The **Coordinator-General**

Wongai project

Terms of reference for an environmental impact statement

July 2012

Queensland Government

Contents

Introduction

Aust-Pac Capital Pty Ltd (acting trustee for the Wongai Project Trust) on behalf of the Kalpowar Traditional Owners, proposes to develop the Wongai Project, which has been declared a 'significant project' by the Coordinator-General. The project components to be assessed include:

- a bord and pillar underground mine
- mine support infrastructure including support facilities and a coal handling and preparation plant
- a 150-person accommodation camp, on-site power generation, a potable water treatment plant and a sewage treatment plant
- an improved 'all weather' road from the south-west, an upgrade of the existing airstrip and a barge supply access terminal to the project
- an elevated covered conveyor transport system from the mine site to the barge coal loading terminal
- barging and transhipping operations.

These terms of reference (TOR) set out the matters to be addressed in an environmental impact statement (EIS) for the project. The document is divided into two parts:

(a) About the project

(b) Contents of the EIS.

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

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

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

Part A. About the project

1. Project summary

The Wongai Project (the project) is a proposed underground coking coal mine, located on the east coast of Cape York Peninsula approximately 150 kilometres (km) north-west of Cooktown. The site is located at Bathurst Bay and is adjacent to the Lakefield and Cape Melville National Parks and a fish habitat area. The property contains cultural heritage sites and a nature reserve.

The project has been proposed by Aust-Pac Capital Pty Ltd on behalf of the Kalpowar Traditional Owners. The project is expected to export 1.5 million tonnes per annum (Mtpa) of coking coal and, at this rate of extraction, has an anticipated mine life of 30 years.

The project involves developing an underground metallurgical coal mining operation, including:

- a bord and pillar underground mine at depths of up to 250 metres (m)
- mine support infrastructure including support facilities and a coal handling and preparation plant
- a 150-person accommodation camp, on-site power generation, a potable water treatment plant and a sewage treatment plant
- an improved 'all weather' road from the south-west, an upgrade of the existing airstrip and barge supply access terminal to the project (no dredging is proposed)
- an elevated covered conveyor transport system (approximately 20 km long) from the mine site to the barge coal loading terminal
- stockpiling of processed coal (no washing of coal is intended).

During operation, it is proposed that coal would be transported from the underground mine via a covered conveyor to a small scale terminal with a barge loading facility. The shallow draught covered barge or barges (of approximately 5000 tonnes) would then transfer coal to ships via a transhipper. It is expected that only one or two coal ships would be loaded per month.

The project site is located on EPC2334 within the Cook Shire Local Government Area. The site is located adjacent to the Great Barrier Reef World Heritage Area (GBRWHA) and is within the boundaries of the Great Barrier Reef Marine Park (GBRMP).

The site is freehold and owned by the Kalpowar Aboriginal Land Trust, which was established under the *Aboriginal Land Act 1991* (Qld).

The project forecasts a construction workforce of 250 people, an operational workforce of 200 people and approximately 600 regional jobs from flow-on economic development. The project estimates capital investment of $500 million.

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

2. Project proponent

The Wongai Project was initiated by the Kalpowar traditional owners, seeking technical and financial assistance of Aust-Pac Capital Pty Ltd (the proponent) for the development of an underground coking coal mine and export facility.

The contact details for the proponent are:

Aust-Pac Capital Pty Ltd ATF Wongai Unit Trust

ABN 56 191 212 511

Peter R Swain, Company Secretary

PO Box 427, Cranebrook, NSW 2749

phone (02) 4776 2185
fax (02) 4776 2196

3. Legislative framework

On 16 April 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 initiates 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 Australian Government Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) for a determination as to whether the project constituted a 'controlled action' under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), due to the likely potential impacts on matters of national environmental significance (MNES).

On 22 September 2011, the Commonwealth Environment Minister determined that the project is a 'controlled action' under the EPBC Act, due to the likely potential impacts on MNES. The controlling provisions under the EPBC Act are:

- World Heritage properties (sections 12 and 15A)
- National Heritage places (sections 15B and 15C)
- listed threatened species and communities (sections 18 and 18A)
- listed migratory species (sections 20 and 20A)
- Commonwealth marine areas (sections 23 and 24A)
- Great Barrier Reef Marine Park (sections 24B and 24C).

Therefore, the project requires assessment and approval under the EPBC Act. The Australian Government is conducting a separate, but parallel, assessment process under the EPBC Act.

On 19 December 2011, the Australian Government finalised the guidelines for the content of the EIS, which were jointly developed by SEWPaC and the Great Barrier Reef Marine Park Authority (GBRMPA). As these guidelines address MNES requirements, they are not detailed in this TOR.

The Coordinator-General has invited relevant Australian, state and local government representatives, and other relevant authorities, to participate in the process as advisory agencies.

3.1. Coordinator-General's report

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

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

4. Contact details

For further inquiries about the Queensland EIS process for this project, please contact:

EIS Project Manager—Wongai project
Significant Projects Coordination
Office of the Coordinator-General
PO Box 15517
City East Qld 4002
tel + 61 7 3224 8854
fax + 61 7 3225 8282
email wongai@coordinatorgeneral.qld.gov.au
web www.projects.industry.qld.gov.au

Part B. Contents of the EIS

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

1. Executive summary

The executive summary should convey the most important aspects and options relating to the project to the reader in a concise and readable form. It should use plain English, avoid using 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 interested parties 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 previous projects undertaken by the proponent, if applicable, and the commitment of the proponent 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 and cultural heritage impacts predicted and the proposed environmental and cultural heritage management strategies and commitments to minimise the significance of these impacts
- a discussion of the cumulative impacts in relation to social, economic, cultural heritage 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, and environmental record, including 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 descriptions of the project in Part B, Section 4 (refer to page 15).

3.3. Project rationale

Describe the specific objectives and justification for the project, including its strategic, economic, environmental, cultural heritage 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 relevant 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.

Provide comment on other current coal exploration permits and exploration activities within the Laura Basin and potential implications.

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. Detail the criteria used to determine the alternatives and provide sufficient detail to enable the reader to understand why certain options or courses of action are preferred and why others are rejected (including the 'no action' option). Discuss the interdependencies of the 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 have been considered and incorporated during the scoping of the project.

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 the 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 should then be outlined and used to explain how the EIS will meet its objectives. The purpose of the EIS is to:

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

3.6.3. Submissions

Inform the reader how to properly make submissions and what form the submissions should take. In consultation with Office of the Coordinator-General staff, 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. Also indicate any implications for submissions in the event of any appeal processes.

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
- production of regular summary information and updates (i.e. newsletters)
- other consultation 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 *Preparing an environmental impact statement: Guideline for proponents* (section 3.2, Audience).

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
- the communication methods that will be used to target the stakeholder/community representatives
- 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

The EIS must include, as an appendix, a public consultation report detailing how the public consultation plan was implemented, and the results. Specifically, it must include:

- a list of stakeholders identified, including the Australian government, Queensland and local government agencies, and other affected parties
- 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

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

3.8.1. Relevant legislation and approvals

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

Australian Government legislation

Relevant legislation may include, but is not limited to:

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

Australian Government obligations

Identify and outline relevant obligations such as:

- protection of World Heritage values
- migratory animals (China–Australia Migratory Bird Agreement (CAMBA), Japan–Australia Migratory Bird Agreement (JAMBA), Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA) and Bonn Convention)
- biodiversity
- climate
- wetlands of international importance (Ramsar)
- sea dumping (London Protocol).

Australian Government approvals

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

- approval of the proposed action for each of the applicable controlling provisions under sections 131(1) and 133 of the EPBC Act

Queensland legislation

Where relevant, refer to applicable Queensland legislation, which may include but is not limited to:

- *Aboriginal Cultural Heritage Act 2003* (ACH Act)
- *Building Act 1975*
- *Coastal Protection and Management Act 1995* (Coastal Act)
- *Dangerous Goods Safety Management Act 2001*
- EP Act
- *Fisheries Act 1994*
- *Forestry Act 1959*
- *Greenhouse Gas Storage Act 2009*
- *Land Act 1994*
- *Land Protection (Pest and Stock Route Management) Act 2002*
- *Marine Parks Act 2004*
- *Maritime Safety Queensland Act 2002*
- *Mineral Resources Act 1989*
- *Native Title (Queensland) Act 1993*
- *Nature Conservation Act 1992* (NC Act)
- *Pest Management Act 2001*
- *Public Health Act 2005* and Regulation
- *Queensland Heritage Act 1992*
- SDPWO Act
- *Sustainable Planning Act 2009* (SPA)
- *Transport Infrastructure Act 1994* (TI Act)
- *Transport Operations (Marine Pollution) Act 1995*
- *Transport Operations (Marine Safety) Act 1994*
- *Vegetation Management Act 1999* (VM Act)
- *Waste Reduction and Recycling Act 2011*
- *Water Act 2000.*

Queensland approvals

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

- development approval for material change of use (MCU)—undefined use (barge loading terminal, suspended conveyor and ancillary activities)—Cook Shire Planning Scheme
- development approval for MCU of a premises for an environmentally relevant activity (ERA)—EP Act:
  - ERA 8: chemical storage
  - ERA 14: electricity generation

  - ERA 16: extractive and screening activities
  - ERA 43: concrete batching
  - ERA 50: bulk materials handling
  - ERA 56: regulated waste storage
  - ERA 63: sewage treatment.
- development approval for tidal works—Coastal Act
- development approval for operational work within a coastal management district, that is:
  - development permit for tidal works—Coastal Act
- development approval for operational work that is the removal, destruction or damage of a marine plant—Fisheries Act
- potential works in declared fish habitat area in Princess Charlotte Bay—Fisheries Act
- development approval for vegetation clearing—VM Act
- licence or permit for clearing of native plants or interference with the breeding place of a native animal—NC Act
- water licence—Water Act
- interference or take of underground water - Water Resource (Great Artesian Basin) Plan 2006; Great Artesian Basin Resource Operations Plan (February 2007); Water Regulation 2002
- any prospective extension of the mining tenure or exploration permit areas should be considered in accordance with the Minerals Resources Act
- resource entitlements
- environmental authority.

The following approvals would be required if development is located outside the mining lease area:

- resource entitlement would be required for development applications involving State resources
- development approval required for operational works, prescribed tidal works for the barge loading facility, supply barge facility, jetty structure
- development approval required for operational works, tidal works for the transhippers if located in Queensland waters
- development approval required for operational works, tidal works for any permanent moorings for example involving a pile driven into the sea bed.

The other potential development triggers under SPA may be:

- development approval for removing or interfering with coastal dunes on land other than State coastal land that is in the erosion prone area above the high water mark
- interfering with quarry material on state coastal land above the high water mark
- development approval for reclaiming land under tidal water.

Please provide a table listing the approvals required for each component of the project and identify the relevant approval agency, jurisdiction and legislation for the approvals required.

3.8.2. Relevant plans and policies

Outline the project's consistency with the existing national, state, regional and local planning framework that applies to the project location. Refer to all relevant statutory and non-statutory plans, policies, guidelines, strategies and agreements. These may include but are not limited to the:

- Planning Scheme for Cook Shire, administered under SPA
- environmental protection policies (EPPs, subordinate to the EP Act), including:
  - EPP (Noise) 2008
  - EPP (Air) 2008
  - EPP (Water) 2009
  - EPP (Waste Management) 2000
- state planning policies and their supporting guidelines, including:
  - State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils
  - 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 2003a)
  - State Planning Policy 4/11: Protecting Wetlands of High Ecological Significance in Great Barrier Reef Catchments
  - Temporary SPP 2/11: Planning for stronger, more resilient floodplains
  - *Queensland Coastal Plan* (Department of Environment and Resource Management 2012a) and Coastal Hazards Guideline
  - State Planning Policy 3/11: Coastal Protection
  - Queensland Government's Environmental Offset Policy (Environmental Protection Agency, 2008)
  - Queensland Biodiversity Offset Policy (Department of Environment and Resource Management, 2011)
  - Policy for Vegetation Management Offsets (Department of Environment and Resource Management, 2009)
- fish habitat management operational policies (FHMOPs subordinate to the Fisheries Act), including:
  - FHMOP 001: Management and protection of marine plants and other tidal fish habitats
  - FHMOP 002: Management of declared fish habitat areas
  - FHMOP 004: Dredging, extraction and spoil disposal activities
  - FHMOP 005.2: Marine Fish Habitat Offset Policy
  - Princess Charlotte Bay Fish Habitat Area Plan (FHA-043)
- Queensland Skills Plan

- Queensland Local Industry Policy (LIP)
- Sustainable Resource Communities Policy
- Cape York Regional Vegetation Management Code.

