The Coordinator-General

Port of Gladstone Gatcombe and Golding Cutting Channel Duplication Project

Terms of reference for an environmental impact statement

December 2012

Queensland Government

Contents

Preamble

These terms of reference (TOR) set out the matters to be addressed in an environmental impact statement (EIS) for the proposed Port of Gladstone Gatcombe and Golding Cutting Channel Duplication Project ('the project'), which has been declared a 'significant project' by the Coordinator-General.

The project proponent for the project is Gladstone Ports Corporation, a government owned corporation (GOC) and port authority for the Port of Gladstone.

The project includes duplication of the existing Gatcombe and Golding Cutting channels, investigation of onshore and offshore locations for dredge spoil disposal and relocation of existing and placement of new navigational aids.

The project involves duplicating the existing Gatcombe and Golding Cutting Channels in the Port of Gladstone to facilitate a two-way passage from the outer harbour, around East Banks, to the western side of Facing Island.

The project components to be assessed include:

- duplication of the existing Gatcombe and Golding Cutting channels with a new channel 9.12 kilometres (km) long, to a depth of RL –16.1 metres (m) and a width of 200 m
- a new onshore (within close proximity to the Port coastline) and/or offshore (within a 20 nautical mile radius) dredge material placement area for disposal of approximately 12 million cubic metres (Mm^3) of dredged spoil material
- relocation of existing and placement of new navigational aids for the channel duplication.

On 25 September 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.

The project was referred to the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities and was determined to be a 'controlled action' under the EPBC Act on 23 October 2012 (EPBC Act referral 12/6558). The Australian Government have advised that the project is likely to have a significant impact on a number of matters protected by the EPBC Act and as such, will be assessed by environmental impact statement in a joint assessment with the Great Barrier Reef Marine Park Authority.

The relevant controlling provisions are:

- World Heritage properties
- National Heritage places
- listed threatened species and communities

- listed migratory species
- commonwealth marine areas
- Great Barrier Reef Marine Park

This TOR does not relate to matters of national environmental significance.

The draft TOR was released for public and advisory agency comment for 20 business days from 6 October 2012 to 5 November 2012. Nineteen submissions were lodged and changes were made to the TOR as a result of these submissions.

The EIS should follow the format and content outlined in this TOR. Discuss any proposed change to the overall structure of the EIS with the EIS project manager.

Content 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.

1. Executive summary

The executive summary should convey the most important and preferred aspects and options relating to the project 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, operational activities 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, commitments and rehabilitation strategies to minimise the significance of these impacts
- a discussion of the cumulative impacts in relation to social, economic and environmental factors of associated infrastructure projects proposed within the region
- 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

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
- 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 relevant sections).

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. Relationship to other projects

Describe how the project relates to other major 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.

3.5. Project alternatives

Describe feasible alternatives including conceptual, technological and locality alternatives to the proposed project and the consequences of not proceeding with the project (including any impacts that would be avoided). Detail the criteria used to determine the alternatives and provide sufficient detail to convey 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.

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 project's scoping phase.

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, assess options and make informed decisions 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 (for example, 'material change of use' (MCU) applications under the *Sustainable Planning Act 2009* (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

3.7.1 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.

3.7.2 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.

3.7.3 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, local government agencies, and/or the affected parties (as defined by the EP Act)
- 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 operational 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. 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.

Commonwealth legislation

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

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1994*
- EPBC Act
- *Environmental Protection (Sea Dumping) Act 1981* (EPSD Act)
- *Great Barrier Reef Marine Park Act 1975* (GBRMP Act)
- *Maritime Transport and Offshore Facilities Security Act 2003*
- *Navigation Act 1912*
- *Native Title Act 1993.*

Queensland legislation

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

- *Aboriginal Cultural Heritage Act 2003* (ACH Act)
- *Coastal Protection and Management Act 1995* (Coastal Act)
- *Dangerous Goods Safety Management Act 2001*
- *Environmental Protection Act 1994* and Regulation
- *Fire and Rescue Service Act 1990*
- *Fisheries Act 1994*
- *Land Act 1994*
- *Land Protection (Pest and Stock Route Management) Act 2002*
- *Local Industry Policy Act 2012*
- *Marine Parks Act 2004*
- *Nature Conservation Act 1992* (NC Act)
- *Queensland Heritage Act 1992*
- Sustainable Planning Act 2009 (SPA)
- SDPWO Act
- *Transport Infrastructure Act 1994* (TIA)

- *Transport Operations (Marine Pollution) Act 1995*
- *Transport Operations (Marine Safety) Act 1994*
- *Transport Operations (Road Use Management) Act 1995* (TORUM Act)
- *Vegetation Management Act 1999* (VM Act)
- *Waste Reduction and Recycling Act 2011*
- *Water Act 2000*
- *Work Health and Safety Act 2011*

Australian Government approvals

Identify and outline Commonwealth approvals required including, but not limited to:

- approval, under sections 131(1) and 133 of the EPBC Act, of the proposed action for each of the applicable controlling provisions
- sea dumping permit to dispose of dredge material at sea under the EPSD Act
- marine park permit to dispose of dredge material within the GBRMP under the GBRMP Act (Great Barrier Reef Marine Park Authority).

Queensland approvals

Key Queensland approvals required, and to be considered in the EIS process, include:

- development permit for tidal works—Coastal Act
- allocation of quarry material if applicable—Coastal Act
- development permit 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 operational work that is the removal, destruction or damage of a marine plant—Fisheries Act
- development approval for a material change of use of a premises for an environmentally relevant activity (ERA) and associated registration certificate:
  - ERA16: Extractive and screening activities (dredging)—EP Act

Identify the relevant approval agency for each of the approvals required.

3.8.2. Relevant plans

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. The key plans and policies are listed under the relevant sections of this TOR. These include but are not limited to the following:

- *Great Barrier Reef Outlook Report 2009* (Commonwealth of Australia 2009a)
- *Draft Great Barrier Reef Ports Strategy* (Department of State Development, Infrastructure and Planning 2012)

- Gladstone Port Corporation's *50 Year Strategic Plan* (Gladstone Ports Corporation 2008)
- relevant local government planning schemes
- Water Resource (Boyne River Basin) Plan 2000
- Boyne River Basin Resource Operations Plan 2006
- environmental protection policies (EPPs, subordinate to the EP Act), including:
  - EPP (Noise) 2008
  - EPP (Air) 2008
  - EPP (Water) 2009
- State planning policies and their supporting guideline, including:
  - State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils (Department of Natural Resources and Mines & Development of Local Government and Planning 2002a)
  - State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide (Department of Environment and Resource Management 2003)
  - State Planning Policy 4/11: Protecting Wetlands of High Ecological Significance in Great Barrier Reef Catchments (Department of Environment and Resource Management 2011)
- Queensland Coastal Plan State Policy for Coastal Management (Department of Environment and Resource Management 2011d)
- Draft Coastal Protection State Planning Regulatory Provision (Department of State Development, Infrastructure and Planning 2012)
- *Queensland Coastal Contingency Action Plan 2011* (Department of Transport and Main Roads 2011)
- *Standards for Hydrographic Surveys within Queensland Waters* (Department of Transport and Main Roads 2007)
- fish habitat policies, administered by the Department of Agriculture, Fisheries and Forestry
- *Queensland Biosecurity Strategy 2009–14* (Department of Primary Industries and Fisheries 2008)
- *Queensland Skills Plan 2008* (Department of Education, Training and the Arts 2008)
- Queensland *Local Industry Policy* (Department of Employment, Economic Development and Innovation 2010)
- plans and policies applicable to the Great Barrier Reef (including the *Reef Water Quality Protection Plan 2009* (Department of the Premier and Cabinet 2009)).

