provide access to or within the project site
- existing traffic levels, vehicle types and numbers, and trip lengths for roads surrounding the access points to project site
- construction traffic, including vehicle types, oversize loads and number of vehicles
- operational traffic, including vehicle types and numbers, across various stages of development
- anticipated times at which movements may occur
- proposed transport routes, including any waterway crossings
- need for increased road and intersection maintenance and upgrading, including any waterway crossings
- proposed road diversions and/or road closures
- vehicle movement risk and control measures
- methods of communicating the issues listed above to the public.

Consult with the Department of Transport and Main Roads (TMR) and GRC to determine appropriate road transport routes and related road transport matters.

More detailed information regarding transport infrastructure will be required in accordance with others sections of this TOR. The EIS should include cross-references between the sections as appropriate.

4.4.2. Rail transport

Provide information on rail transportation and infrastructure requirements for both the construction and operational phases, including:

- the proposed new railway components, including easements and ownership arrangements
- analysis and design plans for any interface with the Blackwater and Moura systems and any other systems that may be relevant, in consultation with TMR, relevant railway managers, and rail operators.
- proposed transport routes of all project-related transport movements associated with rail (including associated infrastructure such as railway crossings)
- need for increased rail crossing maintenance and upgrading, in consultation with TMR, relevant railway managers and rail operators)
- all rail infrastructure required to be constructed, upgraded, relocated, commissioned or decommissioned for the construction and/or operation of the project, including the design and construction standards to be met. Rail crossings should be designed to meet Queensland Rail's requirements
- identification and assessment of the potential impacts that increased coal train services may have on existing rail operations on the relevant sections of the North Coast Line.

More detailed information regarding transport infrastructure will be required in accordance with others sections of this TOR. The EIS should include cross-references between the sections as appropriate.

4.4.3. Maritime support

Provide concept and layout plans, highlighting proposed structures, plant and equipment associated with construction and operation of the proposed Yarwun Coal Terminal loading facilities. The description of the loading facilities should include but is not limited to:

- port boundaries
- jetty and wharf alignment
- ramps and loading (in and out) equipment
- location of navigational aids
- ship-sourced quarantine waste reception and treatment facilities (such as sewage pump-out facilities, garbage disposal bins, waste oil collection facilities)
- berth pockets, swing basins approach and departure channels and dredging
- any other associated facilities.

Discuss current shipping activities and movement in Gladstone Harbour and proposed ship numbers, size, frequency, speed and route through designated shipping channels for the Yarwun Coal Terminal.

Provide detailed drawings of marine facilities.

4.4.4. Energy

Describe all energy requirements, including electricity, natural gas, and/or solid and liquid fuel requirements for the construction and operation of the project.

Detail the location, design and capacity of power generation and transmission infrastructure for construction and ongoing use. The locations of any easements must be shown on the infrastructure plan.

Briefly describe energy conservation measures in the context of any relevant Australian, Queensland and local government policies.

4.4.5. Water supply and storage

Provide information on the proposed water usage by the project, including:

- water supply design
- the ultimate supply and sources of this supply required to meet the demand for full occupancy of the development
- the quality and quantity of all water supplied to the site during the construction phase, based on minimum yield scenarios for water re-use, rainwater re-use and bore water volumes
- a water balance analysis
- water storage details (potable and stormwater)
- firefighting water flows and storage provisions required
- water for coal dust suppression
- a site plan outlining actions to be taken if the main water supply fails
- any recycling of treated waste water.

For any approvals required under the Water Act, report on proposed sources of either allocated or independent water supply to address project requirements (both during construction and for the life of the project operationally) that do not counteract current water allocations and supply demands in the region. This is to include demonstrating an adequate water balance assessment for the project (for example, during all stages of development and ongoing use, including reasonable predicted low rainfall).

Provide estimated rates of supply from each source (average and maximum rates) and describe proposed water conservation and management measures.

Describe how the project would adhere to the National Water Quality Management Strategy (NWQMS)—see **www.environment.gov.au/water/policy-programs/nwqms**). Provide information on how water quality will be managed in accordance with relevant NWQMS guidelines, including:

- *Australian Drinking Water Guidelines 6, 2011* (Commonwealth of Australia 2011)
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand 2000b)
- *Australian Guidelines for Water Quality Monitoring and Reporting* (Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand 2000a)
- *Guidelines for Groundwater Protection in Australia* (Agriculture and Resource Management Council of Australia and New Zealand & Australian and New Zealand Environment Conservation Council 1995)
- the National Guidelines for Sewerage Systems Guidelines series (available from **www.environment.gov.au/water/policy-programs/nwqms/#guidelines**)
- the water recycling guidelines series (available from **www.ephc.gov.au/taxonomy/term/39**)
- relevant state and local water quality policies.

Determine potable water demand for the project, including the temporary demands during the construction period. Include details of any water supply to meet such requirements. Describe any proposed on-site water storage and treatment for use by the site workforce during construction and operational phases.

Where water supplies require on-site treatment, provide details of any infrastructure used for treatment and how and where any contaminated water (if any is generated) will be disposed of.

Where temporary water supply and treatment infrastructure is required, provide details on requirements and timing.

Describe how the development will manage operation of the water supply system in circumstances of disaster or disruption to power supplies.

4.4.6. Stormwater drainage systems

Detail the sources of stormwater and the quantity, quality and location of discharge to watercourses and the marine environment (including the GBRMP).

Discuss the potential impacts of stormwater discharge to water quality and its associated impacts on species, and describe mitigation measures to reduce the potential impacts.

Describe the proposed stormwater drainage system and the proposed disposal arrangements, including any off-site services. Provide details on the standard of proposed stormwater treatment systems, including examples of quality improvement devices (sediment removal, gross pollutant traps) and potential discharge points (spread of flow and scour protection). Provide outcomes of discussions with relevant state and local authorities concerning stormwater management options and mitigation strategies.

Provide information on how water quality will be managed in accordance with the relevant NWQMS guidelines, *Water Quality Guidelines for the Great Barrier Reef Marine Park* (Great Barrier Reef Marine Park Authority 2010) and state and local policies and guidelines.

4.4.7. Telecommunications

Identify the location of, and describe any potential impacts on, existing infrastructure (such as optical cables and microwave towers), identifying and consulting with infrastructure owners regarding any proposed impacts.

4.4.8. Other infrastructure

Describe all other infrastructure (including any temporary and permanent on-site accommodation facilities) that need to be constructed, upgraded, relocated, commissioned or decommissioned for the construction and/or operation of the project.

Discuss alternative approaches or the opportunity of obtaining materials from alternative sources.

4.5. Operational phase

Provide full details of the operation for all elements of the project, including:

- nature and description of all key operational activities
- estimated numbers and roles of persons to be employed during the operational phase of the project
- a description of the plant and equipment to be employed, including the capacity of the project equipment and operations
- maintenance dredging and requirements
- a description of arrangements for long-term maintenance of the marine facilities, including details of the responsible parties
- detail requirements of vessel operations, including tugs, vessel mooring and queuing areas, pilotage, channel closures, quarantine and security arrangements
- opportunities for future expansion.

4.5.1. Product handling

Describe and show on plans at an appropriate scale the proposed methods and facilities to be used for storing coal and for transferring coal from the rail spur to the proposed stockpile, and from the stockpile to export ships. Discuss any environmental design features of these facilities including:

- the possibility of coal spillage during the ship loading and conveying and the feasibility and relative effectiveness of complete coverage of conveyers compared with other dust control methods
- a description of any coal dust suppression facilities, equipment, chemicals and procedures to be employed during operation
- the nature, sources, location and quantities of all materials to be handled, including storage and stockpiling of coal and managements of potential impacts of product handling
- the identification and quantification of hazards and risks where possible and how these hazards and risks will be managed according to best practice should be articulated (cross-reference to Part B, Section 8)
- the method of coal ship mooring or anchor arrangements during coal transfer events, especially with respect to operator safety during extreme weather events and potential direct mechanical damage impacts on the seabed from anchoring and mooring activities.

Include an assessment of hazard and risk cumulative impacts in part of Part B, Section 9.

4.5.2. Waste management

Detail the proposed management of solid and liquid wastes including ship-sourced pollutants and quarantine wastes from shipping, considering the suitability of available waste disposal options. Particular attention must be given to the capacity of wastes to generate acidic, saline or sodic conditions.

Describe the sewerage infrastructure required by the project, including:

- options assessed for wastewater treatment
- the treatment measures of any wastewater generated on the site, whether temporary or not, that will be discharged to council sewerage infrastructure so that the sewage will not adversely impact on treatment processes at council's wastewater treatment plants
- measures required to mitigate any risks to the environment from discharges and overflows, with reference to relevant NWQMS guidelines and other state and local water quality policies and guidance
- buffers between disposal and irrigation areas and other use areas, that is, current rural operations of landholders surrounding the proposed rail corridor
- peak design capacity evaluation of the wastewater treatment system and associated infrastructure using equivalent persons as the measure of capacity
- the proposed disposal and/or re-use of the treated effluent and the management of such use. Provide an irrigation plan detailing where the use of treated effluent is

likely, and provide details of the likely impacts of treated effluent on groundwater quality

- the maintenance regime for the system
- how the development will manage operation of the wastewater treatment and disposal system in circumstances of disaster or disruption to power supplies, including determination of the potential emergency effluent storage that would be required in an extended rain event (one in 50 and one in 100-year) wet weather storage, accounting for climate change.

Address any statutory requirements in relation to ship-sourced pollutants under the Transport Operations (Marine Pollution) Act with particular regard to sewage, garbage and oily waste (also refer to Part B, Section 5.10.5).

Discuss proposed waste minimisation strategies (including the segregation of waste to maximise the capacity to recycle and to minimise the amount of waste going to landfill).

4.6. Decommissioning and rehabilitation

Describe options for decommissioning and rehabilitation of the site. Consult with GPCL regarding port decommissioning requirements.

5. Environmental values and management of impacts

Detail the environmental protection and mitigation measures incorporated in the planning, construction, rehabilitation, commissioning, operations and decommissioning of all facets of the project. Measures should prevent, or where prevention is not possible, minimise environmental harm and maximise environmental benefits of the project. Measures should also protect and/or enhance human health. Identify and describe preferred measures in more detail than other alternatives.

The objectives of the following subsections are to:

- describe the existing environmental values of the area that may be affected by the project, using baseline data and/or new studies to support statements (include reference to all definitions of environmental values set out in relevant legislation, policies and plans)
- describe the potential adverse and beneficial impacts of the project on the identified environmental values and the measures taken to avoid, minimise and/or mitigate those impacts
- present objectives, standards and measurable indicators that protect the identified environmental values
- examine viable alternative strategies for managing impacts (present and compare these alternatives in view of the stated objectives and standards to be achieved)
- discuss the available techniques to control and manage impacts in relation to the nominated objectives.

Where negative impacts of the project cannot be avoided or adequately minimised or mitigated, present proposals to offset impacts in accordance with the Queensland Government Environmental Offsets Policy (Environmental Protection Agency 2008b).

The mitigation measures, monitoring programs etc., identified in this section of the EIS, should be used to develop the EMP for the project. Refer to Part B, Section 11 (page 69).

Describe any cumulative impacts on environmental values caused by the project, either in isolation or in combination with other known existing or planned projects, as part of the requirements of Part B, Section 9 of this TOR.

5.1. Climate, natural hazards and climate change

Describe the climatic conditions that may affect management of the project. This includes a description of the vulnerability of the project area to seasonal conditions, extremes of climate (e.g. cyclones) and natural or induced hazards (including bushfire and landslide). Provide a risk assessment (as part of the requirements of Part B, Section 8.1 of this TOR) and management plan detailing these potential climatic threats to the construction, and operation of the project. Include the following:

- a risk assessment of changing climate patterns that may affect the viability and environmental management of the project
- the preferred and alternative adaptation strategies to be implemented
- commitments to working cooperatively, where practicable, with government, other industry and other sectors to address adaptation to climate change.

Address the most recent information on potential impacts of climatic factors in the appropriate sections of the EIS.

Specific storm surge requirements are addressed in Part B, Section 8.1 below.

5.1.1. Flood management

Provide a flood study which includes, but is not limited to:

- addressing the requirements of State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide (Department of Local Government and Planning and Department of Emergency Services 2003)
- addressing the requirements of the Queensland Coastal Plan (Department of Environment and Resource Management 2011d), including the State Planning Policy 3/11: Coastal Protection (Department of Environment and Resource Management 2011e) and the State Policy: Coastal Management (Department of Environment and Resource Management 2011f)
- the susceptibility of the all project sites and project infrastructure to flooding
- quantification of flood impacts on properties surrounding and external to the project site from redirection or concentration of flows
- identification of likely increased flood levels, increased flow velocities or increased time of flood inundation as a result of the development

- where practicable, addressing the impacts of climate change on the frequency and magnitude of natural hazards (including the full range of flood events from more frequent floods to the probable maximum flood).

The flood study should address any requirements of local or regional planning schemes for flood affected areas. The study report should include details of all calculations along with descriptions of base data, any potential for loss of flood plain storage, and triangulated surface meshes produced in terrain modelling. Refer to any studies undertaken by the local government in relation to flooding.

5.1.2. Bushfire and landslide

Include in the EIS a bushfire study and a landslide study that addresses the requirements of Appendixes 3 and 4 (respectively) of State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide (Department of Local Government and Planning & Department of Emergency Services 2003).

5.2. Land

Detail the existing land environment values for all areas associated with the project. Describe the potential for the construction and operation of the project to change existing and potential land uses of the project sites and adjacent areas.

5.2.1. Land use and tenure

Description of environmental situation

Identify, with the aid of maps:

- land tenure, including reserves, tenure of special interest (such as protected areas and forest reserves), existing and proposed gas, water and power infrastructure and transport corridors, including local roads, state-controlled roads and rail corridors
- existing land uses and facilities surrounding the project
- distance of the project from residential and recreational areas
- declared water storage catchments
- location of the project in relation to environmentally sensitive areas.