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

Describe each of the ERAs 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 Part B, Section 5, 'Environmental values and management of impacts'; and details of the impact on land, water, air, noise and any other relevant environmental values identified.

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. Project overview

Provide an overview of the project to put it into context. Describe and explain:

- a rationale explaining how the preferred operating scenario was selected, 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.

4.2. Location

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

- location of the project
- boundaries and areas of current or proposed land tenures that the project area is or will be subject to, and details of the ownership of that land
- the location of all project components in relation to protected areas including Nature Refuges
- location, boundaries and area of the project footprint, including easement widths and access requirements
- the location of all key components including conveyor, barge loading facility, maintenance tracks, stockpiles, areas of fill, watercourses, plant locations, water storages, power and water supply lines, buildings, site offices and workforce accommodation, roads, bridges and car parks etc
- location and area of any proposed buffers surrounding the project (for construction and operation)
- location of infrastructure relevant to the project, including but not limited to, the state-controlled road network, local roads and marine infrastructure (such as cyclone moorings, navigational aids and ship-sourced pollution management facilities/ infrastructure)
- location of natural features such as waterways (e.g. rivers, streams, creeks, wetlands and other water bodies), shorelines, significant vegetation and navigation channels
- location, dimensions, footprint area and volume of any optional offshore and onshore dredge spoil disposal sites
- views to and from the site especially from the marine area.

Confirm details of all project components including:

- the location, boundaries and area of the project footprint should be defined by GPS coordinates
- location of key components to include the transhipment points 1, 2, 3 using GPS coordinates & GDA. Also confirm if they are located in Queensland tidal waters or Commonwealth waters.
- if the supply barge facility as identified in Figure 3.2 (of Initial Advice Statement documentation) is also considered a key component of the project. Provide details of its location.
- location of the coast camp as identified in Figure 3.2 (of Initial Advice Statement documentation). Provide details of its location.
- if the barge loading facility or supply barge facility requires reclamation of tidal land. If reclamation works are required the following information should be addressed in the TOR in relevant sections.

4.3. Construction

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 where appropriate.

4.3.1. Pre-construction activities

Describe all pre-construction activities, including:

- approvals required for this stage
- land acquisitions and land tenures required (e.g. leases, permits-to-occupy, easements etc.)
- nature, extent and timing for vegetation clearing including coastal land (e.g. hind-dune, dunes and beach)
- access to all construction sites including marine access
- the location of roads and track work
- earthworks
- interference with watercourses, lakes and dams, floodplain and intertidal areas, including wetlands
- site establishment requirements for construction facilities, including access restriction measures and expected size, source and control of the construction workforce accommodation, services (water, sewerage, telecommunications, energy, recreation) and safety requirements
- temporary works. This includes (but not limited to) the temporary jetty needed to assist in the construction of the barge facility or supply barge facility
- upgrade, relocation, realignment, deviation of or restricted access to roads and other infrastructure
- equipment to be used.

4.3.2. 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 operation
- major work programs for the construction phase, including an outline of construction methodologies
- construction inputs, handling and storage, including an outline of potential locations for sourcing 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.

4.3.3. Structures

Describe the location and extent of all proposed terrestrial and marine structures, including:

- locations and dimensions of buildings and marine infrastructure associated with the barge loading facility
- the likely interface of the barge loading facility development with the conveyor and stockpile infrastructure
- the likely construction methodologies
- earthworks, including fill that may need to be imported to the project site
- pollution control methods that will be used to prevent pollution entering marine areas during the construction
- modifications that may be needed to accommodate climate change and sea level rise
- details for equipment hardstand and maintenance areas, including the location and size of these areas and how impacts will be managed (e.g. bunding, visual screening, dust control, surface and ground water management).

4.4. Associated infrastructure

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

4.4.1. Road transport

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

- any proposed new roads to provide access to or within project sites
- existing traffic levels, vehicle types and numbers, and trip lengths for roads surrounding the access points to the project sites
- construction traffic, including vehicle types, oversize loads and number of vehicles
- operational traffic, including vehicle types and numbers
- anticipated times and seasons at which movements may occur
- proposed transport routes and loads (including any waterway crossings)
- trip generation information (including origin data)
- the need for increased road and intersection maintenance and upgrading, including any waterway crossings
- methods of communicating these issues to the public.

More detailed information regarding transport infrastructure will be required in accordance with Part B, Section 5.10 of these TOR. The EIS should include cross-references between the sections as appropriate.

4.4.2. Marine operations

Provide details of the establishment of a port authority and designation of a port at Bathurst Bay under the TI Act.

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

- port boundaries
- jetty and wharf alignment
- barge loading equipment
- berths for other non-bulk carrier vessels
- ship numbers, size, frequency, speed and route through the designated shipping channel in the GBRMP
- offshore transhipment locations
- location of navigational aids
- location and design of cyclone moorings
- any other associated facilities
- ship-sourced pollution management facilities/infrastructure (e.g. sewage pump-out facilities, garbage disposal bins, waste oil collection facilities).

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

- a general description of the operations
- the capacity of stockpiling, in-loading and out-loading operations for the project
- the expected increased shipping frequency, piloting requirements (within port precincts and en route) and route through the GBRMP
- number of additional tugs, location of tug berths and tug operations
- hours of operation
- expected access, navigational and anchorage arrangements
- maintenance dredging operations
- environmental management measures incorporated in the operation of the facility
- options for the location of the terminal to achieve the best environmental outcome.

4.4.3. Energy

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

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

Briefly describe energy conservation measures in the context of any Commonwealth, state and local government policies.

4.4.4. Water supply and storage

Provide information on the project's proposed water usage, including:

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

Develop a groundwater strategy, including:

- description of the mine dewatering plan and how this strategy will be implemented to reduce groundwater take and impacts on nearby groundwater users and environmental assets
- the component of mine water requirement to be taken from groundwater
- whether all the water taken from groundwater is expected to be dewatering water. If additional groundwater is required then details of volumes and target aquifers should be provided
- the impact of dewatering and any other groundwater take on marine discharge of groundwater and dependent ecology, during mine operations and post mining
- dewatering and groundwater take impacts on seawater intrusion post during mine life and after mine closure
- detail the sources of unwanted groundwater and the quantity, quality and location of discharge to watercourses and the marine environment (including the GBRMP) where appropriate
- describe the proposed groundwater pumping system and the proposed storage and disposal arrangements, including any off-site services. Provide details on the standard of proposed groundwater treatment systems, including examples of quality improvement devices (sediment removal, gross pollutant traps) and potential discharge points (spread of flow and scour protection).
- provide information on how water quality will be managed in accordance with the relevant NWQMS guidelines, Water Quality Guidelines for the Great Barrier Reef Marine Park (Great Barrier Reef Marine Park Authority 2009), and state and local policies and guidelines, including the Queensland Water Quality Guidelines (DERM,

2009), the Operational Policy – Licensing: Waste water Discharge to Queensland Waters (EPA, 2007).

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

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

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

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

Determine potable water demand for the project, including the temporary demands during the construction period.

Describe any proposed on-site water storage and treatment for use by the site workforce during construction and operational phases.

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

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

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

4.4.5. Stormwater

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

Describe the proposed stormwater drainage system and the proposed disposal arrangements, including any off-site services. Provide details on the standard of proposed stormwater treatment systems, including examples of quality improvement devices (sediment removal, gross pollutant traps) and potential discharge points (spread of flow and scour protection).

Provide information on how water quality will be managed in accordance with the relevant NWQMS guidelines, *Water Quality Guidelines for the Great Barrier Reef Marine Park* (Great Barrier Reef Marine Park Authority 2009), and state and local policies and guidelines.

4.4.6. Telecommunications

Describe all telecommunications infrastructure that needs to be constructed including mobile, telemetry and internet services.

4.4.7. Other infrastructure

Describe all other infrastructure (including any temporary and permanent on-site accommodation facilities) that need 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

Discuss alternative approaches or the opportunity to obtain materials from alternative sources.

Describe the location of associated infrastructure and the selection of the preferred location after environmental analysis.

4.5. Operation

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

- a description of the project site, including concept and layout plans of buildings, structures, plant and equipment to be employed
- nature and description of all key operational activities (terrestrial and marine)
- the capacity of the project equipment and operations
- estimated numbers and roles of persons to be employed during the operational phase of the project
- a description of the plant and equipment to be employed, including the capacity of the project equipment and operations
- a description of arrangements for long-term maintenance of the marine facilities (including ship-sourced pollution management facilities/infrastructure), including details of the responsible parties

- detail requirements of vessel operations, including tugs, pilotage (within port precincts and en route), customs clearance, quarantine, ship-sourced pollution management and security arrangements
- opportunities for future expansion.

4.5.1. Product handling

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

Discuss the possibility of coal spillage during the ship loading and transhipping and the feasibility and relative effectiveness of completely covering conveyers compared with other dust control methods.

Describe the nature, sources, location and quantities of all materials to be handled, including storage and stockpiling of coal. Identify and describe all potential issues due to product handling.

Identify and quantify hazards and risks where possible and consider cumulative impacts. Describe how these hazards and risks will be managed according to best practice.

Explain the method and location of barge, transhipper and coal ship mooring or anchor arrangements during coal transfer events, especially with respect to operator safety during extreme whether events and potential direct mechanical damage impacts on the seabed from anchoring and mooring activities.

4.5.2. Waste management

Detail the proposed management of solid and liquid wastes, considering the suitability of available waste disposal options. Particular attention must be given to the capacity of wastes to generate acidic, saline or sodic conditions.

Describe the sewerage infrastructure required by the project, including:

- options assessed for wastewater treatment
- the treatment measures/precautions of any wastewater generated on the site
- measures required to mitigate any risks to the environment from discharges and overflows, giving reference to relevant NWQMS guidelines, the Queensland Water Quality Guidelines (DERM, 2009), the Operational Policy – Licensing: Waste water Discharge to Queensland Waters (EPA, 2007) and other state and local water quality policies and guidance
- buffers between disposal and irrigation areas and other use areas
- peak design capacity evaluation of the wastewater treatment system and associated infrastructure using equivalent persons as the measure of capacity
- the proposed disposal and/or re-use of the treated effluent and the management of such use. An irrigation plan should be provided detailing where the use of treated effluent is likely. Details of the likely impacts of treated effluent on groundwater quality should also be provided

- the siting and maintenance regime for the system
- how the development will manage operation of the wastewater treatment and disposal system in circumstances of disaster or disruption to power supplies, including determination of the potential emergency effluent storage that would be required in an extended rain event (one in 50 and one in 100-year) wet weather storage accounting for climate change
- ship-sourced pollutants (e.g. sewage, garbage, oil) likely to be generated and to require appropriate management (onshore disposal) throughout the operation of the project.

Describe the quantity and quality of solid wastes and the proposed methods of their disposal. Describe the proposed location, capacity and suitability of any landfill that would receive solid waste from the project. Describe and illustrate any proposed on-site landfill, including its dimensions, volume and method of construction.

The site selection of waste storage, disposal and stockpiling areas should be described including options and the selection of the preferred location based on comparative environmental impacts.

4.5.3. Tailings management

Describe the methods and materials that would be used to produce tailings waste (tailings should be understood to include any fine reject material). State whether the methods to be used to produce and treat tailings would be novel or established. For novel methods, describe the testing undertaken to determine if the method would be suitable for the proposed use. For established methods, provide examples of where the method has been, or is being, used and assess the equivalence of those examples to the proposed use.

Additionally, with respect to tailings:

- describe how the methods used to produce and treat tailings would be in accordance with the waste management hierarchy and the tailings management principles in the *Tailings Management Guideline* of the *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland* series, (Department of Minerals and Energy 1995)
- describe and illustrate the proposed locations of any pits, dams, bunds or dumps that would be used for the disposal of tailings.

4.5.4. Air emissions

Describe in detail the expected quantity and quality of all air emissions (including particulates, fumes and odours) from the project during construction and operation. Particulate emissions include those that would be produced by any industrial process or disturbance by wind action on stockpiles and conveyors, or by transportation equipment such as trucks or trains, either by entrainment from the load or by travel on unsealed roads.