With specific relevance to maritime safety and operations, the following policies, guidelines and standards should be referenced:

- Maritime Safety Queensland Regulation 2002
- *Maritime Transport and Offshore Facilities Security Act 2003*
- *Transport Operations (Marine Pollution) Act 1995*
- *Transport Operations (Marine Safety) Act 1994*

- Transport Operations (Maritime Safety) Regulation 2004
- Australian Maritime Safety Authority marine orders
- Queensland Coastal Contingency Action Plan (QCCAP)
- Standards for Hydrographic Surveys within Queensland Waters
- Transport Operations (Marine Pollution) Regulation 2008.

3.8.3. Environmentally relevant activities

Briefly describe each environmentally relevant activity (ERA) under the EP Act and associated activities that are to be carried out in connection with the project. Present a detailed description of each ERA in Section 5, Environmental values and management of impacts. Provide details of the impact on land, water, air, noise and any other identified environmental values, as well as a detailed description of the waste generated from each ERA and its quantity, characteristics, handling, storage, management and intended treatment and disposal.

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 operating scenario, including details such as cost, 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 expected cost, timing, and overall duration of the project, including details of and justification for, any staging of the development.

4.1.1. Shipping channel dredging

Describe, map and illustrate the location, area, depth and volume of dredging required for the project, including currently dredged and approved areas for dredging in relation to the proposed dredging.

Explain the provisions of any previous sea dumping permits for port operations relevant to the project including dates, volumes and existing spoil ground location, capacity and environmental values.

Provide details of the dredging methods including:

- the type and design of dredge vessel and equipment to be used, including number and type of vessels and reasons for the proposed selection of equipment including additional or reduced contribution to sediment plume generation according to vessel type being used as compared to alternative vessel types
- the expected duration, timing and operation hours of dredging campaigns (including the reasons for any staging)
- expected dredge and support vessel movement paths and frequency
- measures to be used to minimise risk of introducing exotic species on dredging equipment
- whether, where and how any blasting may be required, including scale, frequency and duration of the blasting and proposed management measures
- operational management of dredging and dredge spoil handling, particularly in relation to sediment plume generation according to vessel type being used, impacts on water quality and marine mega fauna (including turtles, dolphins, sharks and dugongs).

4.1.2. Dredge spoil disposal

Provide details of the grading and composition of likely dredged materials, including potential contaminants as required for testing completed in accordance with the *National Assessment Guidelines for Dredging* (Commonwealth of Australia 2009

Describe proposed disposal options for both capital and maintenance dredge spoil including:

- disposal site locations, characteristics, dimensions and capacity (including initial and final bathymetry for unconfined sea disposal sites
- stability of the disposal site options (retentive or dispersive, considering wave and current erosion) and any requirement for containment
- disposal methods including provision for different dredging equipment, material characteristics, contaminants or acid sulphate soils where relevant.

Sea disposal

Where sea disposal is considered, describe the selection of the preferred spoil disposal site based on:

- relevant agreements, guidelines, policies
- potential ecological impacts
- characteristics of the spoil
- dredging technology constraints
- economic benefits
- cost of alternatives
- lifespan of current maintenance dredge spoil disposal site, impacts on lifespan of current site and lifespan of proposed site.

Land disposal options consideration

Provide descriptions of all feasible alternative land-based spoil disposal sites including:

- equipment and pipeline routes to be used
- location and nature of tail water discharge points
- details of estimated commencement, completion, rate of progress and existing levels and proposed final levels of the land e.g. for filling land or reclamation work
- typical cross-section of the land e.g., for filling land or reclamation work.
- where there is potential for impacts from sea erosion, method of protecting the seaward boundary of the land
- construction details of any temporary or permanent treatment or dewatering structures including measures to contain or collect seepage waters.

Reclamation for land disposal options consideration

Provide the following information in relation to any proposed disposal of dredge spoil to reclaim land below the limit of Highest Astronomical Tide (HAT):

- the boundary of land to be filled or reclaimed by metes and bounds, tied to real property boundary/Commonwealth/State land boundaries
- the location of the limit of mean high water spring tide, HAT and lowest astronomical tide
- existing levels of the land and proposed final levels relative to the Australian Height Datum (AHD)
- method of containment of the dredge spoil and protection from erosion with certification of design by a registered professional engineer of Queensland (REPQ).

Bund walls land disposal options consideration

Where breakwater and revetment walls or reclamation are proposed provide geotechnical and composition information on sediments that may be displaced, and the potential impact of sediment dispersion or displacement on water quality and marine ecosystems, including:

- bore logs at a frequency and depth, and with material characterisation sufficient to determine potential displacement of material and/or the need for excavation
- contaminant assessment of material potential displaced or excavated consistent with the NAGD
- acid sulfate soil 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 et al. 1998).

4.2. 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 and boundaries 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 and size of the project footprint, including easement widths and access requirements
- location and size of any proposed buffers surrounding the project area (for construction and operation)
- location of infrastructure relevant to the project, including but not limited to, the state-controlled road network, local roads and railways, and marine infrastructure
- location of natural features such as waterways (for example, rivers, streams, creeks, other water bodies and wetlands), shorelines, and significant or assessable vegetation
- location of any proposed site offices and accommodation sites
- coordinates of new or modified channels
- State and Commonwealth marine parks and fish habitat reserve boundaries within or adjacent to the project site.
- extent of strategic port land and future strategic port land
- infrastructure relevant to approvals including discharge and monitoring locations
- location of natural features including intertidal sand and mud banks and wetland areas including
- location of seagrass beds, mangrove vegetation, National Heritage values, World Heritage areas

4.3. Port facilities and operation

4.3.1. Port description

Provide concept and layout plans highlighting proposed structures, plant equipment associated with the port. The description of the port and the layout of key components should include, but is not limited to:

- port boundaries
- wharf centres
- shipping channels and berths
- the present and expected increased shipping numbers, sizes, frequency, speed, route and piloting requirements through the Port of Gladstone
- offshore ship mooring locations
- location of navigational aids
- ship-sourced pollution management facilities
- any other associated facilities.

4.3.2. Structures

Describe all structures, including:

- locations and dimensions of marine infrastructure associated with the port

- location and extent of any proposed breakwater and revetment structures if required) and the likely construction methodologies
- the likely interference of the port infrastructure with the port road infrastructure
- temporary infrastructure to be used for any pre-assembled modules or pre-fabricated units
- dimensions, depth, width and cross sections of the proposed navigational channels
- 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 building and structures.

4.3.3. Maritime operation

Describe the location and nature of processes and operations associated with the operation of the project, including:

- a general description of operations
- the present and expected increased shipping numbers, sizes, frequency, speed, route and piloting requirements through the Port of Gladstone
- hours of operation
- expected access, navigational and anchorage arrangements
- maintenance dredging operations
- description of arrangements for maintaining marine facilities, such as ship-sourced pollution management facilities (including details of responsible parties)
- details of predicted usage of marine facilities, including opportunities for recreational and public usage
- details of any increase in restrictions on usage of marine facilities (i.e. exclusion zones)
- detailed requirements of vessel operations, including pilotage, channel closures, quarantine and security arrangements.

4.4. Construction phase

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

Provide an estimate of the number and roles of persons to be employed during the construction phase of the project.

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

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

- land acquisitions required, be it in full or as easements, leases
- vegetation clearing
- site access

- earthworks
- offshore and onshore dredge spoil disposal sites
- discharge and monitoring points
- interference with watercourses and floodplain areas, including wetlands
- site establishment requirements for construction facilities, including access measures, movement of materials and equipment, and expected size, source and control of the construction workforce accommodation, services (water, sewerage, communication, energy, medical, 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.