Potential impacts and mitigation measures

Describe the potential changes to existing and potential land uses due to the construction and operation of the project. In particular, describe the following:

- impacts on project site and adjacent land uses and human activities and strategies for mitigation, such as those required by:
  - State Planning Policy 1/92: Development and the Conservation of Agricultural land (Department of Housing, Local Government and Planning & Department of Primary Industries 1992) and *Planning guidelines: The identification of good quality agricultural land* (Department of Primary Industries & Department of Housing, Local Government and Planning 1993)
  - State Planning Policy 1/12: Protection of Queensland's Strategic Cropping Land (Department of Environment and Resource Management 2012), including, if the

land occurs within the ‘management area’ defined by the SCL Act trigger maps, a description of crop rotations grown on the land (if any)
  - State Planning Policy 2/07: Protection of Extractive Resources (Department of Mines and Energy 2007a) and *State Planning Policy 2/07 Guideline: Protection of Extractive Resources* (Department of Mines and Energy 2007b), especially with respect to ‘key resource areas’ (KRA) defined by that guideline
  - GSDA Development Scheme
  - local government planning schemes
- possible effect on town planning objectives and controls, including local government zoning and strategic plans
- constraints to potential developments and possibilities of rezoning adjacent to the development area
- management of the immediate environs of the project including construction buffer zones
- proposed land use changes in any areas of high conservation value and information on how easement widths and vegetation clearance in sensitive environmental areas will be minimised
- potential issues involved in proximity and/or co-location of other current or proposed infrastructure services
- any land units requiring specific management measures
- potential impact of the proposed development on KRA 20 (Yarwun), located in the rail study area
- strategies to protect KRA 20 resources from incompatible development and/or potential isolation.

5.2.2. Scenic amenity and lighting

Description of environmental values

Describe, in general terms, the existing character of the landscape and the general impression that would be obtained while travelling through and around it. Outline existing landscape features, panoramas and views that have, or could be expected to have, value to the community. Include information such as maps and photographs, particularly where addressing the following issues:

- major views, view sheds, outlooks, and features contributing to the amenity of the area, including assessment from private residences
- focal points, landmarks, waterways and other features contributing to the visual quality of the area and the project site(s)
- character of the local and surrounding areas including vegetation and land use.

Include any relevant World Heritage and National Heritage values of the area, including the values of the Great Barrier Reef.

Potential impacts and mitigation measures

Describe the potential beneficial and adverse impacts of the project on landscape character and visual qualities of the site and the surrounding area. Explain what measures will be undertaken to avoid or mitigate the identified impacts.

Lighting

Provide an assessment of all potential impacts of the project's lighting, during all stages, with particular reference to objectives to be achieved and management methods and strategies to be implemented to avoid or mitigate, such as:

- the visual impact at night
- night operations/maintenance and effects of lighting on residents and terrestrial and marine fauna
- the potential impact of increased vehicular traffic
- changed habitat conditions for nocturnal fauna and associated impacts

Also describe proposed mitigation strategies to ensure there is no interference with the safe navigation of marine traffic and marine activities in Gladstone Harbour caused by project lighting during the construction and operational phases.

5.2.3. Topography, geology and soils

Description of environmental values

Provide maps locating the project in state, regional and local contexts. The topography should be detailed with contours at suitable increments, shown with respect to Australian Height Datum. Include significant features of the landscape and topography, and accompanying comments on the maps.

Provide a description, map and a series of cross-sections of the geology of the project area relevant to the project components. Describe the geological properties that may influence ground stability, occupational health and safety, or the quality of stormwater leaving any area disturbed by the project. In locations where the age and type of geology is such that significant fossil specimens may be uncovered during construction or operation, the EIS must address the potential for significant finds.

Conduct a soil survey of the sites affected by the project, at a suggested field investigation and mapping scale of 1:25 000 with particular reference to the physical and chemical properties of the materials that will influence erosion potential and stormwater run-off quality. Consult with the Department of Natural Resources and Mines (DNRM) (Mackay) for further detail on soil survey requirements. Provide information on soil stability and suitability for construction of project facilities.

Soils should be described and mapped at a suitable scale and described according to the *Guidelines for Surveying Soil and Land Resources* (McKenzie et al. 2008) and *Australian soil classification* (Isbell & CSIRO 2002).

Undertake an appraisal of the depth and quality of useable soil. Assess each soil's agricultural land suitability in accordance with:

- *Guidelines for agricultural land evaluation in Queensland* (Department of Primary Industries 1990)
- *Planning guidelines: The identification of good quality agricultural land* (Department of Primary Industries & Department of Housing, Local Government and Planning 1993)
- State Planning Policy 1/92: Development and the Conservation of Agricultural Land (Department of Primary Industries & Department of Housing, Local Government and Planning 1992).

Identify any areas of land within the project study area identified as 'strategic cropping land or potential strategic cropping land' (SCL) as identified by the SCL Act trigger maps (available from **www.derm.qld.gov.au/land/planning/strategic-cropping/mapping.html**).

Undertake a comprehensive acid sulfate soils (ASS) investigation consistent with:

- *Queensland Acid Sulfate Soil Technical Manual – Soil Management Guidelines* (Dear et al. 2002)
- *Acid Sulfate Soil Laboratory Methods Guidelines* (Ahern et al. 2004)
- State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils (Department of Natural Resources and Mines & Department of Local Government and Planning 2002a)
- *State Planning Policy 2/02 Guideline: Planning and Managing Development Involving Acid Sulfate Soils* (Department of Natural Resources and Mines & Department of Local Government and Planning 2002b).

Provide a map and description of:

- the location of key tidal planes such as:
  - the highest astronomical tide
  - mean high water spring tide
  - mean high water neap tide
  - mean sea level
  - mean low water neap tide
  - mean low water spring tide
  - lowest astronomical tide.
- the bathymetry of the project area and surrounds
- relevant coastal geomorphology.

Potential impacts and mitigation measures

Provide details of any potential impacts to the topography or geomorphology associated with the project and proposed mitigation measures, including:

- a discussion of the project in the context of major topographic features and any measures taken to avoid or minimise impact to such, if required
- the objectives to be used for the project in any re-contouring or consolidation, rehabilitation, landscaping, and fencing.

Identify the possible soil erosion rate for all permanent and temporary landforms and describe the techniques used to manage the impact. Identify all soil types and outline the erosion potential (both wind and water). Include an assessment of likely erosion effects, especially those resulting from removing vegetation, and constructing retaining walls both on site and off site for all disturbed areas.

Identify erosion management techniques to be used. Provide details of an erosion monitoring program (including rehabilitation measures for erosion problems identified during construction), and detail acceptable mitigation strategies. Summarise methods proposed to prevent or control erosion with regard to:

- the *Best Practice Erosion and Sediment Control* (International Erosion Control Association Australasia 2008)
- the *Guideline: EPA Best Practice Urban Stormwater Management—Erosion and Sediment Control* (Environmental Protection Agency 2008a)
- preventing soil loss in order to maintain land capability/suitability
- preventing degradation of local waterways.

Discuss the potential for acid generation through disturbance of ASS during earthworks and construction, and propose measures to manage soils and mitigate impacts for all site earthworks and construction activities. Should action criteria be triggered by acid generating potential as a result of testing, outline management measures in an ASS management plan prepared in accordance with policies and guidelines noted above.

Cross reference to groundwater assessment requirements in Part B, Section 5.5.

Identify any areas within the project footprint likely to temporarily or permanently impact SCL. Where areas of identified SCL are likely to be permanently alienated by the project, the proponent should contact the Department of Environment and Heritage Protection (DEHP) to discuss undertaking the SCL assessment process defined by the SCL Act.

5.2.4. Land contamination

Description of environmental values

Include:

- mapping of any areas listed on the Environmental Management Register or Contaminated Land Register under the EP Act
- identification of any potentially contaminated sites not on the registers whether or not remediation is required
- a description of the nature and extent of contamination at each site.

Potential impacts and mitigation measures

Discuss the management of any contaminated land and potential for contamination from construction, commissioning and operation, in accordance with the Department of Environment and Resource Management's *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* (Department of Environment 1998) and the National Environment Protection (Assessment of Site Contamination) Measure 1999 (Cwlth).

Describe strategies and methods to be used to prevent and manage any land contamination resulting from the project, including the management of any acid generation or management of chemicals and fuels to prevent spills or leaks.

State any intentions concerning the classification of land contamination after project completion.

5.3. Coastal environment

Describe the existing coastal environment that may be affected by the project in the context of coastal values identified in the Queensland State of the Environment reports, the Queensland Coastal Plan (Department of Environment and Resource Management 2011d), associated areas of ecological significance mapping, environmental values as defined by the EP Act, and environmental protection policies.

Identify actions associated with the project that are assessable development within the coastal zone and will require assessment under the provisions of the Coastal Act and State Planning Policy 3/11: Coastal Protection (Department of Environment and Resource Management 2011e).

Assess the project's consistency with all relevant coastal plans and policies including the:

- Queensland Coastal Plan (Department of Environment and Resource Management 2011d)
- State Planning Policy 3/11: Coastal Protection (Department of Environment and Resource Management 2011e)
- State Policy: Coastal Management (Department of Environment and Resource Management 2011f).

Project activities should be considered in relation to the *Historic Shipwrecks Act 1976* (Cwlth). The Maritime Heritage Section of SEWPaC is responsible for administering that Act.

Should any shipwreck or article associated with a shipwreck be discovered, the Historic Shipwrecks Act requires the find to be reported.

5.3.1. Hydrodynamics and sedimentation

Description of environmental values

Assess the physical and chemical characteristics of sediments within the littoral and marine zone.

Describe the physical processes of coastal environment in a historical and current context, and detail how these parameters will be modified due to the proposed development, including:

- waves
- currents
- tides
- storm surges

- freshwater flows
- the key influencing factors of cyclones and other severe weather events and their interaction in relation to the assimilation and transport of pollutants entering marine waters from, or adjacent to, the project area.

Describe the environmental values of the coastal resources of the affected area in terms of the physical integrity and morphology of landforms created or modified by coastal processes.

Describe the tidal hydrodynamics of the project area and the adjoining tidal waterways in terms of water levels and current velocities and directions at different tidal states. Two- and/or three-dimensional modelling should be undertaken. Describe water levels and flows associated with historical and predicted storm surges.

Describe the wave climate in the vicinity of the project area and the adjacent beaches including inter-annual variability and details of historical and predicted extreme wave conditions generated by tropical cyclones or other severe storm events.

Describe the hydrology of the area and the adjacent catchments of the rivers and the associated freshwater flows within the study area and the adjoining tidal waterways in terms of water levels and discharges. Describe the interaction of freshwater flows with different tidal states, including storm tides. Describe inter-annual variability and details of historical and predicted floods, including extent, levels and frequency. Flood studies should include a range of annual exceedence probabilities for affected waterways, where data permits.

Predict the likely changes to hydrodynamics (including water levels, currents, wave conditions and freshwater flows) and sedimentation in the project area due to climate change.

Potential impacts and mitigation measures

Describe the potential changes to the hydrodynamic processes and local sedimentation resulting from the construction and operation of the project. This should include:

- impacts on tidal flows and water levels
- changes to sediment transport patterns, including the potential of the proposal to impact on bank erosion and/or bed degradation within adjacent waterways
- an assessment of the erosive effects of vessel wash associated with boat traffic generated by the proposal. This would be supported by a vessel traffic impact assessment to determine the increase of vessels (size and number) that can be expected as a result of the project relative to the existing situation.

This assessment should also discuss the potential impacts associated with extreme events such as storm tide flooding. This must include an assessment of the vulnerability of the project to storm tide flooding and the potential of the project to affect vulnerability to storm tide flooding on adjacent properties.

When assessing the hydrodynamics of the area and movement of sediment along the coast, consider coastal processes such as erosion and accretion at adjacent locations. Modelling should be undertaken to validate the possible effects on coastal hydrodynamics.

5.3.2. Coastal water quality

Description of environmental values

Provide baseline information, and detailed historical data (where relevant) on water quality of coastal waters that incorporates the effects of seasonal and tidal variation. This information should include (but not necessarily be limited to) biological, physical and chemical water quality parameters such as dissolved oxygen, pH, metals and metalloids, dissolved and particulate nutrients, organic carbon, nitrogen, phosphorus and silicate, temperature, salinity, oil in water, chemical contaminants, turbidity, light attenuation (photosynthetically active radiation (PAR)) and phytoplankton pigment analyses.

For coastal areas potentially affected by sediment run-off or dredging, suspended solids concentration, nutrients, organic carbon, metals and turbidity should be included. Discuss the interaction of freshwater flows with coastal waters and the significance of this in relation to marine flora and fauna adjacent to the project area.

Define and describe the environmental values and water quality objectives of coastal waters in the affected area in terms of:

- values identified in the Environmental Protection (Water) Policy 2009 (EPP (Water))
- the *Queensland Water Quality Guidelines 2009* (Department of Environment and Resource Management 2009)
- *The Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand 2000b)

Dredging and disposal

In the context of a DMP required for development approval under the Coastal Act, describe the method, location and issues associated with both the dredging and disposal of dredge spoil material, including the following:

- undertake two- and three-dimensional sediment plume modelling (as required) including likely dispersion and re-suspension from both dredging operations and dredge spoil disposal during the full range of hydrodynamic conditions and weather events (including 'worst case' conditions). Include justification of the assumptions and parameters used to model 'worst case' conditions, including data source, quality and any uncertainties
- describe the proposed marine water quality monitoring regime (receiving environment monitoring program—REMP) before, during and after dredging and disposal, including any required triggers for actions established by a DMP. Provide information describing the estimated extent of mixing zones for contaminants of potential concern.

Provide details of the physical and chemical qualities of likely dredged materials, including the size grading, potential ASS (identifying sulfidic or organic sources of acidity if detected), contaminants, nutrients, metals and metalloids, and indurated (hardened or cemented) layers.

Obtain this information by implementing a sediment sampling and analysis plan (SAP) prepared in accordance with the *National Assessment Guidelines for Dredging* (Commonwealth of Australia 2009) (NAGD). The EIS must also include a SAP implementation report prepared in accordance with the NAGD and other relevant guidelines.

Where possible, present this information as a map of sediment types based on their physical and chemical properties and include depth profiles.

The criteria used to assess the results of ASS screening tests, to identify actual ASS (AASS) or potential ASS (PASS), must be taken from the Queensland Acid Sulfate Soil Technical Manual (see: **www.derm.qld.gov.au/land/ass/products**). The action criterion from the 'chromium' suite of tests, which triggers a requirement for ASS disturbance to be managed, should be derived from the *Acid Sulfate Soils Laboratory Methods Guidelines* (Ahern et al. 2004) and the *Queensland Acid Sulfate Soil Technical Manual – Soil Management Guidelines* (Dear et al. 2002).

Assessment of marine sediments should be undertaken in accordance with the NAGD. Detail specific measures to maintain sediment quality to nominated quantitative standards within the project and surrounding areas, particularly where future maintenance dredging may be required.

Potential impacts and mitigation measures

Describe the potential environmental impacts caused by the project on coastal water and sediment quality, and associated management and mitigation measures, including:

- potential impacts associated with constructing and operating the coastal and marine facilities
- in the context of the DMP, potential impacts due to dredging and dredge material disposal, including disturbance of fine-grained sediments (for examples, metals, nutrients, PASS or contaminant release), reduced light attenuation and additional sedimentation on coral reefs and seagrasses
- potential accidental discharges of contaminants during construction and operation of the coastal and marine facilities
- release of contaminants from marine structures and vessels, including potential for introducing marine pests
- stormwater run-off from the coastal facilities and associated infrastructure
- flooding of local watercourses and other extreme weather events.