4.6. Decommissioning and rehabilitation

Describe the options, strategies and methods for progressive and final rehabilitation of the environment disturbed by the project, including:

- developing a preferred rehabilitation strategy with a view to minimising the amount of land disturbed at any one time
- illustrating the final topography of any excavations, waste areas and dam sites on maps at a suitable scale
- describing the means of decommissioning the project, in terms of removing equipment, structures and buildings, and the methods proposed for stabilising the affected areas. Discuss options and methods for the disposal of wastes from the demolition of plant and buildings in sufficient detail for their feasibility and suitability to be assessed.
- discussing options and methods for disposing of wastes generated by demolishing project infrastructure, including sufficient detail for their feasibility and suitability to be established
- discussing future land tenure arrangements post-decommissioning of the project.

Include the impacts of the preferred rehabilitation strategy in the appropriate subsections of Part B, Section 5 (refer to page 26).

Refer to infrastructure that is not intended to be decommissioned. In this situation, describe the entity to which the infrastructure is intended to be transferred, and the proposed environmental management regimes.

Evaluate whether the strategies and methods for progressive and final rehabilitation of disturbed areas comply with the objectives of both the:

- *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland* (Department of Minerals and Energy 1995)
- *Guideline: Rehabilitation requirements for mining projects* (Department of Environment and Resource Management 2011b).

In particular, the strategies and methods will have the following objectives:

- Mining and rehabilitation should aim to create a landform with the same or similar land use capabilities and/or suitability it had prior to the disturbance, unless other beneficial land uses are pre-determined and agreed
- Mine wastes and disturbed land should be rehabilitated so that it is self-sustaining or to a condition where the maintenance requirements are consistent with an agreed post-mining land use
- Surface and ground waters that leave the lease should not be degraded when compared with their condition prior to mining operations commencing. Current and future water quality should be maintained at levels that are acceptable for users downstream of the site.
- Describe any proposals to divert creeks during operations and, if applicable, the reinstatement of the creeks after operations have ceased. Rehabilitation will involve the re-establishment of vegetation communities along watercourses, as closely as possible to the original native ecosystem in those areas. Where dams are to be

constructed, describe proposals for the management of these structures after the completion of the project. Also, describe the final drainage and seepage control systems and long-term monitoring plans. Describe and illustrate where final voids and uncompacted overburden and workings at the end of mining would lie in relation to flood levels up to and including the 'probable maximum flood level' based on the Bureau of Meteorology's 'probable maximum precipitation' forecast for the locality.

- The description of topsoil management will address minimising topsoil storage times (to reduce fertility degradation) and the transportation, storage and replacement of topsoil to disturbed areas.
- Detail of the impacts for the preferred rehabilitation strategy will be discussed in the appropriate subsections of Part B, Section 5 (Environmental values and management of impacts), particularly with regard to issues such as final landform stability, rehabilitation of plants and the long-term quality of water in any final voids. Implications for the long-term use and fate of the site will also need to be addressed, particularly with regard to the on-site disposal of waste and the site's inclusion on the Environmental Management Register (EMR) or the Contaminated Land Register (CLR).

5. Environmental values and management of impacts

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
- detail the environmental protection and mitigation measures incorporated in the planning, construction, rehabilitation, commissioning, operation and decommissioning of all facets of the project
- 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.

Measures should prevent, or where prevention is not possible, minimise, environmental harm and maximise environmental benefits of the project. Identify and describe preferred measures in more detail than other alternatives.

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 measures, identified in this section of the EIS should be used to develop the EMP for the project. Refer to Part B, Section 10 (page 84).

5.1. Climate, climate change and natural hazards

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 and natural or induced hazards. Provide a risk assessment and management plan detailing these potential threats to the construction, and operation of the project.

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

Include an assessment of climate change risks and possible adaptation strategies, as well as 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.

It is recognised that predictions of climate change and its effects have inherent uncertainties, and that a balance must be found between the costs of preparing for climate change and the uncertainty of outcomes. Proponents should use their best efforts to incorporate adaption to climate change in their EIS and project design.

5.1.1. Flood plain management

Due to the location of the site, a comprehensive flood study should be included in the EIS that includes:

- quantification of flood impacts on properties surrounding and external to the project site
- identification of likely increased flood levels, increased flow velocities or increased time of flood inundation as a result of the development
- impact of storm surges
- seasonal flooding
- the potential for flooding on the underground mine operations should be assessed for the operational phase to manage flood inflows and during the decommissioning phase to prevent floodwaters entering underground areas.

The flood study should address any requirements of planning schemes for flood affected areas. Reference must be made to any studies undertaken by the local council in relation to flooding. The study report should include details of all calculations along

with descriptions of base data, any potential for loss of flood plain storage, and triangulated surface meshes produced in terrain modelling software.

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. Scenic amenity and lighting

Description of environmental values

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
- the relative importance of views of proposed project areas from relevant parts of Princess Charlotte Bay and Bathurst Bay.

Detail the existing scenic and landscape values of the area, focusing on the visual absorption capacity of the site.

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 mitigate or avoid the identified impacts.

Use sketches, diagrams, computer imaging/simulation and photos where possible to portray the near views and far views of the completed structures and their surroundings from visually sensitive locations.

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

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

5.2.2. 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 and operation, address the potential for significant finds.

Survey, describe and map the soils of the sites affected by the project at a suitable scale in according to the *Guidelines for Surveying Soil and Land Resources* (McKenzie et al. 2008) and *Australian soil classification* (Isbell & CSIRO 2002).

Provide information on the physical and chemical properties of the materials that may influence erosion and water quality, and the discuss soil stability and suitability of soils for the construction of project facilities components.

Assess the potential for acid sulfate soils in accordance with:

- Queensland Acid Sulfate Soils Technical Manual (refer to: **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).

Assess each soil's agricultural land suitability in accordance with:

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

Provide a map and description of:

- the location of key tidal planes such as:
  - the Highest Astronomical Tide (HAT)

  - Mean High Water Spring Tide (MHWS)
  - Mean High Water Neap Tide (MHWN)
  - Mean Sea Level (MSL)
  - Mean Low Water Neap Tide (MLWN)
  - Mean Low Water Spring Tide (MLWS)
  - LAT.
- the bathymetry of the project area and surrounds
- relevant coastal geomorphology.

Potential impacts and mitigation measures

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

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

Identify the possible soil erosion rate for all permanent and temporary landforms and describe the techniques used to manage the impact. 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 all soil types and outline the erosion potential (both wind and water) and 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:

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

Discuss the potential for acid generation through disturbance of acid sulfate soils during earthworks and construction.

Should action criteria be triggered by acid generating potential as a result of testing, outline management measures in an acid sulfate soils management plan prepared in accordance with:

- Queensland Acid Sulfate Soils Technical Manual (refer to: **www.derm.qld.gov.au/land/ass/products.html**)

- the requirements of 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 2002)
- *State Planning Policy 2/02 Guideline: Acid Sulfate Soils* (Department of Natural Resources and Mines and Department of Local Government and Planning 2002).

Append an outline of the acid sulfate soils management plan to the EIS, including the structure, potential monitoring strategies and a likely timeframe for development.

Land disturbance

Develop a strategy that will minimise the amount of land disturbed at any one time. Describe the strategic approach to progressive rehabilitation of landforms and final decommissioning. Describe the methods to be used for the proposal, including backfilling, covering, re-contouring, topsoil handling and revegetation.

Where waterways are proposed to be diverted, describe the impact on land use due to hydrology changes, both upstream and downstream. Also, detail the final drainage and seepage control systems and any long-term monitoring plans.

Where dams, roads, levee banks, waterway diversions and other infrastructure are to remain upon project decommissioning, provide proposals to manage and maintain these structures. Management and maintenance arrangements should be supported by appropriate erosion and stability monitoring to substantiate long-term rehabilitation sustainability.

Assess the mitigation measures for land disturbance to be used on decommissioning the site, providing sufficient detail to decide their feasibility. In particular, address the long-term stability of final voids and spoil dumps, safety of access to the site after surrender of the lease, and the residual risks that will be transferred to the subsequent landholder.

Describe the strategy that will be used to manage topsoil, considering transport, storage and replacement of topsoil to disturbed areas. Address the minimisation of topsoil storage times (to reduce fertility degradation).

If geological conditions are conducive, the proponent should consider the possibility that significant fossil specimens (such as of dinosaurs or their tracks) may be uncovered during construction/operations and propose strategies for protecting the specimens and alerting the Queensland Museum to the find.

Erosion and stability

For all permanent and temporary landforms, describe possible erosion rates and management techniques. For each waste rock and soil type identified, outline erosion potential (wind and water) and erosion management techniques. An erosion monitoring program, including rehabilitation measures for erosion problems identified during monitoring, will also be outlined. Develop and describe mitigation strategies that would achieve acceptable soil loss rates, levels of sediment in rainfall runoff and wind-generated dust concentrations.

Include an assessment of likely erosion and stability effects for all disturbed areas such as:

- areas cleared of vegetation
- waste dumps
- stockpiles
- dams, banks and creek crossings
- the plant site, including buildings
- access roads or other transport corridors
- water supply pipeline and electricity transmission corridors.

Methods proposed to prevent or control erosion will be specified and will be developed with regard to:

- the long-term stability of waste dumps and voids
- preventing soil loss in order to maintain land capability/suitability
- preventing significant degradation of local waterways by suspended solids.

The mitigation measures will address the selective handling of waste rock and capping material to maximise long-term stability of final landforms in regard to slumping and erosion both on and below the surface. Erosion control measures will be developed into an erosion and sediment control plan for inclusion in the EMP.

5.2.3. Underground mining

Description of environmental values

Mineral resources

Summarise the results of studies and surveys undertaken to identify and delineate the mineral resources within the project area (including any areas underlying related infrastructure).

Describe in detail the location, tonnage and quality of the mineral resources within the project area. Where possible, present this information on a 'coal seam-by-seam' basis and include the modifying factors and assumptions made in arriving at the estimates. The mineral resources should be estimated and reported, as appropriate, in accordance with:

- the *Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves* (the JORC Code) (Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists & Minerals Council of Australia 2004)
- the principles outlined in the *Australian Guidelines for the Estimating and Reporting of Inventory Coal, Coal Resources and Coal Reserves* (Coalfields Geology Council of New South Wales & Queensland Mining Council 2003).

In addition, provide maps (at appropriate scales) showing the general location of the project area and in particular the:

- location and aerial extent of the mineral resources to be developed or mined
- location and boundaries of mining tenures, granted or proposed, to which the project area is, or will be subject

- location of the proposed mine excavation(s)
- location and boundaries of any project sites
- location and boundaries of any other features that will result from the proposed mining including waste/spoil dumps, water storage facilities and other infrastructure
- location of any proposed buffers, surrounding the working areas.

Soil profiles should be mapped at a suitable scale and described according to the *Australian soil and land survey field handbook* (National Committee on Soil and Terrain 2009) and *Australian soil classification* (Isbell & CSIRO 2002). Appraise the depth and quality of usable soil and present information according to the standards required in the *Planning guidelines: The identification of Good Quality Agricultural Land* (Department of Primary Industries & Department of Housing, Local Government and Planning 1993) and State Planning Policy 1/92: Development and the Conservation of Agricultural Land (Department of Primary Industries & Department of Housing, Local Government and Planning 1992).

Resource base and mine life

Describe the proposed location and the volume, tonnage and quality of natural resources (such as land, water, timber, energy etc.) needed for the project. Provide specific details of the following:

- the proposed mine life and an outline of the coal/mineral resource base, including the total thickness of seams or extent of the ore body
- the planned recovery of resources
- locations of any resources that would be sterilised by the planned activities
- the quantity of coal to be mined annually, including any proposed ramping of production or staging of development
- the quality of the coal to be mined and average values for the normal parameters used to determine likely coal marketability, utility and price (e.g. ash content, sulphur content, moisture content, calorific value, rank etc.)
- the source of construction materials (sand, gravel, crushed rock) that will be needed in the construction of project infrastructure and facilities, including concrete foundations, hardstand areas, road base, etc.

Methane gas profile

Calculate how many cubic tonnes of methane and carbon dioxide per annum will be released by the mining process and the volume of methane that would be liberated per tonne of coal mined.

Geology and geomorphology

Provide a description, map(s) and a series of cross-sections of the surface and solid geology of the project area. Describe the geomorphology of the project site and the surrounding area. Make particular reference to the physical and chemical properties of surface and sub-surface materials and geological structures (e.g. faults) that could have an influence on, or be influenced by, the project's activities.

Describe geological properties that may influence ground stability (including seismic activity, if relevant), occupational health and safety, rehabilitation programs, or the quality of wastewater leaving any area disturbed by the project.