4.4.1. Program of works

Describe all the construction elements of the project, including:

- an indicative construction timetable, including expected commissioning and start-up dates and hours of construction
- 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
- major hazardous materials 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.

4.4.2. Commissioning

Describe the commissioning process including the associated environmental impacts.

4.5. Associated infrastructure

Detail, with the aid of concept and layout plans, requirements for new infrastructure or upgrading/relocating existing infrastructure to service the project. Consider infrastructure such as transportation (road/rail/air/ship), water supply and storage, energy supply, telecommunications, stormwater, waste disposal and sewerage.

Describe:

- all infrastructure required to be constructed, upgraded, relocated or decommissioned for the construction and/or operation of the project, such as resource extraction areas, access roads, power supply, connection to sewerage or water supply

- the design and construction standards to be met (for example, waterway crossings should be designed to meet the requirements of the Fisheries Act and self-assessable codes for minor or temporary water barrier works)
- alternative approaches or the opportunity to obtain materials from alternative sources.

4.6. Decommissioning and rehabilitation

Present a plan for decommissioning and rehabilitating the site, should it ever be required.

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 if not possible, minimise environmental harm and maximise environmental benefits of the project. 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 background information 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
- describe any cumulative impacts on environmental values caused by the project, either in isolation or in combination with other known existing or planned projects
- 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 and monitoring programs, identified in this section of the EIS, should be used to develop the EMP(s) for the project. For more information, refer to, Section 11 (page 54).

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 (for example, cyclones) and natural or induced hazards (including bushfire). Provide a risk assessment (as part of the requirements of Subsection 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 Subsection 8.1 page (50).

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 infrastructure, water pipelines, powerlines 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.

Describe and detail the land tenure approval processes that are required to create tenure and obtain legal access to the areas required.

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 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.

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.

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.

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.

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/operations, address the potential for significant finds.

A soil survey of the sites affected by the project must be conducted at a suitable scale, with particular reference to the physical and chemical properties of the materials that will influence erosion potential, stormwater run-off quality, rehabilitation and agricultural productivity of the land. Provide information on soil stability and suitability for construction of project facilities.

Assess the potential for acid sulfate soils in accordance with:

- Queensland Acid Sulfate Soil Technical Manual (see **www.derm.qld.gov.au/land/ass/products.html**)
- 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: Acid Sulfate Soils* (Department of Natural Resources and Mines & Department of Local Government and Planning 2002b).

Describe, map and illustrate soil types and profiles according to the *Australian Soil and Land Survey Field Handbook* (National Committee on Soil and Terrain 2009), *Guidelines for Surveying Soil and Land Resources* (McKenzie et al. 2008) and *Australian Soil Classification* (Isbell & CSIRO 2002).

Provide geotechnical information on the soils' stability and suitability for construction of project facilities.

Where necessary, identify any exemptions under the *Strategic Cropping Act 2011* of State Planning Policy 1/12: Conservation of Strategic Cropping Land (Department of Environment and Resource Management 2012b).

Provide a map and description of:

- the location of key tidal planes such as:
  - 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, characterised and supported by illustrative mapping.

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 *Soil Erosion and Sediment Control—Engineering Guidelines for Queensland Construction Sites* (Institution of Engineers Australia 1996)
- 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 from disturbance of acid sulfate soils 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, provide a site-specific acid sulfate soils management plan prepared in accordance with:

- *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998* (Ahern et al. 1998)
- Queensland Acid Sulfate Soil Technical Manual (see **www.derm.qld.gov.au/land/ass/products.html**)
- 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: Acid Sulfate Soils* (Department of Natural Resources and Mines & Department of Local Government and Planning 2002b).

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 and 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.

Assess the project's consistency with the relevant policies of the *Queensland Coastal Plan* (Department of Environment and Resource Management 2012a), including the Draft Coastal Protection State Planning Regulatory Provision (Department of State Development, Infrastructure and Planning, 2012) and the State Policy for Coastal Management (Department of Environment and Resource Management 2011c).

5.3.1. Hydrodynamics and sedimentation

Description of environmental values

Assess the physical and chemical characteristics of sediments within the littoral and marine zone adjacent to the project area.

Describe the physical processes of coastal environment related to the project 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. Provide details of 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 and possible stratification.

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.

Describe the sediment transport dynamics, including sediment budgets, in the project area and adjacent coastline detailing all sinks and sources into and out of this region that influence sediment transport rates and pathways. This should include transport mechanisms during persistent and extreme conditions showing gross and net transport rates. All influencing coastal processes should be investigated through a combination of 1d, 2d and/or 3d numerical modelling.

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

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.

The above information should inform preparation of a long term sediment disposal plan.

Detail the impacts of the existing dredged channel and deposition site on coastal processes and sediment transport dynamics, including siltation rates and the long term fate of material deposited in the spoil area.

All numerical modelling to be undertaken to describe the hydrodynamic and sedimentation aspects of the project area and adjacent coastline will be calibrated and validated against measured data within the project area.

Assess the siltation rates of the dredged channel material and long term fate of the deposition area including the likelihood of acid sulfate soils drifting onto the adjacent beaches.

Describe the duration and extent of turbidity plumes from capital and maintenance dredging and deposition on the waterways and adjacent coastline. Describe this in relation to the background clarity of the receiving waters.

5.3.2. Water quality

Description of environmental values

Provide baseline information on water quality of coastal waters (as defined in EPP (Water) 2009 potentially affected by project activities that incorporates seasonal and tidal variation and that has been produced in accordance with *Queensland Water*

Quality Guidelines (Department of Environment and Resource Management 2009a) and Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (2000) methodologies.

This information should include (but is not necessarily limited to) biological and physico-chemical water quality parameters such as dissolved oxygen, pH, nutrients, organic carbon, silicate, temperature, salinity, total suspended solids, turbidity, photosynthetically active radiation (PAR), and phytoplankton pigment.

Baseline information should also include toxicants, such as hydrocarbons, total and dissolved metals and metalloids, ammonia, and any other relevant contaminants, such as those that might be present as a result of nearby point source discharges, or pesticides in catchments with moderate or high degree of agricultural activities.

Baseline water quality data must be made available in electronic format compatible with transfer of the data to relevant State government databases. (Consult with DSITIA on appropriate format) 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, and consider the variability associated with the local wind climate, seasonal factors, freshwater flows and extreme events when determining baseline values.

Define, describe and where necessary develop environmental values and water quality objectives for potentially affected waters, referring to:

- *Queensland Water Quality Guidelines* (Department of Environment and Resource Management 2009a)
- *Water Quality Guidelines for the Great Barrier Reef Marine Park* (Revised Edition 2010);
- *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 2000)
- EPP (Water) 2009.

Potential impacts and mitigation measures

The potential environmental harm caused by the project on coastal resources and processes shall be described in the context of controlling such effects through management and mitigation measures.

Specific issues to be addressed include:

- the water quality objectives and trigger values used (including how they were developed), and how project planning and management will achieve these objectives;
- potential impacts due to dredging and dredge material disposal such as sediment suspension, release of contaminants, light attenuation and increased sedimentation on sensitive receptors (including coral and seagrass communities)
- potential accidental or controlled discharges of contaminants during construction and operation of the coastal and marine facilities
- effect of flooding from relevant river systems and other extreme events

Undertake two and/or 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 a justification of the assumptions and parameters used in the modelling including data source, quality and any uncertainties. Provide information describing the estimated extent of mixing zones for suspended sediments and contaminants of potential operations and dredge spoil disposal during the full range of hydrodynamic conditions and weather events (including 'worst case' conditions). Include a justification of the assumptions and parameters used in the modelling including data source, quality and any uncertainties. Provide information describing the estimated extent of mixing zones for suspended sediments and contaminants of potential concern.