Provide management strategies for dredging, loading and spoil disposal, including any required trigger levels for management actions linked to quantitative measurements of water quality.

For any onshore dredge spoil disposal options, provide a detailed assessment, with appropriate staging plans. The assessment should demonstrate the quality of the water discharged from dredge spoil disposal areas will meet standards necessary to achieve water quality objectives and therefore maintain receiving water environmental values throughout the period of dredge spoil disposal on land. Consideration should be given to:

- impacts on tidal flows and water levels

- quantities of tailwater likely to be generated from dredging activities
- the settling rate of fine sediments from all dredge material types
- the residence time within settling ponds prior to discharge (related to dredge pumping rate, ratio of solids to water in spoil, settling rates, available capacity of the disposal and settling areas, potential bulking factor, intensity and duration of rainfall events with consideration given to the worst case scenario for these factors)
- source of material for bunds and bund wall stability
- measures to limit channelling and sediment re-suspension in settling ponds
- measures to limit erosion and sediment re-suspension in discharge channels
- contingency measures in the event that discharge limits are exceeded
- management, maintenance and landscaping of the disposed dredge spoil's final form.

Describe how nominated water quality objectives will be monitored, audited and managed, with reference to a REMP.

Where marine sediments may be displaced through construction of revetment walls or bund walls or by reclamation or other filling, state the measures to be taken to limit dispersion of sediment to waters and to maintain water quality within defined limits.

Where reclamation areas are proposed, provide geotechnical information with material characterisation sufficient to determine potential displacement of material or the need for excavation.

Provide a contaminant assessment of material potentially displaced or excavated consistent with the NAGD.

Provide an ASS survey of material potentially displaced or excavated consistent with the *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998* (Ahern, Ahern & Powell 1998).

Include an assessment of the cumulative impacts of proposed dredging and dredge material disposal in relation to existing and approved projects within the Port of Gladstone, as part of the requirements of Part B, Section 9 of this TOR.

5.4. Nature conservation

Detail the existing nature conservation values that may be affected by the proposal. Describe the environmental values in terms of:

- integrity of ecological processes, including habitat of endangered, vulnerable and near-threatened (EVNT) and special least concern species
- conservation of resources
- biological diversity, including habitat of EVNT and special least concern species
- integrity of landscapes and places including wilderness and similar natural places
- aquatic (freshwater and marine) and terrestrial ecosystems.

Survey effort should be sufficient to identify, or adequately extrapolate, the floral and faunal values over the range of seasons, particularly during and following a wet

season. The survey should account for the ephemeral nature of watercourses traversing the proposal area, and seasonal variation in fauna populations.

Wherever possible, seek the involvement of the local Indigenous community in conducting field observations and survey activities, to identify the traditional and contemporary Indigenous uses of species.

Also outline the proposed strategies to avoid, or minimise and mitigate, impacts on the identified values within the project's footprint.

Identify key flora and fauna indicators for ongoing monitoring.

Any clearing requires a vegetation clearing application under the VM Act. Any application will need to comply with the Regional Vegetation Management Code for South East Queensland Bioregion – version 2, 6 November 2009 (or latest version)— refer to **www.derm.qld.gov.au/vegetation/regional_codes.html**

The application may also need to be assessed against the Policy for Vegetation Management Offsets, version 3, 30 September 2011 (or latest version) (Department of Environment and Resource Management 2011b). Consult with DNRM's Vegetation Management Unit when preparing this information.

5.4.1. Sensitive environmental areas

Description of environmental values

Identify areas that are environmentally sensitive in proximity to the project on a map of suitable scale. This should include areas classified as having national, state, regional or local biodiversity significance, or flagged as important for their integrated biodiversity values. Refer to both Queensland and Commonwealth legislation and policies on threatened species and ecological communities.

Areas regarded as sensitive with respect to flora and fauna have one or more of the following features, and should be identified and mapped:

- important habitat of species listed under the NC Act and/or EPBC Act as presumed extinct, endangered, vulnerable or near-threatened
- regional ecosystems listed as 'endangered' or 'of concern' under state legislation, and/or ecosystems listed as presumed extinct, endangered or vulnerable under the EPBC Act
- good representative examples of remnant regional ecosystems or regional ecosystems that are described as having 'medium' or 'low' representation in the protected area estate as defined in the Regional Ecosystem Description Database (REDD) available at **www.eph.qld.gov.au**
- sites listed under international treaties such as Ramsar wetlands, World Heritage areas, JAMBA, CAMBA and ROKAMBA
- sites containing near-threatened or bio-regionally significant species or essential, viable habitat for near-threatened or bio-regionally significant species
- areas or features identified as state significant biodiversity values, pursuant to the Queensland Biodiversity Offset Policy (version 1) (Department of Environment and Resource Management 2011c)

- sites in, or adjacent to, areas containing important resting, feeding or breeding sites for migratory species of conservation concern listed under the Convention of Migratory Species of Wild Animals, and/or bilateral agreements between Australia and other countries
- sites adjacent to nesting beaches, feeding, resting or calving areas of species of special interest (e.g. marine turtles, dugongs and cetaceans)
- sites containing common species that represent a distributional limit and are of scientific value or that contain feeding, breeding, resting areas for populations of echidna, koala, platypus and other species of special cultural significance
- sites of high biodiversity that are of a suitable size or with connectivity to corridors/protected areas to ensure survival in the longer term; such land may contain:
  - natural vegetation in good condition or other habitat in good condition (e.g. wetlands)
  - degraded vegetation or other habitat that still support high levels of biodiversity or act as an important corridor for maintaining high levels of biodiversity in the area
- a site containing other special ecological values (e.g. high habitat diversity and areas of high endemism)
- ecosystems that provide important ecological functions such as:
  - wetlands of national, state and regional significance
  - coral reefs
  - riparian vegetation
  - important buffer to a protected area or important habitat corridor between areas
- declared fish habitat areas and sites containing protected marine plants under the Fisheries Act
- sites of palaeontologic significance such as fossil sites
- sites of geomorphological significance, such as lava tubes or karst
- areas of environmental significance as defined by the Queensland Coastal Plan (Department of Environment and Resource Management 2011d)
- protected areas that have been proclaimed under the NC Act and Marine Parks Act, or are under consideration for proclamation
- areas of major interest, or critical habitat declared under the NC Act
- remnant vegetation listed under the VM Act as containing endangered and of-concern regional ecosystems where clearing is likely to result in land degradation and a loss of ecosystem function and biodiversity.

Areas of special sensitivity include the marine environment and wetlands, wildlife breeding or roosting areas, any significant habitat or relevant bird flight paths for migratory species, bat roosting and breeding caves including existing structures such as adits and shafts, and habitat of threatened plants, animals and communities.

Potential impacts and mitigation measures

Discuss the impact of the project on species, communities and habitat of local, regional or national significance in sensitive environmental areas as identified above. Include human impacts and the control of any domestic animals introduced to the area.

Demonstrate how the project would comply with the following hierarchy:

- avoiding impact on areas of remnant vegetation and other areas of conservation value including listed species and their habitat
- mitigating impacts through rehabilitation and restoration including, where relevant, a discussion of any relevant previous experience or trials of the proposed rehabilitation
- measures to be taken to replace or offset the loss of conservation values where avoiding and mitigating impacts cannot be achieved.

Explain why the measures above may not apply in areas where loss would occur.

Discuss the boundaries of the areas impacted by the project within or adjacent to an ecological community, including details of footprint width. If the project area will impact upon a threatened community, include reasons for the preferred alignment and the viability of alternatives.

Provide details about the approvals that will be required under the NC Act and the VM Act for development made assessable under SPA. The overall EMP for the project should address the performance requirements of the relevant policies and regional vegetation management codes (refer to **www.derm.qld.gov.au/vegetation/regional_codes.html**).

Where relevant, this section should discuss environmental offset requirements in accordance with the Queensland Government Environmental Offsets Policy (Environmental Protection Agency 2008b) and take into account the applicable specific-issue offset policies, as follows:

- Policy for Vegetation Management Offsets (version 3) (Department of Environment and Resource Management 2011b)
- Queensland Biodiversity Offset Policy (version 1) (Department of Environment and Resource Management 2011c)
- Marine Fish Habitat Offset Strategy FHMOP 005.2 (Department of Agriculture, Fisheries and Forestry 2012)
- Offsets for Net Gain of Koala Habitat in South East Queensland Policy (Department of Environment and Resource Management 2010).

Describe any departure from no net loss of ecological values.

5.4.2. Terrestrial flora

Description of environmental values

Provide vegetation mapping for all relevant project sites, and for adjacent areas to illustrate interconnectivity. Mapping should also illustrate any larger scale interconnections between areas of remnant or regrowth vegetation where the project

site includes a corridor connecting those other areas. Discuss any variances between site mapping and mapping produced by the Queensland Herbarium.

Describe the terrestrial vegetation communities within the affected areas at an appropriate scale (maximum 1:10 000), with mapping produced from aerial photographs and ground-truthing, showing the following:

- location and extent of vegetation types using the regional ecosystem type descriptions in accordance with the REDD
- location of vegetation types of conservation significance based on regional ecosystem types and occurrence of species listed as protected plants under the Nature Conservation (Wildlife) Regulation 1994 (Qld) and subsequent amendments, as well as areas subject to the VM Act
- the current extent (bioregional and catchment) of protected vegetation types of conservation significance within the protected area estate (national parks, conservation parks, resource reserves, nature refuges and conservation reserves under the NC Act)
- any plant communities of cultural, commercial (e.g. commercial timber/wood trees) or recreational significance
- the location of any horticultural crops in the vicinity of the project area
- location and abundance of any exotic or weed species.

Highlight sensitive or important vegetation types, including any marine littoral and subtidal zone and riparian vegetation, and their value as habitat for fauna and conservation of specific rare floral and faunal assemblages or community types. The description should contain a review of published information regarding the assessment of the significance of the vegetation to conservation, recreation, scientific, educational and historical interests.

For each significant natural vegetation community likely to be impacted by the project, vegetation surveys should be undertaken at an appropriate number of sites, allowing for seasonal factors, and satisfying the following:

- the relevant regional vegetation management codes
- site data should be recorded in a form compatible with the Queensland Herbarium CORVEG database
- the minimum site size should be 10 × 50 metres
- a complete list of species present at each site should be recorded
- the surveys to include species structure, assemblage, diversity and abundance
- the relative abundance of plant species present to be recorded
- any plant species of conservation, cultural, commercial or recreational significance to be identified
- specimens of species listed as protected plants under the Nature Conservation (Wildlife) Regulation, other than common species, are to be submitted to the Queensland Herbarium for identification
- the methodology in *Biocondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland: Assessment Manual* (version 2.1) (Eyre et al. 2011) and

Ecological Equivalence Methodology Guidelines (version 1) (Department of Environment and Resource Management 2011a) for sites possibly requiring offset considerations under the Policy for Vegetation Management Offsets (version 3) (Department of Environment and Resource Management 2011b) or Queensland Biodiversity Offset Policy (version 1) (Department of Environment and Resource Management 2011c).

Existing information on plant species may be used instead of new survey work, provided that the data is derived from previous surveys at the site consistent with the above methodology. The methodology used for flora surveys should be specified in the appendices to the report.

Provide information on the existence of any mining lease/s over the land or other information that may result in clearing of vegetation being exempt from the application of the VM Act.

Potential impacts and mitigation measures

Describe the potential environmental harm to the ecological values of the area arising from the construction, operation and decommissioning of the project including clearing, salvaging or removing vegetation. Discuss the indirect effects on remaining vegetation. Consider short- and long-term effects and comment on whether the impacts are reversible or irreversible.

For all components of the project, discuss:

- the potential impacts that clearing vegetation will have on listed species and communities in the extent of the proposed vegetation clearing
- any management actions to minimise vegetation disturbance and clearance
- the ability of identified vegetation to withstand any increased pressure resulting from the project, and any measures proposed to mitigate potential impacts
- the methods to ensure rapid rehabilitation of disturbed areas following construction, including the species chosen for revegetation, which should be consistent with the surrounding associations
- any post-construction monitoring programs
- the potential environmental harm on flora due to any alterations to the local surface and groundwater environment, with specific reference to impacts on riparian vegetation or other sensitive vegetation communities
- a description of any foreseen impacts which increase the susceptibility of ecological communities and species to the impacts of climate change.

Outline how these measures will be implemented in the overall EMP for the project. Weed management strategies are required for containing existing weed species (e.g. parthenium and other declared plants) and ensuring no new declared plants are introduced to the area. Refer to the local government authority's pest management plan and any strategies and plans recommended for the project area by Biosecurity Queensland. Discuss the strategies in accordance with provisions of the Land Protection (Pest and Stock Route Management) Act in the main body of the EIS and in the pest management plan within the EMP for the project.

5.4.3. Terrestrial fauna

Description of environmental values

Describe the terrestrial and riparian fauna occurring in the areas affected by the proposal, noting the broad distribution patterns in relation to vegetation, topography and substrate. The description of the fauna present or likely to be present in the area should include:

- species diversity (i.e. a species list) and abundance of animals of recognised significance
- any species that are poorly known but suspected of being endangered, vulnerable and near-threatened
- habitat requirements and sensitivity to changes, including movement corridors and barriers to movement
- the existence of feral or introduced animals including those of economic or conservation significance
- existence (actual or likely) of any species/communities of conservation significance in the study area, including discussion of range, habitat, breeding, recruitment feeding and movement requirements, and current level of protection (e.g. any requirements of protected area management plans or threatened species recovery plans)
- habitat requirements and sensitivity to changes, including movement corridors and barriers to movement
- an estimate of commonness or rarity for the listed or otherwise significant species
- use of the area by migratory fauna
- records in a form compatible with the DEHP WildNet database.

Present fauna data in columns titled: Number, collector, Start date, End date, Location, Latitude, Longitude, Zone, Easting, Northing, Datum, Precision (m), Altitude (m), Vegetation code, Slope, Aspect, Scientific name, Common name, Count, count type, Age code, Sex code, Breeding code, Identification method, Collector code, Specimen registration, Specimen location, Collection notes, vetting code.

DEHP has supporting documents available which explain the above fields and codes.

Identify any species listed by the EPBC Act and the NC Act occurring in the project area. Identify any species listed by the DEHP 'Back on Track' species prioritisation methodology (refer to **http://www.ehp.qld.gov.au/wildlife/prioritisation-framework/index.html**).

Indicate how well any affected communities are represented and protected elsewhere in the bio-region where the project occurs. Specify the methodology used for fauna surveys. Provide relevant site data to DEHP in a format compatible with the Wildlife Online database for listed threatened species (refer to **http://www.ehp.qld.gov.au/wildlife/wildlife-online/index.html**).