Describe the chemical and physical properties of surface and sub-surface material, and assess the impacts and mitigation measures to prevent influences such as immobilisation of physical and chemical properties of surface and subsurface material, erosion and leaching potential. Provide cross-references in this section to those sections of the EIS that assess in detail the potential impacts of any direct or indirect influences to sensitive environments including groundwater.

Describe any sites of geomorphological significance, such as cliff lines, caverns, springs, waterfalls, etc.

Resource utilisation

Demonstrate that the mining proposal will 'best develop' the mineral resources within the project area, minimise resource wastage and avoid any unnecessary sterilisation of these or any other of the state's coal, mineral, and petroleum (including gas and coal seam methane) resources that may be impacted upon, or sterilised by, the mining activities or related infrastructure.

Describe how the company plans to manage low grade or currently uneconomic deposits or excavated material to ensure that this potential future resource is not sterilised. Also describe measures to ensure the minimal dilution of mineralised but currently sub-economic waste rock by non-mineralised waste rock. Provide details and maps of expected residual or remnant resources within the project area including any low grade stockpiles, tailings and currently uneconomic material.

Mine sequencing

Provide specific details of the following:

- the proposed sequence and timing of mining of each seam/ore body within the mining lease
- the physical extent of excavations, location of stockpiles of overburden and/or coal/mineral reject to be handled
- during the project's operation or after mining ceases, the rate of throughput of stockpiles of product, reject and overburden
- typical cross sections of the mine workings showing voids, surface profiles and geological strata
- the proposed progressive backfilling of excavations
- the area disturbed at each major stage of the project.

Mining methods and equipment

Provide details of the following:

- the mining type and methods to be used, including the major equipment to be used in the various components of the operation

- the use of different techniques in areas of different topographic or geo-technical character
- chemicals to be used, including hydraulic fluids used and released in underground operations
- the proposed depth of the underground workings, access for personnel and equipment, ventilation methods and provision for injecting inert gases if required to mitigate risk of heating or spontaneous combustion
- the nature of the overlying strata and any extraction of pillars that will influence the extent of surface subsidence above the workings
- the proposed dimensions of bords and pillars exposed, height of the coal seam(s) to be extracted, whether the proposed mine will incorporate pillar extraction (and if so, details of the extent of pillar extraction).

The description will refer to, and be complemented by, the figures previously presented in Part B, Section 5.2.3, showing the locations of key aspects of the project. Provide additional figures if required.

Excavated waste

Describe the materials to be excavated as waste. Also, describe and illustrate the location, design and methods for constructing dumps for waste rock and any subsoil that will not be replaced in rehabilitation.

Estimate the tonnage and volume of waste rock and subsoil to be excavated during the various stages of operation. Estimates will be made for each separate rock and soil type.

Describe the expected proportion and source of waste rock that is mineralised but currently uneconomical for processing.

Describe the chemical and physical properties of the waste rock and subsoil, and assess the properties that affect their erosion and leaching potential. Undertake the characterisation of the waste in accordance with the *Assessment and Management of Acid Drainage Guideline* of the *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland series* (Department of Minerals and Energy 1995), and any other applicable best practice guidelines (e.g. the *Global Acid Rock Drainage Guide*—refer to **www.gardguide.com**). The characterisation of waste rock and subsoil will include, but not necessarily be limited to:

- sulphides
- metals
- pH
- conductivity and chloride of samples
- the Net Acid Producing Potential (NAPP) and Net Acid Generation (NAG) potential of the mined waste.

Discuss the potential for acid, neutral or alkaline drainage from waste dumps. Characterise the potential quality of leachate from the mined waste under field conditions, including contaminants such as sulphate, pH, chloride, iron, major cations and anions, and any chemical species in sufficient quantity that is likely to cause

environmental harm including nuisance. Provide cross-references in this section to those sections of the EIS that assess in detail the potential impacts of any direct or indirect discharge of leachate on downstream sensitive environments or users of receiving waters.

Use the estimated amounts and characteristics of excavated waste to develop appropriate measures for dealing with that waste, including designs for waste dumps, and alternatives for excavated waste disposal such as in-filling of voids, off-site options and treatment of contaminated soil. Assess the likely performance of the proposed waste disposal options with particular regard to:

- segregating and encapsulating sub-economic but mineralised rock and/or potentially acid-forming rock
- managing surface drainage and sub-surface leachate both during operations at the mine and after mining ceases (note: avoid placing dumps across drainage lines that would pond water behind the dump and cause infiltration)
- slope profiles and the stability and erosion potential of waste dumps
- the intended land use after mining ceases, and the land management and maintenance requirements for the subsequent landholder.

Illustrate the location and cross-sections of the proposed dumps on maps, drawings and diagrams relative to topography and other natural features of the area.

Subsidence

Provide comprehensive surface subsidence predictions, taking into account factors such as topographic variations and geological complexities, with a full description of the methodology and an assessment of the reliability of the predictions. Show the results of the predictions on maps with one-metre contour increments and a scale appropriate for assessing surface subsidence impacts.

Potential impacts and mitigation measures

Provide a hazard management plan for the proposed mine which includes provisions for:

- emergency response
- gas management
- methane drainage
- mine ventilation
- spontaneous combustion.

Provide an outline of a subsidence management plan in accordance with available guidelines as nominated by DEHP. Include in the outline a timeline for predicted subsidence, location, potential subsidence impacts and any mitigation measures, including triggers for managing surface cracking, and rehabilitation methods to a nominated post-mining land use.

The subsidence management plan will form the basis for a specific module to address subsidence in the draft EMP. That module will include:

- commitments to avoiding and mitigating subsidence, with details of the intended objectives, measures and performance standards to avoid, minimise and control subsidence
- periodic audits with a view to progressively improving subsidence management
- a process for regularly reviewing new technologies to identify opportunities to reduce subsidence, consistent with best practice environmental management commitments to monitor, audit and report on subsidence and the success of management actions
- mitigation measures to deal with any significant impacts that would result from subsidence.

5.2.4. Land contamination

Description of environmental values

Discuss the potential for land contamination within the project area from existing and past uses, based on land use history and the nature and quantity of any contaminants. Include:

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

Describe the possible contamination of land from aspects of the project, including waste, reject coal, overburden, and spills at chemical and fuel storage and handling areas; and identify and describe all potential issues.

Potential impacts and mitigation measures

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

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

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

Land degradation

Assess the possible degradation or contamination of land that could result from any aspects of the project. The assessment should not be limited to activities that would result in the land being entered on the EMR or the CLR. Rather, it should include any activity that could have a detrimental impact on land. Matters to be considered include:

- the long-term use, for dust suppression, of water with sufficient dissolved salts to affect soil condition

- disposal to land of any wastewater
- waste rock disposal
- tailings disposal
- disturbance of acid sulfate soils
- spills at chemical and fuel storage areas.

Propose measures that would prevent or remediate any degradation or contamination of land due to the proposed activities. Also, propose any measures required for the management and possible remediation of any existing contamination on the site.

5.2.5. Land use and tenure

Description of environmental situation

Identify, with the aid of maps:

- land tenure, including tenures of special interest such as protected areas and reserves, easements and existing and proposed power, water, gas, road infrastructure
- any changes to public use and access of the existing reserves that may occur from the project and any implications for land covered by the existing Kalpowar ILUA
- existing land uses and facilities surrounding the project
- distance of the project from recreational areas
- location of the project in relation to environmentally sensitive areas.

Potential impacts and mitigation measures

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

- impacts on and strategies for mitigation, for key land resources including:
  - good quality agricultural land—refer to State Planning Policy 1/92: Development and the Conservation of Agricultural land (Department of Primary Industries & Department of Housing, Local Government and Planning 1992) and *Planning guidelines: The identification of good quality agricultural land* (Department of Primary Industries & Department of Housing, Local Government and Planning 1993)
- possible effects and constraints on town planning and port planning objectives and controls, including the local government planning scheme
- management of the immediate environs of the project including construction and transport corridor buffer zones
- proposed land use changes in any areas of high conservation value and information on how easement widths and vegetation clearance in environmentally sensitive areas will be minimised
- potential issues involved in proximity and/or co-location of other current or proposed infrastructure services

- any potential impacts on existing telecommunications infrastructure (such as optical cables, microwave towers, etc.), identifying and consulting with infrastructure owners regarding any proposed impacts
- any land units requiring specific management measures, and the nature of those management measures.

5.3. Nature conservation

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

- biological diversity, including state and Australian government listed species
- habitats of rare, threatened and migratory species
- aquatic and terrestrial ecosystems
- integrity of ecological processes
- conservation of resources.

Survey effort should be sufficient to identify, or adequately extrapolate, the floral and faunal values over the range of seasons, particularly during and following a wet season. The survey should account for the ephemeral nature of watercourses traversing the project area, and seasonal variation in fauna populations including avian and marine megafauna.

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

Detail processes that will be established to engage with other interest groups such as representatives from the Queensland Parks and Wildlife Service prior to any activities occurring that may impact on the adjacent protected area.

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.

5.3.1. Sensitive environmental areas

Description of environmental values

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

Include consideration of the declared Kalpowar Nature Refuge and the terms and conditions of the Conservation Agreement dated 15 December 2005.

Describe likely increases in vehicle traffic and potential impact on national park visitation numbers.

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

- important habitats of species that are listed under the NC Act and/or EPBC Act as presumed extinct, endangered or vulnerable
- REs listed as 'endangered' or 'of concern' under state legislation
- ecosystems listed as presumed extinct, endangered or vulnerable under the EPBC Act
- 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 listed under international treaties such as Ramsar wetlands and World Heritage areas
- sites containing near-threatened or bio-regionally significant species or essential, viable habitat for near-threatened or bio-regionally significant species
- sites in, or adjacent to, areas containing important resting, feeding or breeding sites for migratory species of conservation concern listed under the Convention of Migratory Species of Wild Animals, and/or bilateral agreements between Australia and other countries
- sites adjacent to nesting beaches, feeding, resting or calving areas of species of special interest (e.g. marine turtles, dugongs and cetaceans)
- sites containing common species that represent a distributional limit and are of scientific value or that contain feeding, breeding, resting areas for populations of echidna, platypus and other species of special cultural significance
- sites of high biodiversity that are of a suitable size or with connectivity to corridors/protected areas to ensure survival in the longer term; such land may contain:
  - natural vegetation in good condition or other habitat in good condition (e.g. wetlands)
  - degraded vegetation or other habitats that still support high levels of biodiversity or act as an important corridor for maintaining high levels of biodiversity in the area
- a site containing other special ecological values (e.g. high habitat diversity and areas of high endemism)
- areas which are important or potentially important as migratory corridors or for population connectivity
- ecosystems that provide important ecological functions such as:
  - wetlands of national, state and regional significance
  - coral reefs
  - riparian vegetation
  - important buffer to a protected area or important habitat corridor between areas

- declared fish habitat areas and sites containing protected marine plants under the Fisheries Act
- sites of palaeontologic significance such as fossil sites
- sites of geomorphological significance
- protected areas that have been proclaimed under the NC Act and Marine Parks Act or are under consideration for proclamation
- areas of major interest, or critical habitat declared under the NC Act or high nature conservation value areas or areas vulnerable to land degradation under the VM Act.

Potential impacts and mitigation measures

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

Demonstrate how the project would comply with the following hierarchy:

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

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

Identify beneficial aspects of the proposal, including for example, the beneficial attributes of controlling 4X4 vehicular traffic to beaches, initiation of feral pig control program.

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

Address any actions of the project or likely impacts that require an authority under the NC Act, and/or would be assessable development for the purposes of the VM Act.

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)
- Queensland Biodiversity Offset Policy (Department of Environment and Resource Management 2011f)
- Policy for Vegetation Management Offsets (Department of Environment and Resource Management 2011c)

- *Fish Habitat Management Operational Policy FHMOP 005.2: Marine Fish Habitat Offset Strategy* (Queensland Department of Agriculture, Fisheries and Forestry 2012).

Describe any departure from 'no net loss' of ecological values.

Outline how all management measures for environmentally sensitive areas will be implemented in the project EMP.

5.3.2. Terrestrial flora

Description of environmental values

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

- the relevant regional vegetation management codes
- site data should be recorded in a form compatible with the Queensland Herbarium CORVEG database
- the minimum site size should be 10 × 50 metres
- a complete list of species present at each site should be recorded
- the surveys to include species structure, assemblage, diversity and abundance
- the relative abundance of plant species present to be recorded
- any plant species of conservation, cultural, commercial or recreational significance to be identified
- specimens of species listed as protected plants under the Nature Conservation (Wildlife) Regulation 1994 (Qld), other than common species, are to be submitted to the Queensland Herbarium for identification.