Provide management strategies for dredging, loading and spoil disposal to achieve objectives for affected waters, including:

- the proposed water and sediment quality, and (biological) sensitive receptor, monitoring regime before, during and after dredging and disposal
- trigger levels for management actions linked to quantitative measurements of water quality
- management and reference monitoring locations and any required trigger values or alert levels to be adopted to initiate management actions
- any additional impact assessment monitoring such as event-based seagrass and coral health monitoring surveys
- specific mitigation strategies

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 guideline values within an acceptable mixing zone and therefore maintain receiving water environmental values throughout the period of dredge spoil disposal on land Consideration should be given to:

- 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, bund wall stability and permeability
- measures to limit channelling and sediment re-suspension in settling ponds
- measures to limit erosion and sediment re-suspension in discharge channels and point of discharge
- contingency measures in the event that discharge limits are exceeded
- management, maintenance and landscaping of the disposed dredge spoil's final form.

In addition, the EIS should have regard to relevant information made available by the Gladstone Healthy Harbour Partnership.

Specific issues to be addressed include:

- the water quality objectives used (including how they were developed), and how predicted activities will meet these objectives—refer to:
  - *Queensland Water Quality Guidelines* (Department of Environment and Resource Management 2009a)
  - *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 2000)
- potential threats to the water quality and sediment quality of the coastal environment within the project footprint, specifically associated with constructing and operating the facilities.

This assessment shall consider, at minimum:

- dredging and dredge material disposal, including disturbance of fine-grained sediments and contaminated material
- potential accidental discharges of contaminants during construction and operation of the marine precinct
- release of contaminants from marine structures and vessels, including potential for introducing marine pests
- stormwater run-off from the marine precinct facilities and associated infrastructure
- flooding of relevant river systems and other extreme events.

Describe strategies for protecting Ramsar wetlands; and discuss any obligations imposed by state or Commonwealth legislation or policy, or international treaty obligations (that is, JAMBA, CAMBA and ROKAMBA).

5.3.3. Sediment quality and dredging

Provide baseline information on marine sediments and sediment quality in the area likely to be disturbed by dredging or vessel movements including contaminants (such as heavy metals, nutrients and pesticides), the presence of fines and/or indurated layers and acid sulfate potential. Present this information as a map of sediment types based on their physical and chemical properties and include depth profiles.

Assessment of marine sediments should be undertaken in accordance with the *National Assessment Guidelines for Dredging* (Commonwealth of Australia 2009b).

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.

Dredging

Describe and map the location, area, depth (cross-sections) and volume of dredging required for the project. Provide maps showing existing dredged areas, and areas currently approved for dredging, in relation to the proposed dredging. Provide details of the proposed dredging methods including:

- the type and design of dredging and dredge spoil handling equipment proposed to be used in each area to be dredged, including number and type of vessels and reasons for the proposed vessel/equipment selection
- measures to be used to minimise risk of introducing exotic species on dredging equipment
- the expected duration and operational hours of the dredging campaign, including the reasons for any staging
- whether, where and how any blasting may be required, including the scale, frequency and duration of the blasting and proposed management measures
- expected dredge and support vessel movement paths and frequency and
- operational management of dredging and dredge spoil handling, particularly in relation to impacts on water quality and marine mega-fauna (especially turtle and dugong).

Provide an estimate of maintenance dredging requirements including: volume, frequency, material characteristics, and potential contaminants, including any variation due to extreme events such as cyclones and floods.

Dredge spoil disposal

Describe disposal options for both capital and maintenance dredge spoil including:

- disposal site locations, characteristics, dimensions and capacity (including initial and final bathymetry for sea disposal sites)
- stability (wave and current erosion) and any requirement for containment
- disposal methods including provision for different dredging equipment, material characteristics, contaminants and acid sulfate soils where relevant
- dredge spoil and drain water management
- justification for the choice of the preferred spoil disposal site(s) based on:
  - relevant agreements, guidelines, and policies
  - potential ecological impacts
  - characteristics of the spoil including contaminants/metals
  - dredging technology constraints
  - cost of alternatives.

Comment also required on the on the choice of the disposal site in relation to coastal management outcomes, having regard to the nature of the spoil, cost of alternatives and potential impacts on coastal resources and their values.

Reclamation

Provide the following information in relation to any proposed disposal of dredge spoil to reclaim land below the limit of Highest Astronomical Tide:

- the boundary of land to be filled or reclaimed by metes and bounds, tied to real property boundaries
- details of estimated commencement, completion, rate of progress and estimated cost of the filling or reclamation
- the location of the limit of the landward limit of Mean High Water Spring Tide, Highest Astronomical Tide, and Lowest Astronomical Tide
- typical cross-section across the land to be reclaimed showing the proposed finished levels relative to the Australian Height Datum (AHD) and method of protecting the seaward boundary of the site/s from erosion
- method of containment of the dredge spoil and protection from erosion with certification of design by a suitably experienced Registered Professional Engineer of Queensland
- permeability of containment bunds to water and sediment, including estimations of release rate through or under walls

Where revetment walls, bund walls or reclamation are proposed provide geotechnical and composition information on sediments that may be displaced, and the potential impact of sediment dispersion or displacement on water quality and marine ecosystems, including:

- bore logs at a frequency and depth, and with material characterisation sufficient to determine potential displacement of material and/or the need for excavation
- contaminant assessment of material potentially displaced or excavated consistent with the *National Assessment Guidelines for Dredging* (Commonwealth of Australia 2009b)
- acid sulfate soil 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 et al. 1998)

Information provided in this section should refer to:

- *Reclaiming land under tidal water* (Department of Environment and Heritage Protection 2010)
- *Guideline: Allocation of quarry material* (Department of Environment and Heritage Protection 2010)
- relevant policies of the draft Coastal Protection SPRP
- considerations under Sections 75 and 104 of the Coastal Act

Describe provisions for dredge material disposal and associated impacts on sediment quality. Discuss disposal options for contaminated material, if required. This must include a description of the arrangements to be put in place for long-term (20 years) dredge material disposal including details of proposed material placement areas.

Provide physical, chemical and toxicological characteristics of material to be dredged, displaced, or suspended by vessel or propeller wash, sufficient (location, frequency,

depth, parameters) to allow assessment of suitable dredging equipment, material handling, disposal options and potential water quality and ecological impacts associated with disturbance and dispersion. Implement a sediment sampling and analysis plan (SSAP) prepared in accordance with the *National Assessment Guidelines for Dredging* (Commonwealth of Australia 2009b) and approved by the appropriate administering authority. The EIS must include a SSAP 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 and contaminant hot spots. Where historical or new test data indicates elevated levels of contaminants, carry out additional sampling and testing as necessary to define the extent of the material to be dredged containing elevated levels of contaminant.

Complete an acid sulfate soil survey of material to be dredged consistent with the *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998* (Ahern et al. 1998). Baseline sediment contaminant data must be made available in electronic format compatible with transfer of the data to relevant State government databases. (Consult with DSITIA on appropriate format).

Comment on the choice of the disposal site in relation to coastal management outcomes, having regard to the nature of the spoil, cost of alternatives and potential impacts on coastal resources and their values. Describe provisions for dredge material disposal and associated impacts on sediment quality. Discuss disposal options for contaminated material, if required. This must include a description of the arrangements to be put in place for long-term (20 years) dredge material disposal including details of proposed material placement areas.

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 and terrestrial ecosystems
- seasonal variation in fauna and flora populations.

Survey effort should be sufficient to identify, or adequately extrapolate, the floral and faunal values over the range of seasons. The survey should account for the ephemeral nature of watercourses traversing the proposal area, and seasonal variation in fauna populations.