Potential impacts and mitigation measures

Consider potential impacts on terrestrial fauna, relevant wildlife habitat and other fauna conservation values, including:

- impacts due to loss of range/habitat, food supply, nest sites, breeding/recruiting potential or movement corridors or as a result of hydrological change
- impacts on native species, particularly species of conservation significance
- threatening processes leading to progressive loss
- a description of any foreseen impacts that increase the susceptibility of ecological communities and species to the impacts of climate change.

Address any actions of the project or likely impacts that require an authority under the NC Act. Provide the following information on mitigation strategies:

- measures to avoid and mitigate the identified impacts. Any provision for buffer zones and movement corridors, nature reserves or special provisions for migratory animals should be discussed and coordinated with the outputs of the flora assessment
- details of the methodologies that would be used to avoid injuring livestock and native fauna as a result of the project's construction and operational works, and if accidental injuries should occur, the methodologies to assess and handle injuries
- strategies for complying with the objectives and management practices of relevant recovery plans.

Outline how these measures will be implemented in the overall EMP for the project. Rehabilitation of disturbed areas should incorporate, where appropriate, provision of nest hollows and ground litter.

Address feral animal management strategies and practices. The study should develop strategies to ensure that the project does not contribute to increased encroachment of a feral animal species. Refer to the local government authority's pest management plan and any strategies and plans recommended for the project area by Biosecurity Queensland. Discuss the strategies in accordance with the provisions of the Land Protection (Pest and Stock Route Management) Act in the main body of the EIS and in the pest management plan within the EMP for the project.

Include an assessment of cumulative effects of direct and indirect impacts on terrestrial fauna as part of the requirements of Part B, Section 9 of this TOR.

5.4.4. Aquatic biology and ecology

Description of environmental values

Describe the aquatic (marine and freshwater) flora and fauna present, or likely to be present, in the areas affected by the proposal. Include:

- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways within the affected area and any associated wetlands (as defined under section 5 of the Fisheries Act)
- any endangered, vulnerable or near-threatened marine species

- a description of the habitat requirements and the sensitivity of aquatic species to changes in flow regime, water levels and water quality in the project areas
- aquatic plants including native and exotic/weed species
- aquatic and benthic substrate
- habitat downstream of the project or potentially impacted due to currents in associated lacustrine and marine environments
- aquatic substrate and stream type, including extent of tidal influence and common levels such as highest astronomical tide and mean high water springs
- reef habitat and coral species.

Describe any wetlands listed by the DEHP as areas of national, state or regional significance and detail their values and importance for aquatic flora and fauna species.

Specific biology requirements

Flora

Define the nature and extent of existing marine features such as littoral and sub-littoral lands, waterways, affected tidal and subtidal lands and marine vegetation (e.g. salt couch, seagrass and mangroves) within the proposed area of development and in the areas adjacent to the project.

Conduct field assessments for plant species, preferably in both pre- and post-wet season conditions, as follows:

- record site data in a form compatible with the Queensland Herbarium CORVEG database
- record a complete list of species present at each site, including those species defined and protected under the Fisheries Act
- record the relative abundance of plant species present
- identify any plant species of conservation, cultural, commercial or recreational significance
- submit specimens of species listed as protected plants under the Nature Conservation (Wildlife) Regulation (other than common species) to the Queensland Herbarium for identification and entry into the HERBRECS database.

Aquatic fauna

Describe the marine fauna, such as turtles, dugongs, dolphins, whales, sea snakes and rays and any freshwater species that may be impacted by the proposed development.

Describe the turtle species that may be using beaches in proximity to the proposed development area. Identify turtle nesting sites within five kilometres of the proposed project area.

Identify any fish spawning grounds located in the area that may be affected by the proposed development in consultation with DAFF (Fisheries Queensland).

Consult DEHP and the Great Barrier Reef Marine Park Authority (GBRMPA) and undertake a review of information on the turtle communities and dolphin and dugong

populations of the study area, paying specific attention to any anecdotal or recorded information on populations frequenting the area and any known turtle nesting sites.

Use this information to establish the basis for recommendations on appropriate management measures to be adopted to minimise the risk of marine fauna injury or death. Particular reference should be given to the protection of marine fauna from boat strike, given the potential increase in boat traffic closer to feeding grounds than the existing port channel.

Benthic macro invertebrates

Benthic macro invertebrate communities likely to be directly or indirectly impacted by the project should be characterised for the assessment of the potential impacts of proposed capital works. Consider the effect of ongoing maintenance activities, including dredging, on benthic fauna.

Fish habitat

Describe the nature and extent of fish habitats (marine and freshwater) that have the potential to be impacted, including seagrass (permanent and ephemeral), macro-algae, mangrove and saltcouch communities and sand bars/mudflats, mapped relative to existing features for reference.

Surveys for seagrass and algae should reflect the seasonal variation in occurrence and density of these communities. The location and density of marine plants should be mapped at an appropriate scale.

Show the location of any declared fish habitat areas proximal to the proposed development site.

Reef communities

Describe the reef communities that may be impacted by the proposed development.

Potential impacts and mitigation measures

Discuss the potential impacts of the project on the aquatic ecosystems (marine and freshwater) and describe proposed mitigation actions, including:

- potential impacts to flora and fauna communities from dredging works and transporting marine fill to the project site. This should include two- or three-dimensional sediment plume modelling to show the potential impacts of the dredge plume (e.g. increased turbidity) on seagrass and other aquatic species (refer to Part B, Section 5.3.2 above)
- potential impacts due to alterations to the long-term hydrodynamic processes of the coastal environments, with specific reference to impacts on riparian vegetation and other sensitive vegetation communities, including mangrove stands and seagrass meadows
- quantify the area of proposed marine plant disturbance (temporary and permanent) for each type of marine plant (i.e. mangroves, saltmarsh and seagrass)

- proposed location, type and design of waterway barrier works (temporary and permanent) that would impact on aquatic resources, particularly fish movement, with an appropriately scaled map
- potential mechanism to ensure adequate fish passage is provided at proposed marine infrastructure
- potential impacts on the food web leading to the higher order of species that are the environmental assets of the region
- alternatives to waterway crossings where possible
- measures to avoid fish spawning periods, such as seasonal construction of waterway crossings and measures to facilitate fish movements through water crossings
- offsets proposed for unavoidable, permanent loss of fisheries habitat in accordance with policy requirements
- methods to minimise the potential for introducing or spreading weed species or plant disease
- monitoring aquatic biology health, productivity and biodiversity in areas subject to direct discharge
- methods to minimise the potential of pest aquatic species
- measures to prevent direct impacts on marine fauna and flora by any dredging works
- potential impacts from climate change and the project's potential to increase the susceptibility of aquatic ecological communities and species, e.g. coral bleaching.

Assess work proposed in a waterway taking into consideration Queensland Primary Industries and Fisheries Fish Habitat Management Operational Policy FHMOP 008 *Waterway Barrier Works Development Approvals* (Peterken, Ringwood & Sarac 2009) or latest version.

Address any actions of the project or likely impacts that require an authority under the relevant legislation including the NC Act and/or the Fisheries Act.

Provide details of the management methods which would avoid or minimise impacts on, birds, marine mammals, turtles and fish, including migrations and marine plant propagation. In particular, present a discussion of existence (actual or likely) of any species and communities of conservation significance in the study area, including discussion of range, habitat, breeding, recruitment feeding and movement requirements, and current level of protection (for example, any requirements of protected area management plans or threatened species recovery plans, including, but not restricted to direct reference to all relevant turtle species included in the *Recovery Plan for Marine Turtles in Australia* (Commonwealth of Australia 2003).

Outline how these measures will be implemented in the EMPs for the project.

5.5. Water resources

5.5.1. Description of environmental values

Describe the existing water resources that may be affected by the project in the context of environmental values, as defined in documents such as:

- the EP Act
- Environmental Protection (Water) Policy 2009 (EPP (Water))
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand 2000b)
- *Queensland Water Quality Guidelines 2009* (Department of Environment and Resource Management 2009).

Provide an indication of the quality and quantity of water resources in the vicinity of the project area, describing:

- existing surface and groundwater in terms of physical, chemical and biological characteristics
- existing surface drainage patterns, flows, history of flooding including extent, levels and frequency and present water uses.

Describe the environmental values of the surface waterways and groundwater of the affected area in terms of:

- values identified in the EPP (Water)
- physical integrity, fluvial processes and morphology, including riparian zone vegetation and form, if relevant
- any impoundments (e.g. dams, levees, weirs etc.)
- hydrology of waterways and groundwater
- sustainability, including both quality and quantity
- dependent ecosystems
- existing and other potential surface and groundwater users
- water resource plans relevant to the affected catchments.

If the project is likely to use or affect local sources of groundwater, describe groundwater resources in the area in terms of:

- geology/stratigraphy
- aquifer type—such as confined, unconfined
- depth to and thickness of the aquifers
- depth to water level and seasonal changes in levels
- groundwater flow directions (defined from water level contours)
- interaction with surface water
- possible sources of recharge
- potential exposure to pollution

- current access to groundwater resources in the form of bores, springs and ponds (including quantitative yield of water and locations of access).

Groundwater

Review the quality, quantity and significance of groundwater in the project area, together with groundwater use in neighbouring areas. Refer to relevant legislation or water resource plans for the region. The review should also provide an assessment of the potential take of water from the aquifer and how current users and the aquifer itself and any connected aquifers will be affected by the take of water.

The review should include a survey of existing groundwater supply facilities (bores, wells, or excavations) to the extent of any environmental harm. The information to be gathered for analysis is to include:

- location
- pumping parameters
- drawdown and recharge at normal pumping rates
- seasonal variations (if records exist) of groundwater levels.

Develop a network of observation points that would satisfactorily monitor groundwater resources both before and after commencement of operations.

The data obtained from the groundwater survey should be sufficient to enable specification of the major ionic species present in the groundwater, pH, electrical conductivity and total dissolved solids.

The groundwater assessment should also be consistent with relevant guidelines for the assessment of ASS, including spatial and temporal monitoring, to accurately characterise baseline groundwater characteristics. Reference Part B, Section 5.2.3 above.

5.5.2. Potential impacts and mitigation measures

Assess the project's potential impacts on water resource environmental values identified in the previous section. Also define and describe the objectives and practical measures for protecting or enhancing water resource environmental values, to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of objectives will be monitored, audited and managed. Include the following:

- potential impacts on the flow and the quality of surface and groundwater from all phases of the project, with reference to their suitability for the current and potential downstream uses and discharge licences
- an assessment of all likely impacts on groundwater depletion or recharge regimes
- potential impacts of surface water flow on existing infrastructure, with reference to the EPP (Water) and the Water Act
- chemical and physical properties of any wastewater (including stormwater at the point of discharge into natural surface waters), and the toxicity of effluent to flora and fauna

- potential impacts on other downstream receiving environments, if it is proposed to discharge water to a riverine system
- the results of a risk assessment for uncontrolled releases to water due to system or catastrophic failure, implications of such emissions for human health and natural ecosystems, and list strategies to prevent, minimise and contain impacts
- an assessment of the potential to contaminate surface and groundwater resources and measures to prevent, mitigate and remediate such contamination
- potential impacts on groundwater users and proposed management options available to monitor and mitigate these effects in particular proposed methods and the feasibility of those methods to 'make good' any adverse effects on the groundwater resources used by adjacent landholders. The expected response of the groundwater resource to the progression and final cessation of the project should be described, particularly in relation to the recharge potential of aquifers affected by the project.

Strategies should be adequately detailed to demonstrate best practice management and that environmental values of receiving waters will be maintained to nominated water quality objectives. Describe the monitoring programs that will assess the effectiveness of management strategies for protecting water resources during the construction, operation and decommissioning of the project. Outline how these strategies are incorporated into appropriate sections of the EMP.

Surface water and water courses

Assess the hydrological impacts of the proposal on surface water and water courses, particularly with regard to stream diversions, scouring and erosion, and changes to flooding levels and frequencies both upstream and downstream of the project. If flooding levels will be affected, modelling of afflux should be provided and illustrated with maps.

If required, discuss the need or otherwise for licensing of any dams or creek diversions under the Water Act. Water allocation and water sources, including impacts on existing water entitlements, including water harvesting, should be established in consultation with DNRM. Discuss the need for approvals for referable dams under the Water Supply (Safety and Reliability) Act. Any advice in relation to referable dams should be sought from the Office of the Water Supply Regulator.

Wastewater treatment

Reference should be made to the properties of the land disturbed and processing liquid wastes, the technology for settling suspended clays from contaminated water, and the techniques to be employed to ensure that contaminated water is contained and successfully treated on the site.

In relation to water supply and usage, and wastewater disposal, discuss anticipated flows of water to and from the proposal area (including wastewater from coal suppression). Where dams, weirs or ponds are proposed, investigate the effects of predictable climatic extremes (storm events, floods and droughts) on:

- the capacity of the water storages (dams, weirs, ponds) and the ability of these storages to retain contaminants
- the structural integrity of the containing walls
- relevant operating regime
- the quality of water contained
- flows and quality of water discharged.

The design of all water storage facilities should follow the technical guidelines on site water management.

Discuss the mitigation options and the effectiveness of mitigation measures, with particular reference to sediment, acidity, salinity and other emissions of a hazardous or toxic nature to human health, flora or fauna.

Groundwater

Include an assessment of the potential environmental impact caused by the project to local groundwater resources, including the potential for groundwater-induced salinity.

Describe the response of the groundwater resource to the progression and finally cessation of the proposal.

Assess the impact of the project on the local groundwater regime caused by the altered porosity and permeability of any land disturbance.

Assess and describe any potential for the project to impact on groundwater-dependent plants and animals; and describe avoidance and mitigation measures.

Describe any implications of the Water Resource (Calliope River Basin) Plan 2006 that apply to the project.

5.6. Air quality

5.6.1. Description of environmental values

Describe the existing air quality that may be affected by the project in the context of environmental values as defined by the EP Act and EPP (Air).

Discuss the existing local and regional air shed environment, including:

- background levels and sources of particulates, gaseous and odorous compounds and any major constituent
- pollutants (including greenhouse gases)
- baseline monitoring results, sensitive receptors.

Data on local meteorology and ambient levels of pollutants should be gathered to provide a baseline for later studies or for modelling air quality environmental harms.

Parameters should include air temperature, wind speed and direction, atmospheric stability, mixing depth and other parameters necessary for input to the models.