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

Provide vegetation mapping for all relevant project components. Adjacent areas should also be mapped to illustrate interconnectivity. Mapping should also illustrate any larger scale interconnections between areas of remnant or regrowth vegetation where the project site includes a corridor connecting those other areas.

Discuss any variances between site mapping and mapping produced by the Queensland Herbarium.

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

- location and extent of vegetation types using the RE type descriptions in accordance with the REDD
- location of vegetation types of conservation significance based on RE types and occurrence of species listed as protected plants under the Nature Conservation

(Wildlife) Regulation and subsequent amendments, as well as areas subject to the VM Act

- the current extent (bioregional and catchment) of protected vegetation types of conservation significance within the protected area estate (national parks, conservation parks, resource reserves, nature refuges and conservation reserves under the NC Act
- any plant communities or species of cultural, commercial or recreational significance
- the location of any horticultural crops in the vicinity of the project area
- location and abundance of any known exotic or weed pest plant species.

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

Describe strategies (including monitoring) on how pests and vermin will be appropriately managed to prevent infestation. These measures are to ensure compliance with the provisions of the Public Health Act and Division 3 of the Public Health Regulation 2005.

Potential impacts and mitigation measures

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

For all components of the project, include:

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

Weed management strategies are required for containing existing weed species (e.g. parthenium and other declared plants) and ensuring no new declared plants are introduced to the area. Refer to the local government authority's pest management plan and any strategies and plans recommended for the project area by Biosecurity Queensland. Discuss the strategies in accordance with provisions of the *Land Protection (Pest and Stock Route Management) Act 2002* (Qld) in the main body of the EIS and in the pest management plan within the EMP for the project.

Outline how all flora management measures will be implemented in the project EMP.

5.3.3. Terrestrial fauna

Description of environmental values

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

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

Identify any species listed by the EPBC Act and 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 including methods to accommodate seasonal variation. 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**).

Potential impacts and mitigation measures

Assess the potential impacts the project may have on terrestrial fauna, relevant wildlife habitat and other fauna conservation values, including:

- impacts due to loss of range and 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.

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 for protecting rare or threatened species, and discuss any obligations imposed by state or Australian Government endangered species legislation (e.g. species recovery plans) or policy or international obligations (i.e. JAMBA, CAMBA and ROKAMBA)
- details of the methodologies that would be used to avoid injuries to 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.

Address any actions of the project or likely impacts that require an authority under the NC Act.

Rehabilitation of disturbed areas should incorporate, where appropriate, provision of nest hollows and ground litter.

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

Outline how these measures will be implemented in the project EMP. Describe strategies (including monitoring) on how pests and vermin will be appropriately managed to prevent infestation. These measures are to ensure compliance with the provisions of the *Public Health Act 2005* and Division 3 of the Public Health Regulation 2005.

5.3.4. Aquatic ecology

Description of environmental values

General

Describe the aquatic flora and fauna present, or likely to be present, in the areas affected by the project, noting the patterns and distribution in the waterways and any associated wetlands. Include:

- fish species, mammals, reptiles, amphibians, crustaceans, microfauna and aquatic invertebrates occurring in the waterways within the affected area and any associated wetlands
- any rare or threatened aquatic and marine species
- a description of the habitat requirements and the sensitivity of aquatic species to changes in flow regime, water levels and water quality in the project area
- aquatic plants including native and exotic/weed species
- aquatic and benthic substrate
- aquatic substrate and stream type, including extent of tidal influence and common levels such as highest astronomical tide and mean high water springs.

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.

Flora

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

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

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

Marine fauna

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

Consult DEHP and GBRMPA, and undertake a desktop review of information on the turtle communities of the study area, paying specific attention to any anecdotal or recorded information on turtle populations frequenting the port area and any known nesting sites.

Describe the turtle species that may be using beaches in proximity to the proposed development area. The proponent should monitor turtle nesting along beaches near the proposed project area in the turtle nesting seasons for turtle species occurring in the area. Ensure lighting impacts are considered with respect to turtle management.

Undertake a study on existing noise in the marine environment.

Fish habitat

Describe the nature, extent and condition of fish habitats that have the potential to be impacted, with particular reference to fish nursery habitat. The location and density of marine plants should be mapped at an appropriate scale.

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

Benthic macro invertebrates

Describe the benthic macro invertebrate communities likely to be directly or indirectly impacted by the project. Consider the effect of capital works and 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 ecosystems, including:

- loss of tidal flats on juvenile and adult aquatic species leading to loss of productivity in fish, crustaceans etc.
- loss of seagrasses in relation to the extent and regional significance of seagrass communities and associated impact on fisheries, dugongs, turtles etc.
- potential impacts associated with dredging and dredge spoil disposal (e.g. impacts to seagrass, mangroves, corals and benthic habitat and benthic fauna)
- potential impact of marine structures (whether temporary during construction or permanent) that may impair the movement of fish. Where waterway barrier works are proposed, these are to be described and mapped and will require approval under the Fisheries Act
- potential impacts to marine megafauna, disposal and the construction of marine structures, specifically relating to lighting, noise and vibration (including piling and any blasting) and vessel traffic
- the likely colonisation of the marine structures that may partially offset the adverse impacts of the development on marine biodiversity. Discuss this in relation to *Fisheries Guidelines for Fish-Friendly Structures—Fish Habitat Guideline 006*

(Derbyshire 2006) and, where appropriate, demonstrate fish-friendly design features of the proposed infrastructure

- potential impacts from climate change and the project's potential to increase the susceptibility of aquatic ecological communities and species, e.g. coral bleaching.

Describe proposed mitigation actions, including:

- proposed location, type and design of any waterway barrier works (temporary and permanent) that would impact on aquatic resources, particularly fish movement; and provide an appropriately scaled map
- potential mechanism to ensure adequate fish passage is provided at any proposed waterway barriers
- strategies for protecting any rare or threatened species
- measures to monitor and reduce the impacts on marine megafauna related to increased recreational and commercial vessel traffic (i.e. boat strike, degraded water quality)
- measures to monitor and reduce the impacts on marine megafauna related to construction, lighting, noise, vibration and vessel movement
- measures to avoid fish spawning periods, such as seasonal construction of waterway crossings and measures to facilitate fish movements through water crossings
- offsets proposed for unavoidable, permanent loss of fisheries habitat in accordance with *Mitigation and Compensation for Works or Activities Causing Marine Fish Habitat Loss* (Fish Habitat Management Operational Policy 005) (Dixon & Beumer 2002)
- methods to minimise the potential for introducing or spreading weed species or plant disease
- monitoring aquatic biology health, productivity and biodiversity in areas subject to direct discharge
- measures to prevent direct and indirect impacts on marine fauna and flora from dredging and dredge spoil disposal works.

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 all aquatic ecology management measures will be implemented in the project EMP.

5.4. Water resources

5.4.1. Description of environmental values

Describe the quantity and quality of water resources in the vicinity of the project area, including:

- existing surface and groundwater in terms of physical, chemical and biological characteristics

- existing surface drainage patterns, flows, history of flooding including extent, levels and frequency and present water uses
- 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.

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

- Environmental Protection (Water) Policy 2009 (EPP (Water))
- *Australia 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)
- *Queensland Water Quality Guidelines 2009* (Department of Environment and Resource Management 2009a).
- physical integrity, fluvial processes and morphology, including riparian zone vegetation and form, if relevant
- any impoundments (e.g. dams, levees, weirs)
- hydrology of waterways and groundwater
- sustainability, including both quality and quantity
- dependent ecosystems including stygofauna
- existing and other potential surface and groundwater users
- water resource plans relevant to the affected catchments.

Groundwater

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

- geology and stratigraphy
- bore depths
- the aquifers tapped by bores
- purpose for which bores are being used
- estimate of current annual extraction
- aquifer type, such as confined or unconfined
- depth to and thickness of the aquifers
- depth to water level and seasonal changes in levels
- standing water levels and groundwater flow directions (defined from water level contours)
- interaction with surface water
- possible sources of recharge
- potential exposure to pollution
- current access to groundwater resources in the form of bores, springs and ponds (including quantitative yield of water and locations of access)

- the need and requirements for licensing or permitting of any groundwater related interference, take, or works under the *Water Act 2000*, the Water Resource (Great Artesian Basin) Plan 2006, Great Artesian Basin Resource Operations Plan (February 2007); Water Regulation 2002, and SPA
- the impact of the project on aquifers caused by goafing and/or land subsidence.

The groundwater assessment should also be consistent with relevant guidelines for the assessment of acid sulfate soils including spatial and temporal monitoring to accurately characterise baseline groundwater characteristics.

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

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

- location
- pumping parameters
- draw down and recharge at normal pumping rates
- direction of underground flows
- seasonal variations (if records exist) of groundwater levels.

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

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

5.4.2. Potential impacts and mitigation measures

Assess the potential impacts of the project on water resource environmental values identified in the previous section.

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

If required, discuss the need or otherwise for licensing of any dams (including referable dams) or creek diversions, under the Water Act. Water allocation and water sources, including impacts on existing water entitlements, including water harvesting, should be established in consultation with DEHP.

Define and describe the practical measures for protecting or enhancing water resource environmental values, to describe how nominated quantitative standards and indicators may be achieved. 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 the potential to contaminate surface and groundwater resources and measures to prevent, mitigate and remediate such contamination.

Describe how nominated water quality objectives will be monitored, audited and managed.

Water management 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.

Outline how all water resource management measures will be implemented in the project EMP.

Wastewater, stormwater, sewerage and water storage systems

Describe the proposed wastewater, stormwater and sewerage systems and the proposed storage and disposal arrangements.

In relation to water supply and usage, and wastewater and stormwater disposal, discuss anticipated flows of water to and from the proposal area.

Where dams, weirs or ponds are proposed, investigate the effects of predictable climatic extremes (storm events, floods and droughts) on:

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

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

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

Groundwater

With regard to groundwater resources, describe and assess the potential environmental impact caused by the project (and its associated project components) to local groundwater resources, and the range of project responses, including:

- the aquifers that will be directly impacted by mining operations, including the aquifers that will be exposed/ partially removed by open cut mining and or underground mining
- the aquifers that will be dewatered or indirectly impacted by dewatering

- the potential for the mining method, and the effects of mining, to link aquifers, e.g. the potential for the removal of the overburden or goafing to fracture a confining layer
- an assessment of all likely impacts on groundwater depletion or recharge regimes
- the response of the groundwater resource to the progression and finally cessation of the proposal
- the impact of the project on the local and regional groundwater regime caused by the altered porosity and permeability of any land disturbance
- the potential for groundwater-induced salinity
- the potential to contaminate groundwater resources including after the project ceases
- potential groundwater impacts from the disturbance of acid sulfate soils
- impacts on groundwater-dependent plants and animals
- measures to avoid, or where avoidance is not possible, mitigate and remediate any potential groundwater impacts.

The groundwater report must assess the extent of impacts in terms of spatial impacts, times for impacts to occur and post mining impacts and recoveries. The report must also outline how these impacts will be mitigated and should:

- outline the model conceptualisation of the aquifer system or systems, including key assumptions and model limitations
- accurately represent each aquifer, storage and flow characteristics of each aquifer, linkages between aquifers, if any, and the existing recharge/discharge. Represent mechanisms of the aquifers and the changes that are predicted to occur once mining begins.
- incorporate the various stages of development of mining and provide predictions of water level/pressure declines in each aquifer for the life of the mine and beyond
- provide information on the time to maximum drawdown and the time for drawdown equilibrium to be reached
- identify the volumes predicted to be dewatered on an annual basis with an indication of the proportion supplied from each aquifer
- provide information on potential water level recovery rates and timeframes in each aquifer for the life of the mine and beyond
- include recommendations and a program for review and update of the model as more data and information become available.

Where the operation of the mine impacts on neighbouring bores, the groundwater impact assessment should outline the options available for a make good agreement.

5.5. 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 the potential impacts that may be caused by the project on coastal processes, resources and values.

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 all the relevant specific policy outcomes and policies of the Queensland Coastal Plan (Department of Environment and Resource Management 2012), including the State Planning Policy SPP 3/11: Coastal Protection (Department of Environment and Resource Management 2011d) and its associated guideline, (Department of Environment and Resource Management 2009a) and the State Policy: Coastal Management (Department of Environment and Resource Management 2011e).

To avoid duplication, cross-reference other sections of the EIS where coastal values, such as ecology or scenic amenity, are addressed.

Should any shipwreck or article associated with a shipwreck be discovered, the find is to be reported in accordance with the *Historic Shipwrecks Act 1976* (Cwlth).