Provide flora and fauna assessments of any dredge spoil storage and/or treatment areas where native vegetation is to be disturbed.

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.

Undertake an on-ground assessment of all terrestrial project areas for the presence of weeds and pest animals. Mapping should include the distribution and density of declared species.

5.4.1. Sensitive environmental areas

Description of environmental values

On a map of suitable scale, identify areas that are environmentally sensitive within the study area in proximity to the project. 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 Queensland 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
- regional ecosystems (REs) listed as 'endangered' or 'of concern' under state legislation
- good representative examples of remnant REs or REs 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.ehp.qld.gov.au**
- 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 2011b)
- sites recorded on the National Directory of Important Wetlands in Queensland (Blackman et al 1999)
- sites adjacent to nesting beaches, feeding, resting or calving areas (for example, 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 and protected areas to ensure survival in the longer term; such land may contain:
  - natural vegetation in good condition or other habitat in good condition (for example, 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 (for example, 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, including historical mapping and prior seasonal change mapping
- sites of palaeontologic significance such as fossil sites
- sites of geomorphological significance
- areas of environmental significance as defined by the *Queensland Coastal Plan* (Department of Environment and Resource Management 2012a)
- protected areas that have been proclaimed under the NC Act and Marine Parks Act, or are under consideration for proclamation
- declared areas of major interest or critical habitat declared under the NC Act
- declared areas of high nature conservation value or areas vulnerable to land degradation under the VM 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 state significance in sensitive environmental areas as identified above, in the context of historical loss of habitat, the known and potential impacts of other current and approved development, and other relevant development potentially occurring at the same time.

Demonstrate how the project would comply with the following hierarchy:

- avoiding impact on areas of remnant vegetation and other areas of conservation value including the habitat of listed species
- mitigating impacts through rehabilitation and restoration including, where relevant, a discussion of any relevant previous experience or trials of the proposed rehabilitation
- replacing or offsetting the loss of conservation values, where impacts cannot be avoided or mitigated.

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 an endangered ecological community, include reasons for the preferred alignment and the viability of alternatives.

Describe strategies for protecting Ramsar wetlands and discuss any obligations imposed by state or Commonwealth legislation or policies, or international treaty obligations (that is, China–Australia Migratory Bird Agreement (CAMBA), Japan–Australia Migratory Bird Agreement (JAMBA), Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA)).

Provide details about the approvals that will be required under the NC Act and the VM Act for development made assessable under SPA. The 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:

- State Policy for Vegetation Management (Department of Environment and Resource Management 2009b)
- Policy for Vegetation Management Offsets (Department of Environment and Resource Management 2011a)
- Queensland Biodiversity Offset Policy (Department of Environment and Resource Management 2011b)
- Marine fish habitat offset policy (FHMOP 005.2) (Department of Agriculture, Fisheries and Forestry 2012).

Describe any departure from ‘no net loss’ of ecological values.

5.4.2. Terrestrial fauna

Description of environmental values

Describe any 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 study area should include:

- species diversity (that is, a species list) and abundance of animals of recognised significance
- any species that are poorly known but suspected of being rare or 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 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)
- 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 Wildlife Online database.

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

Fauna survey methodology should be in accordance with the Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland (Department Science, Information Technology, Innovation and the Arts, 2012). (Refer to **www.ehp.qld.gov.au/ecosystems/biodiversity/fauna-survey.html**)

Potential impacts and mitigation measures

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

- impact and contribution by the project, to the entry, spread and establishment of pests (terrestrial and marine) not present in the project area
- 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
- cumulative effects of direct and indirect impacts
- 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
- measures to stop the spread, encroachment or establishment of pests within the project area

- 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
- measures to rehabilitate disturbed areas, which incorporate provision of nest hollows and ground litter, where appropriate.

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

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.

5.4.3. Aquatic

Description of environmental values

Describe the aquatic flora and fauna present, or likely to be present, in the areas affected by the project. Include:

- fish species, mammals, reptiles, amphibians, cetaceans, 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 aquatic and marine species
- exotic and pest marine organisms
- 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, exotic and weed species
- benthic substrate
- habitat downstream of the project or potentially impacted due to currents in associated lacustrine and marine environments
- 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
- location, distribution and species variations of seagrass and coral communities within and adjacent to the project footprint
- any other state significant biodiversity values identified in the Queensland Biodiversity Offset Policy (version 1) (Department of Environment and Resource Management 2011b) that are not described elsewhere.

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

Description of environmental values

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 (for example, 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 1994 (other than common species) to the Queensland Herbarium for identification and entry into the HERBRECS database.

Fish habitat

Describe the nature and extent of fish habitat 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 dredging site and marine infrastructure for transportation of fill.

Marine megafauna

Describe the turtle species that may use beaches near the proposed development area.

Undertake a desktop review of information on the turtle communities of the study area, particularly the green, hawksbill, loggerhead, olive ridley and flatback turtles, paying specific attention to any anecdotal or recorded information on turtle populations frequenting the port area and any known nesting sites.

Refer to studies of the turtle populations and consult the Department of National Parks, Recreation, Sport and Racing on historical data for the area, particularly on previously conducted nesting surveys.

Use this information to develop recommendations on the most appropriate management measures to be adopted to minimise the risk of turtle injury or death. Particular reference should be given to protecting turtles from boat strike.

Describe cetacean species that may be found in or near the proposed development area and propose a program for monitoring the health of cetacean populations, including impacts on the populations due to port expansion activities. Propose mitigation measures to decrease the impact on cetaceans species from the project and other developments within the Port of Gladstone and surrounding region. Impacts include altered habitat conditions, increased dredging and ship traffic, boat strike, water quality impacts and decreased food availability.

Benthic macro invertebrates

Describe the 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.

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 species and ecosystems and describe proposed mitigation actions, including:

- potential impacts to marine ecosystems or communities, species and/or suites of species resulting from water quality changes and disturbance from dredging works and disposal of dredge spoil. This should include modelling of the potential impacts of sediment plumes (for example, increased turbidity, and/or sedimentation) on seagrass and coral communities, other benthic communities. The assessment should include a toxicological assessment based on analysis of the material to be dredged and estimates of potential changes to background water quality resulting from the project
- potential impact of underwater noise from the project on fish and marine megafauna (for example turtle, dugong, cetaceans) in combination with other underwater noise from shipping movements and construction activities (including dredging)
- 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
- 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
- proposed stream diversions, causeway construction and crossing facilities, stockpiled material and other impediments that would restrict free movement of aquatic fauna
- 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
- 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 or indirect impact from project activities, and in appropriately located unaffected reference sites
- measures to be implemented to avoid turtle injury or death through dredge design and operational procedures, and to minimise vessel and propeller strike impacts during construction, commissioning and operation of the project
- potential impacts from climate change and the project's potential to increase the susceptibility of aquatic ecological communities and species, for example, coral bleaching
- Measures to avoid exotic and pest marine organisms being introduced as a result of the project.

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

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 references 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 EMP for the project.

5.5. Water resources

5.5.1. Description of environmental values

Provide an overview of the quality and quantity of water resources in the vicinity of the project area and relevance to the project.

5.5.2. Potential impacts and mitigation measures

Assess the project's potential impacts on water resource environmental values identified in the previous section. 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
- where disposal of dredge spoil to land is being considered, the use of the ANZECC methodology is required to derive water quality trigger values and investigate surface and groundwater quality of the receiving environment that are likely to receive discharge, runoff or seepage waters from any dredge spoil storage/treatment or disposal area
- 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 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
- details of a monitoring program for the groundwater resources, using existing deep bores, to establish the base line yield and water quality of the supply from those bores.

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.