5.6.2. Potential impacts and mitigation measures

Consider the following air quality issues and their mitigation:

- an inventory of air emissions from the project expected during construction and operational activities
- 'worst case' emissions that may occur during operation, in particular coal dust from rail and conveyor operations, port stockpile and handling facilities and barge loading. If these emissions are significantly higher than those for normal operations, it will be necessary to separately evaluate the worst-case impact to determine whether:
  - the planned buffer distance between the facility and neighbouring sensitive receptors (including relevant adjacent industries and any worker camps) will be adequate
  - emissions, especially coal dust, may have a significant negative impact on the terrestrial or marine flora or fauna
- ground level predictions should be made at any site that includes the environmental values identified by the EPP (Air), including any sites that could be sensitive to the effects of predicted emissions (including relevant adjacent industries)
- dust and odour generation from construction activities, especially in areas where construction activities are adjacent to existing road networks or are in close proximity to sensitive receivers (including relevant adjacent industries)
- climatic patterns that could affect dust generation and movement
- vehicle emissions and dust generation along major haulage routes both internal and external to the project site
- human health risk associated with emissions from the facility of all hazardous or toxic pollutants.

Detail the mitigation measures together with proactive and predictive operational and maintenance strategies that could be used to prevent and mitigate impacts.

Discuss potential air quality impacts from emissions, with reference to the National Environmental Protection (Ambient Air Quality) Measure 2003 (Cwlth) and the EPP (Air). If an emission is not addressed in these legislative instruments, the emission should be discussed with reference to its risk to human health, including appropriate health-based guidelines and standards.

Include an assessment of cumulative impacts of air emissions on the Gladstone air shed as part of the requirements of Part B, Section 9 of this TOR.

5.7. Greenhouse gas emissions

5.7.1. Description of environmental situation

Provide an inventory of projected annual emissions for each relevant greenhouse gas, with total emissions expressed in 'CO_2 equivalent' terms for the following categories:

- scope 1 emissions—means direct emissions of greenhouse gases from sources within the boundary of the facility and as a result of the facility's activities (including emission from vegetation clearing)

- scope 2 emissions—means emissions of greenhouse gases from the production of electricity, heat or steam that the facility will consume, but that are physically produced by another facility

Briefly describe method(s) by which estimates were made.

Use the *National Greenhouse Accounts (NGA) Factors* (Commonwealth of Australia 2010) as a reference source for emission estimates, supplemented by other sources where practicable and appropriate. As a requirement of the NGA factors, estimates should include the loss of carbon sink capacity of vegetation due to clearing and impoundment.

5.7.2. Potential impacts and mitigation measures

Discuss potential impacts of greenhouse gas emissions from project activities.

Discuss the potential for greenhouse gas abatement measures, including:

- the proposed measures (alternatives and preferred) to avoid and/or minimise direct greenhouse gas emissions
- how the preferred measures minimise emissions and achieve energy efficiency
- any opportunities to further offset greenhouse gas emissions through indirect means, including sequestration and carbon trading.

5.8. Noise and vibration

5.8.1. Description of environmental values

Describe the existing noise and vibration environment that may be affected by all components of the project in the context of the environmental values defined by the Environmental Protection (Noise) Policy 2008. Refer to both the *Noise Measurement Manual* (Environmental Protection Agency 2000) and the *Guideline: Noise and vibration from blasting* (Environmental Protection Agency 2006).

Identify sensitive noise receptors (such as residences, nearby developments, educational facilities, health/child/aged care centres, community facilities, worker camps, environmentally sensitive areas adjacent to and/or impacted by all components of the project and estimate typical background noise and vibration levels based on surveys at representative sites. Discuss the potential sensitivity of such receptors and nominate performance indicators and standards.

5.8.2. Potential impacts and mitigation measures

Describe the impacts of noise and vibration generated during the pre-construction, construction, operational and decommissioning phases of the project. Noise and vibration impact analysis should include:

- the levels of noise and vibration generated, including noise contours, assessed against current typical background levels, using modelling (such as Environmental Noise Model or SoundPLAN) where appropriate
- impact of noise, including low frequency noise (noise with components below 200 Hz) and vibration at all potentially sensitive receivers (e.g. residences, social

and public infrastructure, such as health, recreational and educational facilities, roads, etc.) compared with the performance indicators and standards nominated above in Part B, Section 5.8.1

- impact on terrestrial and aquatic fauna
- proposals to minimise or eliminate these effects, including details of any screening, lining, enclosing or bunding of facilities, or timing schedules for construction and operations that would minimise environmental harm and environmental nuisance from noise and vibration
- options for sensitive receivers that are otherwise unable to achieve a satisfactory internal noise level for the preservation of health and wellbeing as identified within the EPP (Noise).

Night-time works

Describe any night-time construction work that may be undertaken. Specifically include the:

- reasons why night-time work may be undertaken (e.g. to avoid peak traffic periods)
- likely duration of work (if known)
- proposed hours of the work
- nature of the work to be undertaken
- likely impact on residents and the associated mitigation measures to be undertaken by the proponent
- methods that will be used to communicate with affected residents.

5.9. Waste

5.9.1. Waste generation

Identify and describe all sources, likely volumes and quality (where applicable) of waste associated with pre-construction, construction, operation and decommissioning of all aspects of the project. Refer to regulated waste listed in Schedule 7 of the Environmental Protection Regulation 2008 (Qld). Describe:

- waste generated by delivery of material to site(s)
- all chemical and mechanical processes conducted on the construction sites that produce waste
- the amount and characteristics of solid and liquid waste produced on site by the project
- hazardous materials to be stored and/or used on site, including environmental toxicity data and biodegradability
- ship-sourced waste.

5.9.2. Waste management

Assess the potential impact of all wastes generated during construction and operation (including ship-sourced waste), with regard for best practice waste management strategies, the Environmental Protection (Waste Management) Policy 2000, the

Environmental Protection (Waste Management) Regulation 2000 (Qld) and the Transport Operations (Marine Pollution) Act and Regulations. Provide details of each waste in terms of:

- the options available for avoidance/minimisation
- operational handling and fate of all wastes including storage
- on-site treatment methods proposed for any wastes
- methods of disposal proposed to be used for any trade, liquid and solid wastes (including the need to transport wastes off site for disposal)
- the potential level of impact on environmental values
- measures to ensure stability of the waste storage areas and impoundments
- methods to prevent seepage and contamination of groundwater from stockpiles and/or storage areas and impoundments
- measures to minimise attraction of vermin, insects and pests
- options available for using recycled materials
- market demand for recyclable waste (where appropriate)
- decommissioning of the construction site.

5.10. Transport

Present the transport assessment in separate reports for each project-affected mode (road, rail, air and sea) as appropriate for each phase of the project. These assessment reports should provide sufficient information to allow an independent assessment of how existing transport infrastructure will be affected by project transport at the local and regional level.

5.10.1. Existing infrastructure

Describe the extent, condition and capacity of the existing transport infrastructure on which the project will depend.

Describe the project's impact on the local and state-controlled road networks. Include an overview map(s) of the current and future local and state-controlled road networks, which describes the project's relationship to the networks and shows the location of construction activities and access locations (existing and proposed).

5.10.2. Transport tasks and routes

Describe:

- expected volumes of project inputs and outputs of transported raw materials, wastes, hazardous goods, finished products for all phases of the project
- how identified project inputs and outputs will be moved through the transport network (volume, composition, trip timing and routes)
- traffic generated by workforce personnel including visitors (volume, composition, timing and routes)
- likely heavy and oversize/indivisible loads (volume, composition, timing and routes) highlighting any vulnerable bridges and structures along proposed routes.

Provide a summary of all the freight tasks (inputs and outputs, including wastes) associated with all phases of the project. The summary will be in tabular form (or other suitable format) and include, for each freight task:

- tonnage/volume
- proposed transport methodologies (modes)
- estimates of number of discrete trips required for each task
- cross reference to the relevant section in the EIS where the task is fully described and/or assessed.

Reference should be made to Transport Operations (Road Use Management – Mass, Dimensions and Loading) Regulation 2005.

5.10.3. Potential impacts and mitigation measures

Impact assessment reports should include details of the adopted assessment methodology:

- for impacts on state-controlled roads: *Guidelines for Assessment of Road Impacts of Development* (Department of Main Roads 2006)
- for impacts on council roads: *Pavement Impact Assessment Guidelines* (Gladstone Regional Council 2010).

Assess project impacts on:

- local and state road networks (include impacts on port roads, if applicable)
- associated road infrastructure
- rail networks
- capacity, safety, local amenity, efficiency and condition of transport operations, services and assets (from either transport or project operations)
- possible interruptions to transport operations
- the natural environment within the jurisdiction of an affected transport authority (e.g. road and rail corridors)
- the nature and likelihood of product-spill during transport, if relevant
- driver fatigue for workers (including contractor and sub-contractors) travelling to and from regional centres and key destinations (refer Transport Operations (Road Use Management – Fatigue Management) Regulation 2008)
- any existing or proposed strategies for public passenger transport and active transport and address, where relevant, requirements of Part 2A of the Transport Planning and Coordination Act
- access to transport for people with a disability.

Consult with TMR, GRC and Queensland Police Service (QPS) (Central Police Region) to determine appropriate road transport routes and related road transport matters.

5.10.4. Infrastructure alterations

Detail:

- any proposed alterations or new transport-related infrastructure and services required by the project (as distinct from impact mitigation works)
- construction of any project-related plant and utilities, within or impacting on the jurisdiction of any transport authority.

5.10.5. Transport impact management strategies

Discuss and recommend how identified impacts will be mitigated so as to maintain safety, efficiency and condition of each mode. These mitigation strategies are to be prepared in close consultation with relevant transport authorities (including TMR, GRC and QPS (Central Police Region) and consider those authorities' works programs and forward planning.

Findings of studies and transport infrastructure impact assessments should be an input into preparing a transport management plan.

Road/rail management planning

Outline:

- procedures for assessing and agreeing on the scope of required mitigation works with road/rail corridor managers, including any associated works, such as sourcing water and gravel
- strategies to minimise the effects of project transport on existing and future public road or rail corridors
- steps to be taken to prevent access from public roads/rail corridors to the project sites
- strategies to maintain safe access to public road/rail reserves to allow road/rail/pipeline maintenance activities
- process for decommissioning any temporary access to road and rail reserves, and stockpile sites

Findings of studies and transport infrastructure impact assessments should be an input into preparing a draft road-use management plan. Conditions of approval for transport management impacts should also be detailed in the EMP.

Shipping management planning

Discuss the results of the consultation with the Regional Harbour Master and GPCL regarding maritime issues relating to terminal construction and shipping operations, including:

- the capacity of the Port of Gladstone to accommodate increased shipping movements which will result from the proposed Yarwun Coal Terminal
- current and projected vessel use of the port in state waters including their size, shipping movements, anchorages, access to and from the port and navigational and piloting arrangements for construction and operation stages

- navigational arrangements including likely operational limits (with respect to wind strength, and sea state) and cyclone contingency plans for all vessels
- maritime safety.

Discuss the results of consultation with the Australian Quarantine and Inspection Service (AQIS) regarding details of managing customs and quarantine issues and GPCL regarding quarantine management.

Regarding increased shipping volumes, the following should be specifically addressed, in particular with reference to the GBRMP:

- potential for introduction of exotic organisms from increased shipping rates
- ballast water management arrangements—including AQIS mandatory arrangements and agency contingency planning
- management of ship waste, in particular quarantine waste, domestic garbage, oil and sewage (for all ships used in the construction and operational stages of the project)
- risk of spills and their management for both cargo and pollutants (e.g. shipboard oil pollution emergency plan, a shipboard sewage management plan, a shipboard waste management plan (for garbage) and detailed contingency planning for how spills will be dealt with in an offshore situation)
- operational procedures for adverse weather including cyclones
- potential foreshore damage caused by barge activities
- potential for increased vessel strike to marine species
- routes of ships in transit through port waters and the aligned infrastructure such as navigational aids
- monitoring, prevention and mitigation plans for invasive marine pests
- describe shipping numbers and impacts on trading vessel density within the inner route of the Great Barrier Reef.

Liaise with MSQ regarding the development of management plans for vessel traffic management, aids to navigation, and ship-sourced pollution prevention. Refer to the *Maritime Safety Queensland Guidelines for Major Development* Proposals (Department of Transport and Main Roads 2010).

Consult with QPS (Central Police Region) in relation to marine traffic impacts and the measures proposed to manage shipping incidents.

Consider also the potential of the proposal to impact on commercial fishing and recreational craft.

In the above discussions on shipping, account for coal ship movements, the interaction of those vessels with each other and vessels entering and leaving the Port of Gladstone and recreational and commercial fishing boats operating in the area. Describe the probability of negative impacts arising from interactions between those vessels and the management or other measures that are proposed to avoid, minimise or mitigate such potential negative impacts. Include details of the number of ships likely to be in demurrage waiting to be loaded (including a worst-case scenario) and where the demurrage location will be located.

Describe the measures proposed to be undertaken if shipping incidents occur, including collisions involving project barges during the construction phase of the project.

Describe the routes to and from international waters that coal ships will take approaching and leaving the Port of Gladstone, especially through or adjacent to the Great Barrier Reef and any potential interactions that these ships may have with other ships entering or leaving the Port of Gladstone.

Air services

Describe the air services and their current capacity serving the region. Estimate the project's requirements for air transport to and from these regions, and the services required to supply these projections. Provide an assessment of the infrastructure needed to support the projected level of air services.

5.11. Indigenous cultural heritage

5.11.1. Description of existing Indigenous cultural heritage values

Describe the existing Indigenous cultural heritage values that may be affected by the project and the environmental values of the cultural landscapes of the affected area in terms of the physical and cultural integrity of the landforms.

Also describe how, in conjunction with the appropriate Indigenous people, subject to confidentiality requirements, the cultural heritage values were ascertained. This could include:

- the results of any Aboriginal cultural heritage survey undertaken
- the DEHP Aboriginal Cultural Heritage Register and Database
- any existing literature relating to Indigenous cultural heritage in the project area.

5.11.2. Potential impacts and mitigation measures

Define and describe the objectives and practical measures for protecting or enhancing Indigenous cultural heritage environmental values. Describe how nominated quantitative standards and indicators may be achieved for cultural heritage management, and describe how the achievement of the objectives will be monitored, assessed and managed.

To the greatest extent practicable, significant cultural heritage areas should be avoided by the project. The EIS should provide an assessment of likely effects on sites of Indigenous cultural heritage values, including but not limited to the following:

- description of the significance of artefacts, items or places of conservation or cultural heritage values likely to be affected by the project and their values at a local, regional and national level
- recommended means of mitigating any negative impact on cultural heritage values and enhancing any positive impacts.

As a minimum, impact assessment, management and protection strategies should satisfy statutory responsibilities and duties of care.

During the EIS process, the proponent should initiate a native title agreement (NT agreement), as defined under the ACH Act, that includes management and protection strategies for Indigenous cultural heritage or a Cultural Heritage Management Plan (CHMP) under the ACH Act. An NT agreement or an approved CHMP, in a form which complies with Part 7 of the ACH Act, will ensure that the project meets the Aboriginal cultural heritage duty of care imposed by the ACH Act.