5.5.1. 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 and water quality objectives 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. Undertake two- and/or three-dimensional modelling. 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. Detail the interaction of freshwater flows with different tidal states, including storm tides. Describe inter-annual variability and details of historical and predicted floods including extent, levels and frequency. Flood studies should include a range of annual exceedence probabilities for affected waterways, where data permits.

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

Describe if infrastructure will occur on coastal dunes. If so, analyse the stability of the frontal dune system with respect to current wind erosion and vegetation cover and comment on how the dunes stability will be maintained during the project life. Identify acts or activities which may lead to the destabilisation of the dunes and management strategies to limit impact. Determine shoreline recession from extreme storm events and advise how infrastructure will be protected from damage or loss, and the impact of such works on coastal processes.

Describe the rate and direction of sediment transport along the coast and describe the potential environmental impact of interruption of this transport by structures on or crossing the shore and measures to mitigate any impact.

Potential impacts and mitigation measures

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

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

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

When assessing the hydrodynamics of the area and movement of sediment along the coast, consider coastal processes such as erosion and accretion at adjacent locations.

5.5.2. Water quality

Description of environmental values

Describe water quality of coastal waters within the project area both pre-wet and post-wet season. This information should include (but is not necessarily be limited to) general physical chemical water quality parameters such as dissolved oxygen, pH, heavy metals, nutrients, temperature, salinity, oil in water, contaminants and turbidity.

For coastal areas potentially affected by sediment run-off or dredging, suspended solids concentration and Secchi depth should also be included.

Discuss the interaction of freshwater flows with coastal waters and the significance of this in relation to marine flora and fauna adjacent to the project area.

Describe the environmental values and water quality objectives of coastal waters in the affected area, defined according to:

- the EP Act
- Environmental Protection (Water) Policy 2009 (EPP (Water))
- the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand 2000b)
- the *Queensland Water Quality Guidelines 2009* (Department of Environment and Resource Management 2009a)
- the guideline *Establishing Draft Environmental Values and Water Quality Objectives* (Environmental Protection Agency 2002)
- variability associated with the local wind climate, seasonal factors, freshwater flows and extreme events.

Develop and describe suitable water quality and resource indicators for measuring environmental values, and objectives that would protect the identified values.

Baseline data from a full range of seasonal and meteorological conditions are required (i.e. a minimum of 12 months on all parameters).

Potential impacts and mitigation measures

Describe the potential environmental impacts and practical measures for protecting, mitigating or enhancing coastal environmental values. This includes how nominated quantitative standards and indicators may be achieved, and how the achievement of the water quality objectives will be monitored, audited and managed.

The potential environmental harm caused by the project on coastal resources and processes shall be described in the context of controlling such effects. 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) should be addressed as should the *Queensland Coastal Plan* (Department of Environment and Resource Management 2012a) and the *Fish Habitat Guideline FHG 002—Restoration of fish habitats: fisheries guidelines for marine areas* (Hopkins, White & Clarke 1998).

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 the *Queensland Water Quality Guidelines 2009* (Department of Environment and Resource Management 2009a) and *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:

- 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.

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 air shed environment, both local and regional, including:

- background levels and sources of particulates (including coal dust), 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.

Undertake EIS sampling and modelling work to assess likely impact of coal dust dispersal by air and sea drift.

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
- maximum 24-hour 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 maximum 24-hour impact to determine whether:
  - the planned buffer distance between the facility and neighbouring sensitive receptors will be adequate

  - emissions, especially coal dust, may have a significant negative impact on terrestrial and marine flora or fauna
- ground level predictions should be made at any site that includes the environmental values identified by the EPP (Air), including any sites that could be sensitive to the effects of predicted emissions
- dust 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 the facility of all hazardous or toxic pollutants
- impacts on terrestrial flora and fauna.

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

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

Detail design and management measures to minimise potential impact of coal dust dispersal. Explain the techniques to manage coal dust during loading and unloading operations. Identify the risk of coal being spilt in the ocean, transported and washed ashore along the coast and what preventative and recovery methods will be in place and implemented.

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
- 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.

The Australian Government Department of Climate Change and Energy Efficiency's *National Greenhouse Accounts (NGA) Factors* (Commonwealth of Australia 2010) can be used as a reference source for emission estimates and 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.

Include estimates of coal seam methane to be released as well as emissions resulting from activities such as transporting products and consumables, and energy use by the project.

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
- the potential impacts of the project on the state and national greenhouse gas inventories and the proposed greenhouse gas abatement measures.

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:

- *Noise Measurement Manual* (Environmental Protection Agency 2000)
- *Guideline: Noise and Vibration from Blasting* (Environmental Protection Agency 2006)
- *Guideline: Planning for Noise Control* (Environmental Protection Agency 2004).

Identify sensitive noise receptors adjacent to all project components and estimate typical background noise and vibration levels based on surveys at representative sites. Discuss the potential sensitivity of such receptors and nominate performance indicators and standards.

5.8.2. Potential impacts and mitigation measures

Describe the impacts of noise and vibration generated during the construction and operational 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 where appropriate
- impact of noise, including low frequency noise (noise with components below 200 Hz) and vibration at all potentially sensitive receivers compared with the performance indicators and standards nominated above
- blast vibration and airblast overpressure and assessment of the potential impacts on human health in accordance with AS 2670.2-1990 *Evaluation of human exposure to*

whole-body vibration – Continuous and shock-induced vibration in buildings (1 to 80 Hz) (Standards Australia 1990)

- 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 sensitive receivers (including recreational users) that are otherwise unable to achieve a satisfactory internal noise level for the preservation of health and wellbeing as identified within the EPP (Noise).

Night-time works

Provide details for night-time works that may be undertaken. Specifically include:

- the reasons why night time works may be undertaken
- the likely duration of the works
- the proposed hours of the works
- the nature of the works
- the likely impact on fauna and any surrounding sensitive receptors.

5.9. Waste

5.9.1. Waste generation

Identify and describe all sources, likely volumes and quality (where applicable) of waste associated with 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

Assess the potential impact of all wastes generated during construction and operation, with regard for best practice waste management strategies, the *Waste Reduction and Recycling Act 2011* and the Environmental Protection (Waste Management) Regulation 2000, Transport Operations (Marine Pollution) Act 1995 (TOMPA) and associated Regulation 2008.

Provide details of waste management strategies (including reduction, reuse, recycling, storage, transport and disposal of waste). Demonstrate that waste minimisation and

cleaner production techniques and designs will be implemented to prevent or minimise environmental impacts when selecting processes, equipment and facilities.

Provide details of cleaner production waste management planning, especially how these concepts will be applied to prevent or minimise environmental impacts at each stage of the proposal. Discuss measures to improve natural resource use efficiency (e.g. energy and water), integrated processing design, any co-generation of power and by-product re-use as shown in a material/energy flow analysis.

Provide information on the variability, composition and generation rates of all waste produced at the site.

Provide an inventory of all wastes to be generated by the project during the construction, operational and decommissioning phases of the project. In addition to the expected total volumes of each waste produced, include an inventory of the following per-unit volume of product produced:

- the tonnage of raw materials processed
- the amount of resulting process wastes
- the volume and tonnage of any re-usable by-products.

This information is required to enable the resource management agencies and other stakeholders to assess the efficiency of resource use, and allocation issues.

- Air emissions—provide information on air emissions, including particulates, fumes and odours, during the construction and operation stages of the project. Particulate emissions include those that would be produced by any industrial process, or disturbed by wind action on stockpiles and conveyors, or by transportation equipment (e.g. trucks, either by entrainment from the load or by passage on unsealed roads).
- Excavated waste—describe and show the location, design and methods for constructing dumps for waste rock and subsoil. Show the location of the dumps on a map relative to topography and other natural features of the area.
- Tailings—describe the tailings waste produced by preparation and/or processing plants and the proposed methods for its disposal. Describe alternative options for tailings disposal including the proposed location, site suitability and volume of any tailings storage and/or disposal site(s), including the method of construction. Describe the:
  - approximate quantity of tailings to be produced by the project and its processing plant annually for the life of the mine; also present tailings characterisation information in this section
  - construction of the tailings storage facility with regards to construction material and design; and how the tailings storage facility complies with relevant codes for the construction of such containment systems
  - strategies to monitor and manage seepage into ground and surface waters. Discuss the location of the storage and/or disposal site with regard to adjacent creeks and rivers.
- Solid waste disposal—describe the quantity and quality of solid wastes (other than excavated waste, subsoil and tailings addressed in other sections) and the proposed

methods of their disposal. Show the proposed location, site suitability, dimensions and volume of any landfill, including its method of construction.

- Liquid waste—present a description of the origin, quality and quantity of wastewater and any immiscible liquid waste originating from the project other than that addressed in other sections. Pay particular attention to the capacity of wastes to generate acid, and saline or sodic wastewater. A water balance for the proposal and processing plant is required to account for the estimated usage of water.

The EIS may need to consider the following effects:

- groundwater from excavations
- rainfall directly on to disturbed surface areas
- run-off from roads, plant and industrial areas, chemical storage areas
- drainage (i.e. run-off plus any seepage or leakage)
- seepage from other waste storages
- water usage for
  - process use
  - dust suppression
  - domestic purposes
- evaporation
- domestic sewage treatment—disposal of liquid effluent and sludge
- water supply treatment plant—disposal of wastes.

5.10. Transport

Present the transport assessment in separate reports for each project-affected mode (road, conveyor, air and sea) as appropriate. 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 tasks and routes

Describe:

- expected volumes of project inputs and outputs of transported raw materials, wastes, hazardous goods, finished products for all phases of the project
- how identified project inputs and outputs will be moved through the transport network (mode, volume, composition, trip timing and routes)
- traffic generated by workforce personnel (drive-in drive-out (DIDO), fly-in fly-out (FIFO), bus-in bus-out (BIBO)) including visitors (volume, composition, timing and routes)

- likely heavy and oversize/indivisible loads (volume, composition, timing and routes), highlighting any vulnerable infrastructure including pavements, bridges and structures along proposed routes.

Assess the impacts of the construction and operation of any conveyors. The direct impacts on any other transport infrastructure, such as those due to road crossings, will be addressed in the transport section of the EIS, while the impacts on other matters (such as ecology, noise, etc) should be addressed in the appropriate sections of the EIS, but cross-referenced in the transport section.

Detail proposed works to improve access on the primary access route across the Normanby River. Given this is the only available access corridor for all construction and operational purposes, specific assessment should be provided on any proposed improvements to this river crossing, available options and appropriate assessment. In particular, any impacts on the existing national park campground at Kalpowar Crossing should be addressed.

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 (RIA) in general accordance with the *Guidelines for Assessment of Road Impacts of Development* (Department of Main Roads 2006).

Assess project impacts on:

- local and state-controlled road networks, including key road intersections
- capacity, safety, local amenity, efficiency and condition of transport operations, services and assets (from either transport or project operations)
- possible interruptions to transport operations
- the natural environment within the jurisdiction of an affected transport authority (e.g. road corridors)
- the nature and likelihood of product-spill during transport, if relevant
- driver fatigue for workers travelling to and from regional centres and key destinations
- 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 1994* (Qld)
- access to transport for people with a disability
- the construction and operation of any conveyors
- spread of weeds, disease and other exotic species.

The direct impacts on any other transport infrastructure, such as those due to road crossings, will be addressed in this transport section of the EIS, while the impacts on other matters (such as ecology, noise etc.) should be addressed in the appropriate sections of the EIS, but cross-referenced in the transport section.

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.

Any required road works should be designed and constructed in accordance to the *Interim Guide to Road Planning and Design Practice Road Planning and Design Manual* (Department of Transport and Main Roads 2010a).

5.10.5. Transport management strategies

Discuss and recommend how identified impacts will be mitigated so as to maintain safety, efficiency and condition of each modes infrastructure. These mitigation strategies are to be prepared in close consultation with relevant transport authorities including local government and consider those authorities' works programs and forward planning.

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

Road-use management planning

Prepare a road-use management plan (RMP), to be finalised in consultation with TMR subsequent to the EIS, which includes:

- procedures for reviewing and updating:
  - project transport information such as sourcing water and gravel
  - impact assessment
  - any required mitigation works in consultation with road corridor managers, including any associated works before commencement of project construction
- low cost management strategies to minimise the impacts of project transport on existing and future public road corridors e.g. temporary road signs advising of increased traffic during construction
- steps to be taken to prevent access from public road corridors to the project sites
- strategies to maintain safe access to public road reserves to allow road/conveyor maintenance activities
- process for decommissioning any temporary access to road, e.g. stockpile sites.