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 Environmental Protection (Air) Policy 2008 (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 the modelling of 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 (including source, nature and levels of emissions)
- 'worst case' emissions that may occur during operation. 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 will be adequate
- 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
- 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
- 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 project activities of all hazardous or toxic pollutants
- impacts on terrestrial flora and fauna.

Detail the best practice 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, discuss the emission with reference to its risk to human health, including appropriate health-based guidelines/standards.

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 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 the project in the context of the environmental values defined by the Environmental Protection (Noise) Policy 2008 (EPP (Noise)). Refer to the following documents:

- *Noise Measurement Manual* (Environment Protection Agency 2000)
- *Guideline: Planning for Noise Control* (Environmental Protection Agency 2004)

Identify sensitive noise receptors adjacent to all project components (in both air and underwater) and estimate typical background noise and vibration levels based on surveys at representative sites. Discuss the potential sensitivity of such receptors and the sensitivity of marine fauna and nominate performance indicators and standards. Baseline studies are to also include the marine environment.

5.8.2. Potential impacts and mitigation measures

Describe the impacts of noise and vibration both in air and under water 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 (for example, residences, social and public infrastructure, such as health, recreational and educational

facilities, roads) compared with the performance indicators and standards nominated above in Section 5.8.1

- impact on terrestrial, avian 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 air sensitive receptors that are otherwise unable to achieve a satisfactory internal noise level for the preservation of health and wellbeing as identified within the EPP (Noise).

Provide details of any night-time surface work that may be undertaken. Specifically include:

- the reasons why night-time work may be undertaken (for example, to avoid peak traffic periods, or to undertake work in a rail corridor)
- the likely duration of work (if known)
- the proposed hours of the work
- the nature of the work to be undertaken
- the likely impact on residents and the associated mitigation measures to be undertaken by the proponent
- the 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.

5.9.2. Waste management

Detail the proposed management of solid and liquid waste. Assess the potential impact of all waste generated during construction and operation, with regard for best practice waste management strategies, the Environmental Protection (Waste Management) Policy 2000 and the Environmental Protection (Waste Management) Regulation 2000 (Qld).

5.10. Transport

If a terrestrial location is required for a land based spoil ground/dredge material placement area, provide a detailed traffic impact assessment report for all modes of transport. The EIS should clearly identify and assess all impacts associated with a land based dredge material placement area for all modes of transport and identify effective mitigation strategies for these impacts.

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.

5.10.2. Transport activities and 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, vehicle types, payloads)
- estimates of the number of discrete trips required for reach task
- origins of inputs and destinations of outputs (including wastes)
- cross reference to the relevant section in the EIS where the task is fully described and/or assessed.

For each mode of transport and each phase of the project, provide traffic generation information on:

- existing background traffic including volumes, composition, peak traffic and peak times along the transport routes to and from the project
- background traffic growth for the transport routes for all stages of the project life
- the construction of any project-related plant and utilities within or impacting on the jurisdiction of any transport authority
- the stages, timing and duration of each stage/phase and how these impact on the transport-related infrastructure
- comparison of the traffic situation and road conditions with and without the project
- expected volumes of project inputs and outputs of transported raw materials, plant, construction materials and operational equipment, waste, hazardous goods and finished products for all phases of the project
- how identified project inputs and outputs will be moved through the local and regional transport network (including number and type of vehicles, mode, volume, composition, trip timing and routes)

- traffic generated by workforce personnel including visitors (volume, composition, timing and routes)
- likely heavy, oversize and indivisible loads (volume, composition, timing and routes) highlighting any vulnerable bridges and structures along proposed routes.

Describe:

- access locations (existing and proposed) to state-controlled roads
- locations of proposed road-crossing points of existing and proposed rail infrastructure associated with the project.

5.10.3. Potential impacts and mitigation measures

Impact assessment reports should include details of the adopted assessment methodology (for impacts on roads: the road impact assessment report in accordance with the *Guidelines for Assessment of Road Impacts of Development*) (Department of Main Roads 2006). Assessment of traffic impacts is to include the transport arrangements for permanent and temporary workforce associated with all phases of the project.

Assess project impacts on:

- local and state-controlled road networks, including key road and road/rail intersections, at project construction, operation and decommissioning stages. Any impact to level crossings should be assessed using the Australian Level Crossing Assessment Model (ALCAM)
- capacity, safety, local amenity, efficiency and condition of transport operations, services and assets from either transport or project operations, including an assessment of pavement life of the road network as a result of the project. Refer, where relevant, to the *Queensland Road Safety Action Plan 2010–2011* (Department of Transport and Main Roads 2010)
- possible interruptions to transport operations
- the natural environment within the jurisdiction of an affected transport authority (for example, road and rail corridors)
- the nature and likelihood of product-spill to both land and marine environments during transport, if relevant
- 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
- transport and handling of hazardous substances and dangerous goods
- the cumulative impact of this project adding to the impact of other known proposed or current major projects impacting on the road network.

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 and Government entities (including local government and Queensland Police Service), consider those authorities' works program and forward planning, and be in accordance with the relevant transport authorities' methodologies and design manuals and the identification of impacts and the mitigation strategies to be implemented regarding both road and marine transport.

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

Shipping management planning

Develop management plans in accordance with the *Maritime Safety Queensland Guidelines for Major Development Proposals* (Department of Transport and Main Roads 2010).

Consult the Regional Harbour Master on maritime issues including:

- any potential conflict with existing shipping while dredging where channels meet
- aids to navigation required for new channels
- replacement of any navigation aids shifted for dredging.

The results of this consultation should be detailed in the EIS.

In regard to increased shipping volumes, address the following:

- potential for introduction of exotic organisms from increased shipping rates
- ballast water management arrangements—including Australian Quarantine and Inspection Service mandatory arrangements and agency contingency planning
- management of ship waste, in particular quarantine waste, domestic garbage, oil and sewage
- monitoring, prevention and mitigation approaches for invasive marine pests
- risk of spills and their management
- potential foreshore damage caused by tanker and tug activities
- potential for increased vessel strike to marine species
- potential impacts on existing shipping activity
- routes of ships in transit through port waters and the aligned infrastructure such as navigational aids

- impact on ship scheduling
- additional requirements for pilots.

Additional marine transport issues that should be considered include the potential of the proposal to impact on recreational craft.

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.

Explain the significance of artefacts, items or places of Indigenous cultural heritage value likely to be affected by the project at a local, regional, state and national level.

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 Department of Natural Resources and Mines 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

To the greatest extent practicable, significant cultural heritage areas should be avoided by the project.

Provide an assessment of likely effects on sites of Indigenous cultural heritage values.

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.

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

Native title agreement or cultural heritage management plan

During the EIS process, the proponent should initiate a native title agreement (NT agreement), as defined under the ACH Act, which 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 that 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 protecting and managing 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.

Describe the significance of artefacts, items or places of conservation or non-Indigenous cultural heritage value, including historic shipwrecks (e.g. SS Glanworth) likely to be affected by the project and their values at a local, regional, state and national level.

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 (for example, 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.

5.12.2. Potential impacts and mitigation measures

Provide an assessment of any likely effects on sites of non-Indigenous cultural heritage values, including historic shipwrecks. It is recommended that a thorough survey is undertaken (e.g. a remote sensing survey using multi-beam or side scanning sonar with magnetometer) of the impacted areas and that a suitably qualified and experienced maritime archaeologist is engaged to interpret the resultant data to identify any potential shipwrecks for further investigation and management.

Provide strategies to mitigate and manage any negative impacts on non-Indigenous cultural heritage values and enhance any positive impacts.

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

6. Social values and management of impacts

6.1. Description of existing social values

6.1.1. Social and cultural area

Conduct a social impact assessment and 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
- 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 undertake a

community engagement strategy to 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.