An NT agreement or CHMP should be negotiated between the proponent and the appropriate native title/Indigenous parties and should include the following:

- a process for including Indigenous people associated with the development areas in protection and management of Indigenous cultural heritage
- processes for mitigating, managing and protecting identified cultural heritage sites and objects in the project areas, including associated infrastructure developments, during both the construction and operational phases of the project
- provisions for managing the accidental discovery of cultural material, including burials
- a clear recording process to assist initial management and recording of accidental discoveries
- a cultural heritage induction for project staff
- developing a cultural heritage awareness program to be incorporated into the contractor/employee manual and induction manual. This is to be in the form of a plain language, short document that is easy for contractors and staff 'on the ground' to understand
- a conflict resolution process.

If an NT agreement is not finalised or a CHMP has not been approved, when the EIS is submitted to the Coordinator-General the following must be provided:

- an outline of the draft CHMP or draft plan within the NT agreement that addresses management and protection strategies for cultural heritage, subject to any confidentiality provisions, outlining the position of the relevant parties
- details of the proposed steps and timeframes for finalising the CHMP or NT agreement.

5.11.3. Native title

Identify areas covered by applications for native title claims or native title determinations, providing boundary descriptions of native title representative body(ies), and whether it is necessary to notify the representative body(ies) or if there is evidence that native title does not exist.

Identify the potential for native title rights and interests likely to be impacted upon by the project and the potential for managing those impacts by an indigenous land use agreement or other native title compliance outcomes.

5.12. Non-Indigenous cultural heritage

5.12.1. Description of existing non-Indigenous cultural heritage values

Include a cultural heritage study/survey that describes non-Indigenous cultural heritage sites and places, and their values. Any such study should be conducted by an appropriately qualified cultural heritage practitioner and should include the following:

- review of:
  - the Australian Heritage Places Inventory
  - the Queensland Heritage Register and other information regarding places of potential non-Indigenous cultural heritage significance
  - any local government heritage register
  - any existing literature relating to the heritage of the affected areas
- liaison with relevant community groups/organisations (e.g. local historical societies) concerning places of non-Indigenous cultural heritage significance located or identified
- locations of culturally and historically significant sites, shown on maps, which could potentially be impacted by the project
- a constraints analysis of the proposed development area to identify and record non-Indigenous cultural heritage places, including a field survey by a qualified heritage professional, where necessary. The extent of which can be informed by desktop analysis and consultation.

5.12.2. Potential impacts and mitigation measures

Provide an assessment of any likely effects on sites of non-Indigenous cultural heritage values, including but not limited to the following:

- description of the significance of artefacts, items or places of conservation or non-Indigenous cultural heritage value likely to be affected by the project and their values at a local, regional, state and national level
- recommended means of mitigating any negative impacts on non-Indigenous cultural heritage values and enhancing any positive impacts
- strategies to manage places of historic heritage significance, taking account also of community interests and concerns.

As a minimum, investigation, consultation, impact assessment, management and protection strategies should satisfy statutory responsibilities and duties of care, including those under the EPBC Act and Queensland Heritage Act.

6. Social values and management of impacts

6.1. Description of existing social values

Conduct a social impact assessment (SIA) and consider:

- the social and cultural area, which should include the suburbs intersected by and adjacent to the study corridor

- community engagement
- a social baseline study
- a workforce profile
- potential impacts and mitigation measures
- management strategies.

Include results of the SIA in the EIS.

6.1.1. Social and cultural area

Define the project's social and cultural area of influence, including the local, district, regional and state level as relevant, taking into account the:

- potential for social and cultural impacts to occur
- location of other relevant proposals or projects
- location and types of physical and social infrastructure, settlement and land use patterns
- social values that might be affected by the project (e.g. integrity of social conditions, visual amenity and liveability, social harmony and wellbeing, and sense of community)
- Indigenous social and cultural characteristics such as native title rights and interests, and cultural heritage.

6.1.2. Community engagement

Consistent with national and international good practice, and with regard to local and regional strategies for community engagement, the proponent should engage at the earliest practicable stage with likely affected parties to discuss and explain the project, and to identify and respond to issues and concerns regarding social impacts.

Describe the community engagement processes used to conduct open and transparent dialogue with stakeholders. Such processes should include, but not be limited to, community reference group forums. Include the project's planning and design stages and future operations including affected local and state authorities. Engagement processes should consider social and cultural factors, customs and values, and linkages between environmental, economic, and social impact issues.

Discuss engagement strategies and processes, including how complaint resolution will be addressed, for all stages of the project.

6.1.3. Social baseline study

Undertake a targeted baseline study of the people residing in the project's social and cultural area, to identify the project's social issues, potential adverse and positive social impacts, and strategies and measures developed to address the impacts. The social baseline study should be based on qualitative, quantitative, and participatory methods. It should be supplemented by community engagement processes, and reference relevant data contained in local and state government publications, reports, plans, guidelines and documentation, including regional plans and, where available, community plans.

Describe and analyse a range of demographic and social statistics determined relevant to the project's social and cultural area including:

- major population trends/changes that may be occurring irrespective of the project
- total population (the total enumerated population for the social and cultural area and the full-time equivalent transient population), 18 years and older
- estimates of population growth and population forecasts resulting from the proposal
- family structures
- age and gender distributions
- education, including schooling levels
- health and wellbeing measures
- cultural and ethnic characteristics
- the Indigenous population including age and gender
- income including personal and household
- labour force by occupation and industry
- housing costs (monthly housing repayments (per cent of dwellings in each category), and weekly rent (per cent dwellings in each category), housing tenure type and landlord type, household and family type
- housing availability and affordability: the rental market (size, vacancy rate, seasonal variations, weekly rent by percentage dwellings in each category); the availability and typical costs of housing for purchase, monthly housing repayments by percentage dwellings in each category; and the availability of social housing
- disability prevalence
- the social and economic index for areas, index of disadvantage—score and relative ranking
- crime, including domestic violence
- any other indicators determined through the community engagement process as relevant.

The social baseline study should take account of current social issues such as:

- the social infrastructure, including community and civic facilities, services and networks—for definition see South East Queensland Regional Plan 2009–2031 (Department of Infrastructure and Planning 2009)
- settlement patterns including the names, locations, size, history and cultural aspects of settlement in the social and cultural area
- the identity, values, lifestyles, vitality, characteristics and aspirations of communities in the social and cultural area, including Indigenous communities
- land use and land ownership patterns including:
  - rural properties, farms, croplands and grazing areas including on-farm activities near the proposed activities
  - the number of properties directly affected by the project
  - the number of families directly and indirectly affected by the project including Indigenous traditional owners and their families, property owners, and families of

workers either living on the property or workers where the property is their primary employment.

- use of the social and cultural area for forestry, fishing, recreation, business and industry, tourism, aquaculture, and Indigenous cultural use of flora and fauna.

Cross-reference this section with Part B, Section 7.1 (Economy).

6.1.4. Workforce profile

The SIA should include a profile of the workforce that describes the:

- workforce demand:
  - the estimated composition of workforce for each stage of the development by occupation, status (permanent, full-time, part-time and contract), project stage and duration (including any planned construction prior to final investment decision)
- supply issues and strategies:
  - analysis of relevant local, state and national workforce profiles and labour supply
  - strategies and proposed programs for:
    - recruitment and attraction
    - population groups (including Indigenous, women, secondary school students and unemployed and underemployed)
    - unskilled and semi-skilled labour requirements
    - structured training (apprenticeships, traineeships, graduates)
    - analysis of impact on local community workforce.

The Skills Queensland website at **www.skills.qld.gov.au/significantprojects.aspx** provides useful information, including a fact sheet, on how to address workforce demand.

6.2. Potential impacts

Assess and describe the type, level and significance of the project's social impacts (both beneficial and adverse) on the local and cultural area, based on outcomes of community engagement processes and the social baseline study. This section should:

- describe and summarise outcomes of community engagement processes including the likely response of the affected communities, including Indigenous people
- address direct, indirect and secondary impacts from any existing projects and the proposed project including an assessment of the size, significance, and likelihood of these impacts at the local and regional level. Consider the following:
  - local, regional and state labour markets, with regard to the source of the workforce, and any proposed employment strategies targeted at disadvantages groups in the study area
  - proposed new skills and training related to the project including the occupational skill groups required and potential skill shortages anticipated

- impacts of construction and operational workforces, their families, and associated contractors on housing and accommodation availability and affordability, land use and land availability
- impacts resulting from any significant increase in population due to the development
- size, location and required approvals of any proposed workers accommodation camps or villages and social impacts of worker camps (if applicable)
- impacts on community greenspace (specifically address the Queensland Greenspace Strategy 2011–2020).

6.2.1. Cumulative social impacts

Evaluate and discuss the potential cumulative social impacts resulting from the project including an estimation of the overall size, significance and likelihood of those impacts. In this context, 'cumulative impacts' is defined as the additional impacts on population, workforce, accommodation, housing, training and use of community infrastructure and services, from the project, and other proposals for development projects in the area, which are publicly known or communicated by the office of the Coordinator-General, if they overlap the proposed project.

This section should be cross-referenced to Part B, Section 9.

6.2.2. Mitigation measures and management strategies

For identified social impacts, provide detail of proposed social impact mitigation strategies and measures and how these will be implemented.

Prepare an Indigenous participation plan in consultation with the Department of Aboriginal and Torres Strait Islander and Multicultural Affairs (DATSIMA) and in accordance with DATSIMA recommendations. Discuss the relationship of this plan to the NT agreements and CHMPs outlined in Part B, Section 5.11.

Describe any consultation about acceptance of proposed mitigation strategies and how practical management and monitoring regimes are proposed to be implemented.

7. Economies and management of impacts

7.1. Economy

7.1.1. Description of affected local and regional economies

Describe the existing economy in which the project is located and the economies materially impacted by the project. Include:

- a map illustrating the local and regional economies (local government areas—LGAs) that could be potentially affected by the project
- gross regional product or other appropriate measure of annual economic production
- demographic and employment profile of the study area as a whole and disaggregated by LGA. Include:
  - existing population (size, age, distribution)

  - existing community profiles of the LGAs directly affected by the project (household type, size, average income)
  - existing employment statistics (part-time/full-time, by occupation)
  - the regional economy's key industries and their contribution to regional economic income
- sufficient baseline economic data to underpin a comprehensive assessment of the direct, indirect, cumulative, costs and impacts of the project
- the key regional markets relevant to the project:
  - labour market
  - housing and land markets
  - construction services and building inputs market
  - regional competitive advantage and expected future growth.

With regard to the region's key industries and factor prices, provide information on:

- current input costs (wage rates, building costs, housing rent etc.)
- land values in the region by type of use.

7.1.2. Potential impacts and mitigation measures

The potential impacts should consider local, regional, state and national perspectives as appropriate to the scale of the project.

The analysis should describe both the potential and direct economic impacts including estimated costs, if material, on industry and the community, assessing the following:

- property values
- industry output
- employment
- the indirect impacts likely to flow to other industries and economies from developing the project, and the implications of the project for future development
- the distributional effects of the proposal including proposals to mitigate any negative impact on disadvantaged groups.

7.2. Strategies for local participation

The assessment of economic impacts should outline strategies for local participation, including:

- strategies for assessing the cost effectiveness of sourcing local inputs from the regional economy during the construction, operation and rehabilitation phases of the project
- employment strategies for local residents including members of Indigenous communities and people with a disability, including a skills assessment and recruitment and training programs to be offered
- strategies responding to relevant government policy, relating to:
  - the level of training provided for construction contracts on Queensland Government building and construction contracts, with regard to the Queensland

Government Building and Construction Contracts Structured Training Policy—the 10 per cent training policy (Skills Queensland 2008)

– development of a Local Industry Participation Plan in accordance with the Local Industry Policy (Department of Employment, Economic Development and Innovation 2010) and the *Local Industry Policy Guidelines* (Department of Employment, Economic Development and Innovation 2011) in consultation with the DSDIP Office of Advanced Manufacturing, to encourage the use of locally sourced goods and services.

7.3. Impact upon property management

Address the current and future management processes for adjacent properties that are likely to be impacted by the project during construction and/or operation. Mention the:

- impact of the project on existing agricultural land uses and management practices (e.g. disruption to stockyards, fences, water points, sowing or harvesting of crops, movement of livestock, agricultural machinery and any loss of agricultural land)
- impact of the project on residential, commercial and industrial land uses, property values and property management practices
- range of measures required to mitigate real and potential disruptions to rural, residential, commercial and industrial property uses and management practices
- impact of potential introduction of weeds, pest animals and diseases (biosecurity measures).

8. Hazard and risk

8.1. Hazard and risk assessment

Describe the potential hazards and risks to people and property that may be associated with the project, which may include but are not restricted to:

- identifying potential hazards, accidents, spillages, fires and abnormal events that may occur during all stages of the project, including possible frequency of occurrence
- identifying all hazardous substances to be used, stored, processed or produced and the rate of usage
- identifying hazards and risks from neighbouring industries that may impact on the project during all stages of the development
- potential wildlife hazards, natural events (e.g. cyclone, storm surge, flooding, bush fire, landslide) and implications related to climate change.

To the extent of design complete at the EIS stage, undertake a risk assessment for all components and stages of the project, as part of the EIS process in accordance with *Australia/New Zealand AS/NZS ISO 31000:2009 Risk management—Principles and guidelines* (Standards Australia/Standards New Zealand 2009) and *Managing environment-related risk* (HB203:2012) (Standards Australia 2012). With respect to risk assessment, the EIS should:

- deal comprehensively with external and on-site risks, including transport risks
- assess risks during the pre-construction, construction, operational and decommissioning phases of the project
- include an analysis of the consequences of each hazard on safety in the project area, examining the likelihood of both individual and collective consequences, involving injuries and fatalities to workers and to the public
- assess risks of potential interactions with other local industries include major hazardous facilities such as the Orica sodium cyanide facility at Yarwun
- where practicable, address potential risks from trespass action, non-violent direct action and other protest-related activities
- address hazard audits and response plans
- present qualitative and quantitative levels of risks from the above analysis.

Provide details on the safeguards that would reduce the likelihood and severity of hazards, consequences and risks to persons, within and adjacent to the project area(s).

Present a comparison of assessed and mitigated risks with acceptable risk criteria for land uses in and adjacent to the project area(s).

Present draft risk management plans for the construction and operational phases of the project.

Report on any hazards and risks that may arise through interaction with the existing Port of Gladstone.

8.2. Health and safety

8.2.1. Description of public health and safety community values

Describe the existing health and safety values of the community, workforce, suppliers and other stakeholders in terms of the environmental factors that can affect human health, public safety and quality of life, such as air pollutants, odour, lighting and amenity, dust, noise and water.