The findings of any road transport studies and RIA should be an input into preparing the RMP.

Conveyors

Discuss major issues for the conveyor corridor including: the nature of construction, towers/ spacing of the supports, how the conveyor route will be maintained, access to the conveyor by road, maintaining the integrity of the weed free nature of the area as the project will create at least three corridors through a relatively weed free site, dust

generation, operational hours, light and noise. Discuss risks associated with the construction and maintenance of the conveyors.

Marine

Consult the Regional Harbour Master regarding maritime issues relating to moving and loading barges, transhippers and vessels, and dredge operations; and discuss the results of the consultation in the EIS.

Describe current and projected use of vessels utilising the jetty and in the GBRMP and Commonwealth Marine Area, their size, shipping movements, anchorages, access to/from the port and navigational arrangements (especially the likely operating limits (with respect to wind strength and sea state) and cyclone contingency plans for both the barges and transhippers).

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

- potential for introduction of exotic organisms from increased shipping rates
- ballast water management arrangements—including Australian Quarantine and Inspection Service mandatory arrangements and agency contingency planning
- management of ship waste, in particular quarantine waste, domestic garbage, oil and sewage (for all vessel locations including the barge loading and supply facilities, the tug harbour and the various transhipment locations)
- risk of spills and their management for both cargo and pollutants (e.g. a ‘shipboard oil pollution emergency plan’, a ‘shipboard sewage management plan’, a ‘shipboard waste management plan’ for garbage) and detailed contingency planning for how spills will be dealt with in an offshore situation
- 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
- procedures for the transfer of fuel from tankers to storage facilities and the transfer of bunker fuel to tugs/barges.

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

Discuss the transhipment points and the location of these during seasonal variation.

Discuss barge, transhipper and coal ship movements and the interaction of those vessels with each other and recreational and commercial fishing boats in the area. Describe the probability of negative impacts arising from these interactions and measures that are proposed to avoid, minimise or mitigate negative impacts. Describe the measures proposed to be undertaken if shipping incidents occur, especially collisions involving project coal barge(s) and/or transhipper(s).

Describe the routes to and from international waters that coal ships will take approaching and leaving the transhipping points, especially through or adjacent to the

Great Barrier Reef and any potential interactions that these ships may have with other ships.

Describe cyclone contingency aspects and provide information on the route to and the location of cyclone shelters or safe waters.

Additional data to be provided in relation to the barges and transhipping include:

- communications
- vessel tracking
- seasonal data and impact on transhipment points
- information required for declaring a port
- management during swells/ cyclonic weather conditions
- fuel storage at sea
- transhipper and barge design
- vessel mooring.

To assist proponents to identify maritime-related impacts and to define mitigation strategies, Maritime Safety Queensland has developed guidelines for major development proposals. The guidelines specify the minimum information required by Maritime Safety Queensland to evaluate significant development proposals. The preferred format for presentation of this information is through the development of management plans for:

- vessel traffic management plan
- aids to navigation management plan
- ship-sourced pollution prevention management plan.

The three management plans must:

- identify, describe and evaluate all likely impacts on navigational safety and ship sourced marine pollution resulting from the proposed development
- consider the whole lifecycle period of the proposed development including site establishment, staged construction, staged and full operation, renewal, downsizing, closing down and site rehabilitation
- identify and describe proposed mitigation measures to manage the impacts including marine infrastructure assets and supporting systems
- identify and describe the delivery method and process on how and when the proposed mitigation measures are to be implemented
- identify and describe funding requirements and financial guaranties necessary for the successful delivery and operation of the proposed mitigation measures through the project lifecycle
- identify and describe proposed ownership model for the delivered marine infrastructure and supporting systems.

In addition to the standard conditions detailed in the ‘Maritime Safety Queensland guidelines for major development proposals’ with likely maritime impact, the EIS should address:

- operational procedures for adverse or construction-limiting weather, including but not limited to cyclone procedures for all vessels involved in the construction and operational phases of the project
- the anticipated requirement for pilotage based on the types and numbers of vessels to be used in the operation.

Furthermore, the EIS should also contain a commitment to:

- fund all operating and maintenance expenses associated with aids to navigation installation, removal, relocation required for the construction and operational phases of the project
- fund all operating and maintenance expenses associated with vessel traffic management services required for the construction and operational phases of the project.

Air services

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

5.11. Indigenous cultural heritage

5.11.1. Description of existing Indigenous cultural heritage values

Describe the existing Indigenous cultural heritage values that may be affected by the project and the scientific, social, spiritual and 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.

Describe how, in conjunction with the appropriate Indigenous people, the cultural heritage values were ascertained. This could include:

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

Undertake a cultural heritage assessment in accordance with processes and measures outlined in ACHA 2003 Duty of Care Guidelines.

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 places and sites of Indigenous cultural heritage values.

Define and describe the objectives and practical measures for protecting or enhancing Indigenous cultural and heritage environmental values in accordance with legislation,

best practice and the International Council on Monuments and Sites (ICOMOS) Guidelines. 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.

Describe the means of mitigating any negative impact on cultural heritage values and enhancing any positive impacts.

As a minimum, impact assessment, management and protection strategies should satisfy statutory responsibilities and duties of care. Consult with the Cultural Heritage Coordination Unit (Department of Aboriginal, Torres Strait Islander and Multicultural Affairs) as a source of information on 'duty of care' requirements.

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 that includes management and protection strategies for Indigenous cultural heritage or a cultural heritage management plan (CHMP) under the ACH Act. An NT agreement or an approved CHMP, in a form which complies with Part 7 of the ACH Act, will ensure that the project meets the Aboriginal cultural heritage duty of care under the ACH Act.

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.

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

- a process for including Indigenous peoples associated with the development areas in protection and management of Indigenous cultural heritage
- processes for managing and protecting identified cultural heritage sites and objects in the proposed development 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 which includes traditional owners or guided by traditional owners where possible
- 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.

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 that describes non-Indigenous cultural heritage sites and places, and their values in accordance with legislation, best practice including the ICOMOS Guidelines.

Describe the significance of artefacts, items or places of conservation or non-Indigenous cultural heritage value likely to be affected by the project and their values at a local, regional, state and national level.

Any such study should be conducted by an appropriately qualified cultural heritage practitioner and should include the following:

- consultation with:
  - the Australian Heritage Places Inventory
  - the Queensland Heritage Register and other information regarding places of potential non-Indigenous cultural heritage significance
  - any local government heritage register
  - any existing literature relating to the heritage of the affected areas
- liaison with relevant community groups/organisations (e.g. local historical societies) concerning:
  - places of non-Indigenous cultural heritage significance
  - opinion regarding significance of any cultural heritage places located or identified
- locations of culturally and historically significant sites, shown on maps, that are likely to 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 but not limited to the following:

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

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

6. Social values and management of impacts

6.1. Description of existing social values

A social impact assessment (SIA) should be conducted in consultation with the DSDIP Social Impact Assessment Unit.

Matters to be considered in the SIA include the social and cultural area, community engagement, a social baseline study, a workforce profile, potential impacts and mitigation measures and management strategies.

Social, economic and cultural values are not easily separated and therefore it may be necessary for some materials in this section to be cross referenced to other sections of the EIS.

6.1.1. Social and cultural area

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

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

6.1.2. Community engagement

Consistent with national and international good practice, the proponent should engage at the earliest practical stage with likely affected parties to discuss and explain the project, and to identify and respond to issues and concerns regarding social and cultural impacts.

Detail the community engagement processes used to conduct open and transparent dialogue with stakeholders. This dialogue should include the project's planning and

design stages and future operations including affected local and state authorities. Engagement processes will involve consideration of social and cultural factors, customs and values, and relevant consideration of linkages between environmental, economic, and social impact issues.

Discuss how complaint resolution will be addressed, for all stages of the project.

6.1.3. Social baseline study

Include a targeted baseline study of the people residing in the project's social and cultural area to identify the project's critical social issues, potential adverse and positive social impacts, and strategies and measures developed to address the impacts.

The social baseline study should be based on qualitative, quantitative, and participatory methods. It should be supplemented by community engagement processes, and reference relevant data contained in local and state government publications, reports, plans, guidelines and documentation, including regional plans and, where available, community plans.

The social baseline study should describe and analyse a range of demographic and social statistics determined relevant to the project's social and cultural area including:

- the identity, characteristics and aspirations of each community within the region, including Indigenous communities
- the name, location of communities, including history and size
- a description of social issues faced by local communities.
- total population (the total enumerated population for the social and cultural area and the full-time equivalent transient population), 18 years and older
- demographic characteristics (including the Indigenous population), including age and gender
- Indigenous population and demographic characteristics
- major population trends/changes that may be occurring irrespective of the project
- estimates of population growth and population forecasts resulting from the proposal
- family structures
- education, including schooling levels
- health and wellbeing measures
- cultural and ethnic characteristics
- median income including personal and household
- labour force by occupation and industry
- labour force by employment type (full time/ part time and employed/not employed)
- housing availability and affordability:
  - the rental market (size, vacancy rate, seasonal variations, weekly rent by percentage dwellings in each category)
  - the availability and typical costs of housing for purchase, monthly housing repayments by percentage dwellings in each category
  - the availability of social housing

- housing costs (monthly housing repayments (per cent of dwellings in each category), and weekly rent (per cent dwellings in each category), housing tenure type and landlord type, household and family type
- disability prevalence
- the social and economic index for areas, index of disadvantage—score and relative ranking
- key social and political organisations and service providers
- crime, including domestic violence
- any other indicators determined as relevant through the community engagement process.

Provide a profile of the local business community, including:

- a description of the key industries
- use of the project area for fishing, recreation, tourism
- Indigenous businesses.

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

- current social infrastructure, including community and civic facilities, services and networks
- settlement patterns, including the names, locations, size, history and cultural aspects of settlement in the social and cultural area
- the identity, values, lifestyles, vitality, characteristics and aspirations of communities in the social and cultural area, including Indigenous communities
- land use and land ownership patterns, including:
  - rural properties, farms, croplands and grazing areas including on-farm activities near the proposed activities
  - the number of properties directly affected by the project
  - the number of families directly and indirectly affected by the project, including Indigenous traditional owners and their families, property owners, and families of workers either living on the property or workers where the property is their primary employment
- social and cultural use of the area for forestry, fishing, recreation, business and industry, tourism, aquaculture, and Indigenous cultural use of flora and fauna.

6.1.4. Workforce profile

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

- 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**
- supply issues and strategies:
  - analysis of relevant local, state and national workforce profiles and labour supply
  - strategies and proposed programs for:

- recruitment and attraction
- population groups (including Indigenous, women, secondary school students and unemployed and underemployed)
- unskilled and semi-skilled labour requirements
- structured training (apprenticeships, traineeships, graduates)
- analysis of impact on local community workforce.

Estimates should be provided according to occupation groupings, employment tenure (full time, part time, contract) and variations in the workforce numbers for the duration of the project.

The fact sheet provided on Skills Queensland's website **www.skills.qld.gov.au/functions/significantprojects** provides essential information, contact and relevant program details for the development of the workforce management plan.

Estimates should be provided according to occupational groupings, employment tenure (full time/part time, permanent/contract) and variations in the workforce numbers for the duration of the project and show anticipated peaks in worker numbers during the construction period.

Provide an outline of recruitment schedules and policies for recruiting workers, addressing recruitment of local and non-local workers including Indigenous workers, people from culturally and linguistically diverse backgrounds and people with a disability.

Provide information on the location of other major projects or proposals under study within the social and cultural area, together with workforce numbers.

6.1.5. Workforce accommodation

If re-locatable camp sites are to be used to accommodate the workforce, provide details on the number, size, location (shown on a map), management, proximity to the construction site, and typical facilities for these sites. Information should outline any local government or other regulatory approvals required to establish and operate such camps, including building, health and safety and waste disposal purposes.

Options for the location/s of any workforce accommodation camps are to be determined in consultation with Cook Shire Council.