Detail 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, where relevant, 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 an assessment of the impact of the dredging proposal on recreational and commercial fishing activities and the traditional owner values related to traditional fishing and hunting.

Workforce profile

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

Workforce demand

The estimated composition of workforce by occupation, project stage and duration (including any planned construction prior to final investment decision) using the template provided at **www.skills.qld.gov.au/significantprojects.aspx**

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 people, 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 fact sheet on Skills Queensland's website (**www.skills.qld.gov.au/significantprojects.aspx**) provides essential information, contact and program details to develop the workforce management plan.

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. Furthermore:

- 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 during the construction and operational phases, with regard to the source of the workforce. Present this information according to occupational workforce groupings. Detail whether the proponent and/or contractors are likely to employ locally or through other means and whether there are initiatives for local employment business opportunities and how these workforce strategies relate and align to state and Commonwealth resource workforce planning, skill development and training strategies and policies
  - proposed new skills and training related to the project including the occupational skill groups required
  - impacts of construction and operational workforces. Discuss the capability of existing housing and rental accommodation to meet any additional demands created by the project, including direct impacts on Indigenous people.

6.2.1. Cumulative 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. Cumulative impacts, in this context, are defined as the additional impacts on population, workforce, accommodation, housing, 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 in the same timeframe as its construction period.

6.3. Impact mitigation measures and management strategies

For identified social impacts, social impact mitigation strategies and measures should be presented to address the recruitment and training of the construction and operational workforces and the social and cultural implications this may have for the host community, including if any part of the workforce is sourced from outside the social and cultural area.

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

7. Economies and management of impacts

7.1. 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 (particularly industries that are materially impacted - i.e. seafood / commercial fishing)
- 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
  - education and training markets
  - 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 (for example, wage rates, building costs, housing rent)
- land values in the region by type of use.

7.2. 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 cumulatively 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.

7.2.1. Strategies for local participation

The assessment of economic impacts should outline strategies to encourage participation by local industry and the local workforce, including:

- strategies for assessing the capacity and cost-effectiveness of sourcing goods and services from the regional economy during the pre-construction, 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 adopting 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)
  - Indigenous employment opportunities—the *Indigenous Employment Policy for Queensland Government: Building and Civil Construction Projects*—the 20 per cent policy (Department of Employment, Economic Development and Innovation 2008a) could be adopted or its implementation measures used as a guide or tool for engaging Indigenous workers
  - development of a Local Industry Participation Plan (LIPP) under the *Local Industry Policy* (Department of Employment, Economic Development and Innovation 2010)—see the *Local Industry Policy Guidelines* (Department of Employment, Economic Development and Innovation 2011a). The LIPP should be developed in consultation with the Office of Advanced Manufacturing (part of the Department of State Development, Infrastructure and Planning) and the Queensland office of the Industry Capability Network (refer to **www.icnqld.org.au**).

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, fire and abnormal events that may occur during all stages of the project, including possible risk of occurrence
- identifying all hazardous substances to be used, stored, processed or produced and the rate of usage. Include a description of the quantities and types of storage and handling systems and their location on a site plan
- Identify the susceptibility of the project from flooding, potential impacts of the project on flooding to adjacent properties and the impact of the project on existing flood characteristics. The EIS should consider the specific outcomes of flood hazard management in 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)
- potential wildlife hazards, natural events (for example, cyclone, storm surge, flooding, bushfire) and implications related to climate change.

Undertake a preliminary risk assessment for all components 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). Where relevant, refer to the *Queensland Coastal Plan Coastal Hazards Guideline* (Department of Environment and Heritage Protection 2012) risk assessment factors. With respect to risk assessment, the EIS must:

- 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
- present 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).

Identify the residual risk following application of mitigation measures. Present an assessment of the overall acceptability of the impacts of the project in light of the residual uncertainties and risk profile.

Describe the mitigation strategies for flood hazard.

8.2. Cumulative risk

The risk analysis is to address the potential impacts that may occur on the normal on-site day-to-day activities during the construction and/or operation of the facilities. Furthermore, determine the level of change that may result on the risk contours of other relevant existing or proposed industrial facilities / activities in the area as a result of the proposed project (where details of such proposed facilities are provided to the proponent by the office of the Coordinator-General or otherwise published). Individual risk criteria should be used to limit risks to individual workers and members of the public. Societal risk criteria should be used to limit risk to the affected population as a whole.

Identify and adopt, where appropriate, any changes to operating or storage procedures that would reduce the possibility of these events occurring, or reduce the severity of the events should they occur. Present draft risk management plans for the construction and operational phases of the project.

8.3. Health and safety

8.3.1. 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.

8.3.2. 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.

Assess 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. Recommend any practical monitoring regimes in this section.

Include relevant consultation with the appropriate regional health service providers..

8.4. 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 (including Queensland Police Service - Gladstone Police District, Queensland Ambulance Service, Queensland Fire and Rescue Service).

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 man made and natural disasters during operation and construction including identification of key stakeholders. Reference should be made to the requirements of the *Disaster Management Act 2003*.

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

- marine collision minimisation
- fire prevention/protection
- leak detection/minimisation
- release of contaminants
- emergency shutdown systems and procedures
- natural disasters.

If the proposed design and operation systems required are outside the scope of relevant standards or codes, a fire study is to be undertaken to ensure adequate levels of protection are in place.

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 fire fighting 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 and the like.
- an outline of any dangerous goods stores associated with the plant operations, including fuel storage and emergency response plans.

Present outlines of emergency planning and response strategies to deal with relevant incidents above, which have been determined in consultation with state and regional emergency service providers and which show integration of emergency services into the plans.

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).

9. Cumulative impacts

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 environmental values. In particular, address cumulative impacts in sensitive environmental areas identified in section 5.4.1 of this TOR (refer to page 29) and in regard to potential economic impacts to existing industry and commercial operations which may be impacted by the project. (Refer also to section 7.)

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) and propose strategies for mitigating identified cumulative impacts. This assessment should include both qualitative and quantitative assessment of identified impacts.

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 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 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 meet the requirements of section 203 of the EP Act, 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.

Element/issue	Aspect of construction or operation to be managed (as it affects environmental values).
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 (for example, 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 in the Coordinator-General's evaluation report as 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/subsection of the TOR with the corresponding section/subsection 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 Subsection 3.7, (page 6).
- 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
- any reports of 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
- a copy of the proponent's land acquisition protocols.

Acronyms and abbreviations

Acronym/abbreviation	Definition
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)
DEHP	Department of Environment and Heritage Protection, Queensland
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
GBRWHA	Great Barrier Reef World Heritage Area
JAMBA	Japan–Australia Migratory Bird Agreement
NC Act	*Nature Conservation Act 1992* (Qld)
NGA	National Greenhouse Accounts
NT agreement	native title agreement
RE	regional ecosystem (for a definition, refer to the Glossary)
REDD	Regional Ecosystem Description Database
ROKAMBA	Republic of Korea–Australia Migratory Bird Agreement
SDPWO Act	*State Development and Public Works Organisation Act 1971* (Qld)
SIA	social impact assessment
SPA	*Sustainable Planning Act 2009* (Qld)
The proponent	Far North Queensland Ports Corporation (trading as Ports North)
TIA	*Transport Infrastructure Act 1994* (Qld)
TOR	terms of reference
TORUM Act	*Transport Operations (Road Use Management) Act 1995* (Qld)
VM Act	*Vegetation Management Act 1999* (Qld)
WSSR Act	*Water Supply (Safety and Reliability) Act 2008* (Qld)