8.2.2. Potential impact and mitigation measures

Define and describe the objectives and practical measures for protecting or enhancing health and safety community values. Describe how nominated quantitative standards and indicators may be achieved for social impact management, and how the achievement of the objectives will be monitored, audited and managed.

Include an assessment of the cumulative effects on public health values and occupational health and safety impacts on the community, workforce and regional health services from project operations and emissions, as part of the requirements of Part B, Section 9 of this TOR.

Recommend any practical monitoring regimes in this section.

Include relevant consultation with the appropriate regional health service providers.

8.3. Emergency management plan

The development of emergency and evacuation planning and response procedures is to be determined in consultation with state and regional emergency service providers.

Provide an outline of the proposed integrated emergency management planning procedures (including evacuation plans, if required) for the range of situations identified in the risk assessment developed in this section. This includes strategies to deal with natural disasters during operation and construction including identification of key stakeholders.

Present preliminary information on the design and operation of proposed safety and contingency systems to address significant emergency issues delineated in the risk assessment, together with at least the following areas of emergency:

- terrorist attack (refer Part B, Section 8.3.1)
- marine collision minimisation
- fire prevention and protection
- leak detection and minimisation
- release of contaminants
- emergency shutdown systems and procedures
- natural disasters.

In addition, undertake an assessment of businesses that may be affected in the event of an emergency, including strategies to mitigate the impact on these businesses.

In regard to fires, outline strategies to manage the provision of:

- fire management systems to ensure the retention on site of fire water or other fire suppressants used to combat emergency incidents
- building fire safety measures for any construction or permanent accommodation
- details of any emergency response plans and bushfire mitigation plans under the State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide (Department of Local Government and Planning & Department of Emergency Services 2003)
- on-site firefighting equipment provided and the level of training of staff who will be tasked with emergency management activities
- detailed maps showing the plant outline, potential hazardous material stores, incident control points, firefighting equipment, etc.
- an outline of any dangerous goods stores associated with the plant operations, including fuel storage and emergency response plans
- compliance with the Fire and Rescue Service Act.

Present outlines of emergency and evacuation planning and response strategies (including potential meeting points for emergencies and detail of key stakeholders) to deal with relevant incidents, which have been determined in consultation with state and regional emergency service providers (including QPS, Queensland Ambulance Service, Queensland Fire and Rescue Service and Emergency Management

Queensland), and which show integration of emergency services into the plans. Reference should be made to the Disaster Management Act.

Present operational procedures for adverse or construction-limiting weather, including but not limited to cyclone procedures for all vessels involved in the construction and operational phases of the project.

Present plans for emergency medical response and transport and first aid matters with involvement of the relevant state agencies (such as the Queensland Ambulance Service, Queensland Fire and Rescue Service and Emergency Management Queensland) and GRC.

8.3.1. Maritime security plan

Provide an outline of the proposed integrated emergency management planning procedures (including evacuation plans, if required). The procedures should cover the range of situations identified in the risk assessment developed in this section, including strategies to deal with natural disasters during operation and construction.

The emergency management plan is to include a maritime security plan that meets Australian Government security requirements pursuant to the requirements of:

- the Maritime Transport and Offshore Facilities Security Act and Regulations
- the Queensland Transport Security (Counter Terrorism) Act and Regulations
- International Ship and Port Facility Security Code (International Maritime Organization 2003).

A draft maritime security plan should be submitted as a separate confidential document to the Coordinator-General when the EIS is submitted.

The maritime security plan, which is to be developed in consultation with national and state maritime security representatives (including QPS (Central Region Water Police) and incorporated in the EIS, should contain:

- an outline of relevant project information, such as the contact details of the proponent and port operator and security officer responsible for implementing the plan
- a map showing each zone that is covered by the plan, along with site boundaries and any security zones within the area that will be covered by the plan
- a security assessment that is in accordance with Regulation 3.05 of the Maritime Transport and Offshore Facilities Security Regulation
- details of common requirements for security plan audits and reviews
- the security measures or activities to be implemented at each level of security
- details on how the plan will be implemented and will contribute towards achieving maritime security outcomes
- specific requirements that are detailed in Regulation 3.20 of the Maritime Transport and Offshore Facilities Security Regulation.

As part of the maritime security plan, include a security assessment that details:

- when the assessment was completed

- the scope of the assessment, including assets, infrastructure and operations
- how the assessment was conducted
- the skills and experience of those involved in the assessment
- the risk context and threat situation of the port facility
- how important assets, infrastructure and operations will be identified and evaluated
- how possible risks or threats to important assets, infrastructure and operations will be identified
- existing security measures, procedures and operations
- weaknesses in infrastructure, policies and procedures
- the identification, selection and prioritisation of possible risk treatments.

9. Cumulative impacts

Detail and summarise the project's cumulative impacts and describe these impacts in combination with those of existing or proposed project(s) publicly known or advised by the office of the Coordinator-General to be in the region, to the greatest extent practicable. Assess cumulative impacts with respect to both geographic location and the environmental values noted in the sections above.

Explain the methodology used to determine the cumulative impacts of the project, detailing the range of variables considered (including relevant baseline or other criteria upon which the cumulative aspects of the project have been assessed, where applicable).

10. Sustainable development

Provide a comparative analysis of how the project conforms to the objectives for 'sustainable development'—see the *National Strategy for Ecologically Sustainable Development* (Commonwealth of Australia 1992).

Consider the cumulative impacts (both beneficial and adverse) of the project addressed in Part B, Section 9, from a life-of-project perspective, taking into consideration the scale, intensity, duration and frequency of the impacts to demonstrate a balance between environmental integrity, social development and economic development.

This information is required to demonstrate that sustainable development aspects have been considered and incorporated during the scoping and planning of the project.

11. Environmental management plan

Detail the EMPs for both the construction and operational phases of the project. The EMP should be developed from, and be consistent with, the information in the EIS. The EMP must address discrete project elements and provide life-of-proposal control strategies. It must be capable of being read as a stand-alone document without reference to parts of the EIS.

The EMP must comprise the following components for performance criteria and implementation strategies:

- the proponent's commitments to acceptable levels of environmental performance, including environmental objectives, performance standards and associated measurable indicators, performance monitoring and reporting
- impact prevention or mitigation actions to implement the commitments
- corrective actions to rectify any deviation from performance standards
- an action program to ensure the environmental protection commitments are achieved and implemented. This will include strategies in relation to:
  - continuous improvement
  - environmental auditing
  - monitoring
  - reporting
  - staff training
  - where relevant, a rehabilitation program for land proposed to be disturbed under each relevant aspect of the proposal.

The recommended structure of each element of the EMP is shown below.

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

The proponent's commitments to environmental performance, as described in the EMP, may be included as Coordinator-General's conditions to ensure the commitments are met. Therefore, the EMP is a relevant document for project approvals, environmental authorities and permits, and may be referenced by them.

12. Conclusions and recommendations

Make conclusions and recommendations with respect to the project, based on the studies presented, the EMP and conformity of the project with legislative and policy requirements.

13. References

All references consulted should be presented in the EIS in a recognised format.

14. Appendices

Provide the following as appendices to the EIS:

- final TOR for this EIS
- TOR cross-reference table, which links the requirements of each section of the TOR with the corresponding section of the EIS, where those requirements have been addressed
- a list of the project approvals required by the project
- the consultation report, as described in Part B, Section 3.7, (page 10)
- a list of the relevant qualifications and experience of the key study team members and specialist sub-consultants
- a glossary of technical terms
- a list of abbreviations
- all reports generated on specialist studies undertaken as part of the EIS
- a copy of the proponent's corporate environmental policy and planning framework document
- a list of all commitments made by the proponent in the EIS, with cross-references to the relevant section in the EIS.

Acronyms and abbreviations

Acronym/abbreviation	Definition
3TL	Tenement to Terminal Limited, the proponent
ACH Act	*Aboriginal Cultural Heritage Act 2003* (Qld)
AS/NZS	Australian standard/New Zealand standard
CAMBA	China–Australia Migratory Bird Agreement
CHMP	cultural heritage management plan
Coastal Act	*Coastal Protection and Management Act 1995* (Qld)
DAFF	The Department of Agriculture, Fisheries and Forestry, Queensland
DATSIMA	Department of Aboriginal and Torres Strait Islander and Multicultural Affairs, Queensland
DEHP	Department of Environment and Heritage Protection, Queensland
DMP	dredge management plan
DNRM	Department of Natural Resources and Mines
DSDIP	Department of State Development, Infrastructure and Planning
EIS	environmental impact statement
EMP	environmental management plan
EP Act	*Environmental Protection Act 1994* (Qld)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EPP	Environmental Protection Policy (water, air, waste, noise)
ERA	environmentally relevant activity
GRC	Gladstone Regional Council
GBRWHA	Great Barrier Reef World Heritage Area
JAMBA	Japan–Australia Migratory Bird Agreement
MNES	matters of national environmental significance (under the EPBC Act)
NAGD	*National Assessment Guidelines for Dredging* (Commonwealth of Australia 2009)
NC Act	*Nature Conservation Act 1992* (Qld)
NGA	National Greenhouse Accounts
NT agreement	native title agreement
The proponent	Tenement To Terminal Limited (3TL)
QPS	Queensland Police Service
REDD	Regional Ecosystem Description Database
REMP	receiving environment monitoring program
ROKAMBA	Republic of Korea–Australia Migratory Bird Agreement
SAP	sediment sampling and analysis plan
SDPWO Act	*State Development and Public Works Organisation Act 1971* (Qld)
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities (Cwlth)
SIA	social impact assessment

SPA	*Sustainable Planning Act 2009* (Qld)
TOR	terms of reference
TMR	Department of Transport and Main Roads, Queensland
VM Act	*Vegetation Management Act 1999* (Qld)

Glossary

Term	Definition
afflux	A flow to or toward an area.
aquifer	A water bearing stratum of permeable rock, sand, or gravel, able to transmit substantial quantities of water.
assessable vegetation	Vegetation in which clearing is assessable development under Schedule 3, Part 1, Table 4, Item 1 of SPA.
Australian Height Datum	A mapping system applied to Australia, which uses a datum, or agreed level, from which the heights of naturally occurring features can be measured; this level, to which the value of zero is given, is equivalent to the mean sea level for 1966–68 at thirty tide gauges around the coast of the Australian continent.
benthic substrate	Pertaining to the bottom of a body of water.
biodiversity	Biodiversity is short for 'biological diversity'. It describes the natural diversity of native wildlife, together with the environmental conditions necessary for their survival and includes: a) regional diversity, that is, the diversity of the landscape components of a region, and the functional relationships that affect environmental conditions within ecosystems b) ecosystem diversity, that is, the diversity of the different types of communities formed by living organisms and the relations between them c) species diversity, that is, the diversity of species d) genetic diversity, that is, the diversity of genes within each species.
bunding	An artificial created boundary, usually in the form of an embankment used to prevent sediment and substances from entering a water steam or storage facility.
cape class	Vessel – load carrying capacity – 80,000–199,000 dwt
community	An assemblage of interdependent populations of different species (plants and animals) interacting with one another, and living in a particular area.
controlling provision	The matters of national environmental significance, under the EPBC Act, that the proposed action may have a significant impact on.
Coordinator-General	The corporation sole constituted under section 8A of the *State Development and Public Works Organisation Act 1938* and preserved, continued in existence and constituted under section 8 of the SDPWO Act.
CORVEG	Queensland Herbarium's site based floristic dataset containing field survey data
ecosystem	A biophysical environment containing a community of organisms.
effluent	Outflow of treated wastewater.
ephemeral	Transitory, short-lived.

endangered	A species is endangered if: • there have not been thorough searches conducted for the wildlife and the wildlife has not been seen in the wild over a period that is appropriate for the life cycle or form of the wildlife, or • the habitat or distribution of the wildlife has been reduced to an extent that the wildlife may be in danger of extinction, or • the population size of the wildlife has declined, or is likely to decline, to an extent that the wildlife may be in danger of extinction, or • the survival of the wildlife in the wild is unlikely if a threatening process continues.
endemism	The ecological state of being unique to a defined geographic location, such as an island, nation or other defined zone, or habitat type.
erosion	The process by which rocks are loosened, worn away and removed from parts of the earth's surface.
fluvial	Of, relating to, or inhabiting a river or stream.
geomorphological	The form or shape of the landscape and the processes that modify or change it.
groundwater	Water found underground in porous rock or soil strata.
habitat	The biophysical medium or media occupied (continuously, periodically or occasionally) by an organism or group of organisms.
habitat corridor	A strip of habitat that facilitates fauna movement between otherwise isolated patches of habitat.
handymax	Vessel – load carrying capacity – 30,000–50,000 dwt
listed species	A plant or animal included in a schedule of vulnerable, rare or endangered biota, such as the schedules in the EPBC Act or the Nature Conservation (Wildlife) Regulation 2004 (Qld).
mitigation	The effort to eliminate or reduce impacts.
morphology	Form and structure of organisms without consideration of function.
native species	A species that is indigenous to Australia or an external territory, or periodically or occasionally visits.
native wildlife	Any taxon or species of wildlife indigenous to Australia.
natural environment	The complex of atmospheric, geological, and biological characteristics found in an area in the absence of artefacts or influences of a well-developed technological human culture.
palaeontologic	The study of fossils to determine the structure and evolution of extinct animals and plants.
permeability	The capacity of a material (rock) to transmit fluids (groundwater).
porosity	That fraction of total rock volume which is filled with water, gas, or oil.
proponent	The entity or person who proposes a significant project. It includes a person who, under an agreement or other arrangement with the person who is the existing proponent of the project, later proposes the project.
regional ecosystems (REs)	Regional ecosystems were defined by Sattler and Williams (1999) as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil.

rehabilitation	Making the land useful again after a disturbance. It involves the recovery of ecosystem functions and processes in a degraded habitat.
remnant vegetation	Small remaining areas of naturally occurring vegetation in a landscape that has been altered by human activity such as agriculture. These remnants were once part of a continuously vegetated landscape.
riparian	Pertaining to, or situated on the bank of, a body of water, especially a watercourse such as a river.
run-off	The amount of rainfall which actually ends up as stream flow, also known as rainfall excess.
sediment	Any usually finely divided organic and/or mineral matter deposited by air or water in non-turbulent areas.
sensitive receptor	Those locations or areas where dwelling units or other fixed, developed sites of frequent human use occur.
significant project	A project declared as a 'significant project' by the Coordinator-General, under section 26 of the SDPWO Act.
terrestrial	Pertaining to land, the continents, and/or dry ground. Contrasts to aquatic.

References

Agriculture and Resource Management Council of Australia and New Zealand, and Australian and New Zealand Environment and Conservation Council 1995, *Guidelines for Groundwater Protection in Australia,* Agriculture and Resource Management Council of Australia and New Zealand, and Australian and New Zealand Environment and Conservation Council, Canberra, viewed 13 July 2012, <http://www.environment.gov.au/water/publications/quality/nwqms-groundwater-guidelines.html>.

Ahern CR, McElnea AE and Sullivan LA 2004, *Acid Sulfate Soils Laboratory Methods Guidelines*, viewed 15 June 2012, <http://www.derm.qld.gov.au/land/ass/lab_methods.html>.

Ahern CR, Ahern MR and Powell B 1998, *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998*, Queensland Acid Sulfate Soils Investigation Team, Department of Natural Resources, Indooroopilly, viewed 13 July 2012, <http://www.derm.qld.gov.au/land/ass/pdfs/sample_analysis_guide.pdf>.

Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand 2000a, *Australian Guidelines for Water Quality Monitoring and Reporting*, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra, viewed 13 July 2012, <http://www.environment.gov.au/water/publications/quality/nwqms-monitoring-reporting.html>.

Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand 2000b, *The Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, viewed 24 February 2012, <http://www.mincos.gov.au/publications/australian_and_new_zealand_guidelines_for_fresh_and_marine_water_quality>.

Commonwealth of Australia 1992, *National Strategy for Ecologically Sustainable Development*, Ecologically Sustainable Development Steering Committee, Canberra, viewed 24 February 2012, <http://www.environment.gov.au/about/esd/publications/strategy/index.html>.

——2003, *Recovery Plan for Marine Turtles in Australia*, Environment Australia, Canberra, viewed 13 July 2012, <http://www.environment.gov.au/coasts/publications/turtle-recovery/pubs/marine-turtles.pdf>.

——2009, *National Assessment Guidelines for Dredging*, Department of Environment, Water, Heritage and the Arts, Canberra, viewed 24 February 2012, <http://www.environment.gov.au/coasts/pollution/dumping/publications/pubs/guidelines09.pdf>.

——2010, *National Greenhouse Accounts (NGA) Factors*, Department of Climate Change and Energy Efficiency, Canberra, viewed 24 February 2012, <http://www.climatechange.gov.au/~/media/publications/greenhouse-acctg/national-greenhouse-factors-july-2010-pdf.pdf>.

——2011, *Australian Drinking Water Guidelines 6, 2011*, National Health and Medical Research Council and National Resource Management Ministerial Council, Canberra, viewed 25 June 2012, <http://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/eh52_aust_drinking_water_guidelines_update_120430.pdf>.

Dear SE, Moore NG, Dobos SK, Watling KM and Ahern CR 2002, *Soil Management Guidelines*, in *Queensland Acid Sulfate Soil Technical Manual*, Department of Natural Resources and Mines, Indooroopilly, Queensland, Australia, viewed 18 January 2012, <http://www.derm.qld.gov.au/land/ass/pdfs/soil_mgmt_guidelines_v3_8.pdf>.

Department of Education, Training and the Arts 2008, Queensland Skills Plan, Department of Education, Training and the Arts, Brisbane, viewed 25 June 2012, <http://training.qld.gov.au/resources/information/pdf/skills-plan-2008.pdf>.

Department of Employment, Economic Development and Innovation 2010, Local Industry Policy, Department of Employment, Economic Development and Innovation, Brisbane, viewed 24 February 2012, <http://www.industry.qld.gov.au/documents/AdvancedManufacturing/local-industry-policy.pdf>.

——2011, *Local Industry Policy Guidelines*, Department of Employment, Economic Development and Innovation, Brisbane, viewed 24 February 2012, <http://www.industry.qld.gov.au/documents/AdvancedManufacturing/LIP-guidelines.pdf>.

Department of Environment 1998, *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland, Department of Environment, Brisbane*, viewed 24 February 2012, <http://www.derm.qld.gov.au/register/p00090aa.pdf>.

Department of Environment and Resource Management 2009, *Queensland Water Quality Guidelines*, Department of Environment and Resource Management, Brisbane, viewed 20 December 2010, <http://www.derm.qld.gov.au/environmental_management/water/queensland_water_quality_guidelines/queensland_water_quality_guidelines_2009.html>.

——2010, Offsets for Net Gain of Koala Habitat in South East Queensland Policy, Department of Environment and Resource Management, Brisbane, viewed 24 February 2012, <http://www.derm.qld.gov.au/wildlife-ecosystems/wildlife/koalas/strategy/pdf/offset-netgain.pdf>.

——2011a, *Ecological Equivalence Methodology Guidelines* (version 1), Department of Environment and Resource Management, Brisbane, viewed 3 April 2012, <http://www.derm.qld.gov.au/environmental_management/environmental-offsets/pdf/ecological-equivilance-methodology.pdf>.

——2011b, Policy for Vegetation Management Offsets, version 3, Department of Environment and Resource Management, Brisbane, viewed 24 February 2012, <http://www.derm.qld.gov.au/environmental_management/environmental-offsets/pdf/policy-for-vegetation-management-offsets.pdf>.

——2011c, Queensland Biodiversity Offset Policy (version 1), Department of Environment and Resource Management, Brisbane, viewed 24 February 2012, <http://derm.qld.gov.au/environmental_management/environmental-offsets/pdf/biodiversity-offset-policy.pdf>.

——2011d, Queensland Coastal Plan, Department of Environment and Resource Management, Brisbane, viewed 24 February 2012, <http://www.derm.qld.gov.au/coastalplan/pdf/qcp-web.pdf>.

——2011e, State Planning Policy 3/11: Coastal Protection, Department of Environment and Resource Management, viewed 24 February 2012, <http://www.derm.qld.gov.au/coastalplan/pdf/qcp-web-coastal-protection.pdf>.

——2011f, State Policy: Coastal Management, Department of Environment and Resource Management, viewed 24 February 2012, <http://www.derm.qld.gov.au/coastalplan/pdf/qcp-web-coastal-management.pdf>.

——2012, State Planning Policy 1/12: Protection of Queensland's Strategic Cropping Land, Department of Environment and Resource Management, Brisbane, viewed 24 February 2012 <http://www.derm.qld.gov.au/land/planning/strategic-cropping/legislation-planning.html>.

Department of Infrastructure and Planning 2009, South East Queensland Regional Plan 2009–2031, Department of Infrastructure and Planning, Brisbane, viewed 24 February 2012, <http://dlgp.qld.gov.au/regional-planning/south-east-queensland-regional-plan-2009-2031.html>.

Department of Local Government and Planning and Department of Emergency Services 2003, State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide, Brisbane, viewed 24 February 2012, <http://www.emergency.qld.gov.au/publications/spp/pdf/spp.pdf>.

Department of Main Roads 2006, *Guidelines for Assessment of Road Impacts of Development*, Department of Main Roads, Brisbane, viewed 24 February 2012, <http://www.tmr.qld.gov.au/~/media/ace67ef2-b6c3-46a3-91a7-39f790c309fe/garid_guidelines_200406.pdf>.

Department of Mines and Energy 2007a, State Planning Policy 2/07: Protection of Extractive Resources, viewed 24 February 2012, <http://mines.industry.qld.gov.au/assets/land-tenure-pdf/dme_stateplan_policy_1.pdf>.

Department of Mines and Energy 2007b, *State Planning Policy 2/07 Guideline: Protection of Extractive Resources*, Department of Mines and Energy, Brisbane, viewed 24 February 2012, <http://mines.industry.qld.gov.au/assets/land-tenure-pdf/dme_stateplan_guideline.pdf>.

Department of Natural Resources and Mines and Department of Local Government and Planning 2002a, State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils, viewed 24 February 2012, <http://dlgp.qld.gov.au/resources/policy/ass-spp-oct-02.pdf>.

Department of Natural Resources and Mines and Department of Local Government and Planning 2002b, *State Planning Policy 2/02 Guideline: Acid Sulfate Soils*, Department of Natural Resources and Mines and Department of Local Government and Planning, Brisbane, viewed 24 February 2012, <http://dlgp.qld.gov.au/resources/policy/spp-guidelines-oct-02-v2.pdf>.

Department of Planning (NSW) 2008, *Hazardous Industry Planning Advisory Paper No. 4: Risk Criteria for Land Use Safety Planning*, consultation draft, Sydney, viewed 24 February 2012, <http://www.planning.nsw.gov.au/plansforaction/pdf/hazards/haz_hipap4_rev2008.pdf>.

Department of Primary Industries 1990, *Guidelines for agricultural land evaluation in Queensland*, Land Resources Branch, Department of Primary Industries, Brisbane.

Department of Primary Industries and Department of Housing, Local Government and Planning 1992, State Planning Policy 1/92: Development and the Conservation of Agricultural Land, viewed 24 February 2012, <http://dlgp.qld.gov.au/resources/policy/spp1-92.pdf>.

Department of Primary Industries and Department of Housing, Local Government and Planning 1993, *Planning guidelines: The identification of good quality agricultural land*, viewed 24 February 2012, <http://dlgp.qld.gov.au/resources/policy/plng-guide-identif-ag-land.pdf>.

Department of Primary Industries and Fisheries 2008, Queensland Biosecurity Strategy 2009–14, Department of Primary Industries and Fisheries, Brisbane, viewed 13 July 2012, <http://www.daff.qld.gov.au/4790_12541.htm>.

Department of the Premier and Cabinet 2009, Reef Water Quality Protection Plan 2009, Reef Water Quality Protection Plan Secretariat, Brisbane, viewed 13 July 2012, <http://www.reefplan.qld.gov.au/index.aspx>.

Department of Transport and Main Roads 2007, Standards for Hydrographic Surveys within Queensland Waters, Maritime Safety Queensland, Brisbane, viewed 13 July 2012, <http://www.msq.qld.gov.au/Charts/Hydrographic-survey-standards.aspx>.

——2010, *Maritime Safety Queensland Guidelines for Major Development Proposals*, Department of Transport and Main Roads, Brisbane, viewed 24 February 2012, <http://www.msq.qld.gov.au/~/media/71b5bd33-2949-429e-9323-2040c4922b85/pdf_guidelines_major_development_proposals.pdf>.

——2011a, Queensland Coastal Contingency Action Plan, Maritime Safety Queensland, Brisbane, viewed 13 July 2012, <http://www.msq.qld.gov.au/Environment/Contingency-plans.aspx>.

——2011b, Standard for Marine Construction Activities within Gladstone Harbour, Maritime Safety Queensland, Brisbane, viewed 13 July 2012, <http://www.msq.qld.gov.au/Publications.aspx#gladstoneconstruction>.

——2012, *Marine Fish Habitat Offset Strategy* FHMOP005.2, Queensland Department of Agriculture, Fisheries and Forestry, Brisbane, viewed 18 July 2012, <*http://www.daff.qld.gov.au/28_12908.htm*>

Environmental Protection Agency 2000, *Noise Measurement Manual*, 3rd edn, Department of Environment and Resource Management, Brisbane, viewed 24 February 2012, <http://www.derm.qld.gov.au/register/p00367aa.pdf>.

——2004, *Guideline: Planning for Noise Control*, Environmental Protection Agency, Brisbane, viewed 24 February 2012, <http://www.derm.qld.gov.au/register/p01369aa.pdf>.

——2006, *Guideline: Noise and vibration from blasting*, Environment Protection Agency, Brisbane, viewed 24 February 2012, <http://www.derm.qld.gov.au/register/p01382aa.pdf>.

——2008a, *Guideline: EPA Best Practice Urban Stormwater Management – Erosion and Sediment Control*, Environmental Protection Agency, viewed 24 February 2012, <http://www.derm.qld.gov.au/register/p02301aa.pdf>.

——2008b, Queensland Government Environmental Offsets Policy, Environmental Protection Agency, Brisbane, viewed 3 August 2011, <http://www.derm.qld.gov.au/register/p02501aa.pdf>.

Eyre, TJ, Kelly, AL, Neldner, VJ, Wilson, BA, Ferguson, DJ, Laidlaw, MJ and Franks, AJ 2011, *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland: Assessment Manual*, version 2.1, Department of Environment and Resource Management, Biodiversity and Ecosystem Sciences, Brisbane, viewed 3 April 2012, <http://www.derm.qld.gov.au/wildlife-ecosystems/biodiversity/pdf/biocondition_manual.pdf>.

Gladstone Ports Corporation 2008, 50 Year Strategic Plan, Gladstone Ports Corporation, Gladstone, viewed 13 July 2012, <http://www.gpcl.com.au/Portals/0/pdf/final_low_cmm5087gpcl_50_year_strategic.pdf>.

Great Barrier Reef Marine Park Authority 2010, *Water Quality Guidelines for the Great Barrier Reef Marine Park*, Great Barrier Reef Marine Park Authority, Townsville, viewed 13 July 2012, <http://www.gbrmpa.gov.au/about-the-reef/how-the-reefs-managed/water-quality-in-the-great-barrier-reef/water-quality-guidelines-for-the-great-barrier-reef>.

Institution of Engineers Australia 1996, *Soil Erosion and Sediment Control – Engineering Guidelines for Queensland Construction Sites*, Institution of Engineers Australia Queensland Division, Brisbane.

International Erosion Control Association Australasia 2008, *Best Practice Erosion and Sediment Control,* International Erosion Control Association Australasia, Picton, viewed 15 June 2012, <http://www.austieca.com.au/BestPracticeESCDocumentInfo.aspx>.

International Maritime Organization 2003, International Ship and Port Facility Security Code, International Maritime Organization, London, viewed 24 February 2012, <http://www.imo.org/ourwork/security/instruments/pages/ispscode.aspx>.

Isbell, RF and CSIRO 2002, *The Australian soil classification*, CSIRO Publishing, Collingwood, Victoria.

McKenzie, NJ et al. 2008, *Guidelines for Surveying Soil and Land Resources*, 2nd edn, CSIRO Publishing, Melbourne.

National Committee on Soil and Terrain 2009, *Australian soil and land survey field handbook*, 3rd edn, CSIRO Publishing, Collingwood.

Peterken C, Ringwood G and Sarac Z 2009, *Waterway barrier works development approvals*, Queensland Primary Industries and Fisheries Fish Habitat Management Operational Policy FHMOP 008, Queensland Primary Industries and Fisheries, Brisbane, viewed 13 July 2012, <http://www.daff.qld.gov.au/documents/Fisheries_Habitats/FHMOP008-Fish-Hab-Manage.pdf>.

Skills Queensland 2008, Government Building and Construction Contracts Structured Training Policy, Skills Queensland, Brisbane, viewed 24 February 2012, <http://www.skills.qld.gov.au/DownloadAttachment.ashx?AttachmentId=136298>.

Standards Australia 2012, *Managing environment-related risk* (HB203:2012), Standards Australia, Sydney.

Standards Australia and Standards New Zealand 2009, *Risk Management—Principles and guidelines* (AS/NZS ISO 31000:2009), Standards Australia (Sydney) and Standards New Zealand (Wellington).

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