Glossary

Term	Definition
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.
bilateral agreement	The agreement between the Australian and Queensland governments, which accredits the State of Queensland's EIS process. It allows the Commonwealth Environment Minister to rely on specified environmental impact assessment processes of the state of Queensland in assessing actions under the Environment Protection and Biodiversity Conservation Act 1999 (Cwlth).
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.
community	An assemblage of interdependent populations of different species (plants and animals) interacting with one another, and living in a particular area.
controlled action	A proposed action that is likely to have a significant impact on a matter of national environmental significance; the environment of Commonwealth land (even if taken outside Commonwealth land); or the environment anywhere in the world (if the action is undertaken by the Commonwealth). Controlled actions must be approved under the controlling provisions of the EPBC Act.
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.
lacustrine environments	A lake or lake-like environment. Wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or dammed river channel; (2) lacking trees, shrubs, persistent emergent plants, mosses, or lichens with greater than 30% areal coverage; and (3) total area exceeds 8 ha (20 acres).
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.
regrowth	A young, usually even-aged forest stand that has regenerated after disturbance.
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.
riparian zone	Located alongside a watercourse.
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

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, Resource Sciences Centre, Department of Natural Resources, Indooroopilly, viewed 29 November 2012, <http://www.derm.qld.gov.au/land/ass/products.html>.

Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand 2000, *The Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Australian Water Association (Artarmon) and NZ Water and Wastes Association (Auckland), viewed 7 June 2012, <http://www.daff.gov.au/oldmincos/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 7 June 2012, <http://www.environment.gov.au/about/esd/publications/strategy/index.html>.

——2003, *Recovery Plan for Marine Turtles in Australia*, Marine Species Section, Approvals and Wildlife Division, Environment Australia, Canberra, viewed 5 June 2012, <http://www.environment.gov.au/coasts/publications/turtle-reocvery/pubs/marine-turtles.pdf>.

——2009a, *Great Barrier Reef Outlook Report 2009*, Great Barrier Reef Marine Park Authority, Townsville, viewed 20 September 2012, <http://www.gbrmpa.gov.au/outlook-for-the-reef/great-barrier-reef-outlook-report>.

——2009b, *National Assessment Guidelines for Dredging*, Department of Environment, Water, Heritage and the Arts, Canberra, viewed 7 June 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 7 June 2012, <http://www.climatechange.gov.au/~/media/publications/greenhouse-acctg/national-greenhouse-factors-july-2010-pdf.pdf>.

Department of Agriculture, Fisheries and Forestry 2012, Marine fish habitat offset policy (FHMOP 005.2), Fisheries Queensland, Brisbane, viewed 6 September 2012, <http://www.daff.qld.gov.au/documents/Fisheries_Habitats/Marine-Fish-Habitat-Offset-Policy-12.pdf>.

Department of Education, Training and the Arts 2008, *Queensland Skills Plan 2008*, 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 2008a, *Indigenous Employment Policy for Queensland Government: Building and civil construction projects*, Department of Employment, Economic Development and Innovation, Brisbane, viewed 6 September 2012, <http://www.employment.qld.gov.au/pdf/eii/iep-policy-building-&-civil-construction-projects.pdf>.

——2010, *Local Industry Policy*, Department of Employment, Economic Development and Innovation, Brisbane, viewed 17 July 2012, <http://www.industry.qld.gov.au/documents/AdvancedManufacturing/local-industry-policy.pdf>.

——2011a, *Local Industry Policy Guidelines*, Department of Employment, Economic Development and Innovation, Brisbane, viewed 6 September 2012, <http://www.industry.qld.gov.au/documents/AdvancedManufacturing/LIP-guidelines.pdf>.

Department of Environment and Resource Management 2009a, *Queensland Water Quality Guidelines, Version 3*, Department of Environment and Resource Management, Brisbane, viewed 17 July 2012, <http://www.ehp.qld.gov.au/water/guidelines/queensland_water_quality_guidelines_2009.html>.

——2009b, State Policy for Vegetation Management, version 2, Department of Environment and Resource Management, Brisbane, viewed 17 July 2012, <http://www.derm.qld.gov.au/vegetation/pdf/state_policy_nov_2009.pdf>.

——2011a, Policy for Vegetation Management Offsets, version 3, Department of Environment and Resource Management, Brisbane, viewed 6 September 2012, <http://www.ehp.qld.gov.au/management/environmental-offsets/pdf/policy-for-vegetation-management-offsets.pdf>.

——2011b, Queensland Biodiversity Offset Policy (version 1), Department of Environment and Resource Management, Brisbane, viewed 6 September 2012, <http://www.ehp.qld.gov.au/management/environmental-offsets/pdf/biodiversity-offset-policy.pdf>.

——2011c, State Policy for Coastal Management, Department of Environment and Resource Management, Brisbane, viewed 6 September 2012, <http://www.ehp.qld.gov.au/coastalplan/pdf/qcp-web-coastal-management.pdf>.

——2012a, *Queensland Coastal Plan*, Department of Environment and Resource Management, Brisbane, viewed 6 September 2012, <http://www.ehp.qld.gov.au/coastalplan/pdf/qcp-web.pdf>.

——2012b, State Planning Policy 1/12: Protection of Queensland's Strategic Cropping Land, Department of Environment and Resource Management, Brisbane, viewed 6 September 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 6 September 2012, <http://www.dsdip.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 6 September 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 7 June 2012, <http://www.tmr.qld.gov.au/~/media/ace67ef2-b6c3-46a3-91a7-39f790c309fe/garid_guidelines_200406.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, Department of Natural Resources and Mines and Department of Local Government and Planning, Brisbane, viewed 6 September 2012, <http://www.dsdip.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 6 September 2012, <http://www.dsdip.qld.gov.au/resources/policy/spp-guidelines-oct-02-v2.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 State Development, Infrastructure and Planning, Draft Coastal Protection State Planning Regulatory Provision 2012, Department of State Development, Infrastructure and Planning, Brisbane, viewed 12 October 2012, <http://www.dsdip.qld.gov.au/resources/laws/state-planning-regulatory-provision/draft-coastal-protection-sprp.pdf>.

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, *Queensland Road Safety Action Plan 2010–2011*, Department of Transport and Main Roads, Brisbane, viewed 7 June 2012, <http://www.tmr.qld.gov.au/~/media/61ac4911-1036-410f-a048-6b13a16a4f66/pdf_road_safety_action_plan_2010_2011_web.pdf>

——2011, *Queensland Coastal Contingency Action Plan 2011*, Maritime Safety Queensland, Brisbane, viewed 20 September 2012, <http://www.msq.qld.gov.au/Environment/Contingency-plans.aspx>.

Environmental Protection Agency 2000, *Noise Measurement Manual*, 3rd edn, Department of Environment and Resource Management, Brisbane, viewed 17 July 2012, <http://www.derm.qld.gov.au/register/p00367aa.pdf>.

——2004, *Guideline: Planning for Noise Control*, Environmental Protection Agency, Brisbane, viewed 6 September 2012, <http://www.ehp.qld.gov.au/register/p01369aa.pdf>.

——2008a, *Guideline: EPA Best Practice Urban Stormwater Management – Erosion and Sediment Control*, Environmental Protection Agency, Brisbane, viewed 17 July 2012, <http://www.derm.qld.gov.au/register/p02301aa.pdf>.

——2008b, Queensland Government Environmental Offsets Policy, Environmental Protection Agency, Brisbane, viewed 6 September 2012, <http://www.ehp.qld.gov.au/register/p02501aa.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>.

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

International Maritime Organization 2003, *International Ship and Port Facility Security Code*, International Maritime Organization, London.

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.

Skills Queensland 2008, *Government Building and Construction Contracts Structured Training Policy*, Skills Queensland, Brisbane, viewed 7 June 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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