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
- include sufficient data to enable affected local and state authorities to make informed decisions about the project's effect on their business and plan for the provision of social infrastructure in the project's social and cultural area

- If the project is likely to result in a significant increase in the population of the area, then the proponent should consult the relevant management units of the state authorities and summarise the results of the consultations
- 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:
  - key population/demographic shifts; disruptions to existing lifestyles, the health and social wellbeing of families and communities; social dysfunction including alcohol and drugs, crime, violence, and social or cultural disruption due to population influx
  - the needs of vulnerable groups including women, children and young people, the aged and people with a disability
  - Indigenous peoples, including cultural property issues
  - impacts on Indigenous and local residents existing lifestyle and enterprises
  - local, regional and state labour markets, with regard to the source of the workforce. Present this information according to occupational groupings of the workforce. Detail whether the proponent, and/or contractors, is likely to employ locally or through other means and whether there are initiatives for local employment business opportunities
  - proposed new skills and training related to the project including the occupational skill groups required and potential skill shortages anticipated
  - how much service revenue and work from the project would be likely to flow to the project's social and cultural area
  - impacts of construction and operational workforces, their families, and associated contractors on housing and accommodation availability and affordability, land use and land availability
  - discuss the capability of the existing housing and rental accommodation market in the region, to meet any additional demands created by the project
  - discuss conflict with surrounding recreational and commercial users
  - impacts of communities where sizeable workforce numbers will be drawn from
  - impacts on infrastructure caused by construction/operational workforce
  - identify, avoid and minimise, through changes to the project design and implementation, the unintended negative community health and wellbeing impacts that can arise
  - provide an equitable, transparent and evidence-based approach to planning and funding community health infrastructure and development activities to protect and enhance sustainable local livelihoods
  - identify existing community health problems, which could amplify the impact of a proposed project and affect its viability
  - provide a process through which the project can work in partnership with local health, social care, and welfare services to jointly alleviate these health problems

– help to make explicit the potential trade offs between community health and wellbeing and other economic, environmental and social objectives of the proposed project.

Evaluate and discuss the potential cumulative social impacts resulting from the project including an estimation of the overall size, significance and likelihood of those impacts. In this context, 'cumulative impacts' is defined as the additional impacts on population, workforce, accommodation, housing, 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.

Evaluate the feasibility of providing up to 75 per cent of the workforce to be drawn from regional Indigenous communities.

6.2.1. 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
- housing and accommodation issues—the Major Resource Projects Housing Policy (Department of Employment, Economic Development and Innovation 2011) sets out the core principles to guide the identification and assessment of accommodation and housing impacts, and development of mitigation and management strategies
- demographic changes in the profile of the region and the associated sufficiency of current social infrastructure, particularly health and welfare, education, policing and emergency services
- adequate provision of education, training and employment for women, people with a disability, and Indigenous peoples
- health impacts resulting from social isolation within the accommodation camps. This should include but not be limited to alcohol management, smoking and drug management.

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

Present a draft social impact management plan (SIMP) that promotes an active and ongoing role for impacted communities and local authorities through the project life cycle. The draft SIMP should cover:

- assignment of accountability and resources
- updates on activities and commitments
- mechanisms to respond to public enquiries and complaints
- mechanisms to resolve disputes with stakeholders
- periodic evaluation of the effectiveness of community engagement processes
- practical mechanisms to monitor and adjust mitigation strategies and action plans

- action plans to implement mitigation strategies and measures.

For further information on preparing the SIMP, refer to *Social impact assessment: Guideline to preparing a social impact management plan* (Department of Infrastructure and Planning 2010).

7. Economic values and management of impacts

7.1. Economy

7.1.1. Description of affected local and regional economies

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

- a map illustrating the local and regional economies (local government areas) that could be potentially affected by the project
- gross regional product or other appropriate measure of annual economic production
- population
- labour force statistics
- economic indicators
- the regional economy's key industries and their contribution to regional economic income
- contribution to the state economy
- the key regional markets relevant to the project:
  - labour market
  - housing, land and rental accommodation markets
  - construction services and building inputs market
  - education and training market
- regional competitive advantage and expected future growth.

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

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

7.1.2. Potential impacts

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

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

- property values
- industry output

- impact of project construction and operation, including additional marine transport, on commercial boating and fishing
- employment including further analysis on Indigenous employment opportunities
- the indirect impacts likely to flow to other industries and economies from the development of the project. This should also consider the implications of the project for future development
- the distributional effects of the proposal, including proposals to mitigate any negative impact on disadvantaged groups.

Strategies for local participation

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

- strategies for assessing the cost effectiveness of sourcing local inputs from the regional economy during the construction, operation and rehabilitation phases of the project
- employment strategies for local residents including members of Indigenous communities and people with a disability, including a skills assessment and recruitment and training programs to be offered
- strategies responding to relevant government policy, relating to:
  - the level of training provided for construction contracts on Queensland Government building and construction contracts, with regard to the Queensland Government Building and Construction Contracts Structured Training Policy (the 10 per cent policy) (see **http://training.qld.gov.au/industry/10percent-policy.html**)
  - Indigenous employment opportunities, with regard to 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)
  - development of a Local Industry Participation Plan under the Local Industry Policy (Department of Employment, Economic Development and Innovation 2010) in conjunction with the DSDIP Office of Advanced Manufacturing to embrace the use of locally sourced goods and services.

Impact upon property management

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

- impact of the project on existing agricultural land uses and management practices (e.g. disruption to stockyards, fences, water points, movement of livestock, agricultural machinery and any loss of agricultural land)
- range of measures required to mitigate real and potential disruptions to rural practices and management of properties.

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
  - include sufficient data to enable affected local and state authorities to make informed decisions about the project's effect on their business and plan for the provision of social infrastructure in the project's social and cultural area. If the project is likely to result in a significant increase in the population of the area, then the proponent should consult the relevant management units of the state authorities and summarise the results of the consultations
  - 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:
    - key population/demographic shifts; disruptions to existing lifestyles, the health and social wellbeing of families and communities; social dysfunction including alcohol and drugs, crime, violence, and social or cultural disruption due to population influx
      the needs of vulnerable groups including women, children and young people, the aged and people with a disability
    - Indigenous peoples including cultural property issues
    - impacts on Indigenous and local residents existing lifestyle and enterprises
    - local, regional and state labour markets, with regard to the source of the workforce. Present this information according to occupational groupings of the workforce. 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
    - proposed new skills and training related to the project including the occupational skill groups required and potential skill shortages anticipated
    - how much service revenue and work from the project would be likely to flow to the project's social and cultural area
    - impacts of construction and operational workforces, their families, and associated contractors on housing and accommodation availability and affordability, land use and land availability
    - discuss the capability of the existing housing and rental accommodation market in the region to meet any additional demands created by the project
    - discuss conflict with surrounding recreational and commercial users
    - impacts of communities where sizeable workforce numbers will be drawn from
    - impacts on infrastructure caused by construction/operational workforce
    - evaluate and discuss the potential cumulative social impacts resulting from the project including an estimation of the overall size, significance and likelihood

of those impacts. In this context, ‘cumulative impacts’ is defined as the additional impacts on population, workforce, accommodation, housing, 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.

  - evaluate the feasibility of providing up to 75 per cent of the workforce to be drawn from regional Indigenous communities.

7.1.3. Mitigation measures

- 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
  - housing and accommodation issues, the *Major resource projects housing policy* (Department of Employment, Economic Development and Innovation 2011) sets out the core principles to guide the identification and assessment of accommodation and housing impacts and development of mitigation and management strategies
  - demographic changes in the profile of the region and the associated sufficiency of current social infrastructure, particularly health and welfare, education, policing and emergency services
  - adequate provision of education, training and employment for women, people with a disability, and Indigenous peoples
- describe any consultation about acceptance of proposed mitigation strategies and how practical management and monitoring regimes are proposed to be implemented
- present a draft social impact management plan (SIMP) that promotes an active and ongoing role for impacted communities and local authorities through the project life cycle. The draft SIMP should cover:
  - assignment of accountability and resources
  - updates on activities and commitments
  - mechanisms to respond to public enquiries and complaints
  - mechanisms to resolve disputes with stakeholders
  - periodic evaluation of the effectiveness of community engagement processes
  - practical mechanisms to monitor and adjust mitigation strategies and action plans
  - action plans to implement mitigation strategies and measures.

  For further information on preparing the SIMP, refer to *Social impact assessment: Guideline to preparing a social impact management plan* (Department of Infrastructure and Planning 2010).

7.2. 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.

8. Hazard and risk

8.1. Hazard and risk assessment

Conduct a hazard identification study to identify the nature and scale of hazards that might occur during the construction and operation of the project. This would be expected to include hazards involving:

- remoteness of the location and site accessibility
- fatigue
- construction accidents
- potential wildlife hazards including risks from mosquitoes, marine fauna, crocodiles
- vehicle incidents including collisions with fauna
- underground mining incidents, including explosions
- conveyor or storage vessel rupture or loss of containment, and explosions and fires associated with such incidents
- release to the environment of liquid gaseous or particulate pollutants or any other hazardous material used, produced or stored on the site
- all hazardous substances to be used, stored, processed or produced and the rate of usage
- marine collision
- spills of materials during loading, unloading and transport
- the extent of heatflux and/or overpressure zones following hazard/ignition incidents (e.g. in terms of 23 kW/m^2, 5 kW/m^2 heatflux and 35 kPa and 7 kPa overpressure end points)
- natural events such as cyclones, storm surges, heat waves, earthquakes, bushfires or local flooding and hazards.

External risks could be determined on the basis of Australia/New Zealand AS/NZS ISO 31000:2009 *Risk management—Principles and guidelines* (Standards Australia & Standards New Zealand 2009). With respect to risk assessment, the EIS should:

- deal comprehensively with external and on-site risks, including transport risks

- assess risks during the 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).

A set of representative incident scenarios should be selected. This set should include credible event scenarios (e.g. a catastrophic failure of a processing unit and the consequential explosion zone). This will require an evaluation of the likelihood of each scenario occurring in order to calculate the level of risk in surrounding areas due to the presence of the facility.

The risk analysis should include fatality and serious injury consequences, and present individual fatality risk contours at 0.5, 1, 5, 10, and 50 x 10^{-6} per year and injury risk contours at 10 and 50 × 10^{-6} per year. Risk contours should be presented on a suitably scaled location map.

In addition, undertake a detailed risk assessment of the plant and associated operational activities to identify risks and mitigation measures to ensure containment within the site boundaries, so as not to impact on future industrial development on adjacent industrial land. Any identified impact on the project should also be extended to determine the resultant impact on the surrounding areas and community.

Assess the acceptability of the risk on site and to surrounding land uses by referring to nationally adopted risk criteria presented in the New South Wales Department of Urban Affairs and Planning's *Hazardous Industry Planning Advisory Paper No. 4: Risk Criteria for Land Use Safety Planning* (Department of Planning (NSW) 2008)). Provide details of the methodology and results of each step described above.

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 in the area, as a result of the proposed project (where details of such proposed facilities are provided by DSDIP 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 and workforce from project operations and emissions. Recommend any practical monitoring regimes in this section.

Assess the impacts on the national parks visitors and recreational needs of staff. Discuss measures to resolve conflicts with access.

8.4. Emergency management plan

Develop emergency planning and response procedures in consultation with state and regional emergency service providers including:

- implementation of emergency response plans detailing mitigation strategies to achieve specific outcomes as outlined in the *State Planning Policy 1/03: Guideline for Mitigating the Adverse Impacts of Flood, Bushfire and Landslide* (Department of Local Government and Planning & Department of Emergency Services 2003b)
- hazard analysis and risk assessment undertaken in accordance with 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)
- all dangerous goods, explosives and hazardous substances used, stored and handled in accordance with relevant legislation
- development of safety management plans and emergency response procedures in consultation with state and regional emergency service providers and provide an adequate level of training to staff who will be tasked with emergency management activities
- compliance where necessary with the *Fire and Rescue Service Act 1990*.

Provide an outline of the proposed integrated emergency management planning procedures (including evacuation plans, if required) for the range of situations identified

in the risk assessment developed in this section. This includes strategies to deal with natural hazards during operation and construction.

Due to the distance involved and the delay in any QFRS response it is imperative the project's on-site emergency response plan considers:

- an all hazards approach to risk assessments
- proposed controls and mitigation measures for each hazard, including preventative and responsive measures
- the formation and training of emergency response teams
- compatibility of the project's emergency equipment and procedures with QFRS operational procedures.

8.5. Maritime security plan

The development of emergency planning and response procedures is to be determined in consultation with Australian government, state and regional emergency service providers and prepared and submitted separately to the EIS.

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

Provide information on the design and operation of proposed safety and contingency systems to address Queensland's counter-terrorism and critical infrastructure protection policies and arrangements and an operational security plan.

The emergency management plan is to include a confidential maritime security plan that meets the Australian Government security requirements pursuant to the requirements of the *Maritime Transport and Offshore Facilities Security Act 2003* and Maritime Transport and Offshore Facilities Security Regulation 2003 (Cwlth) and the International Ship and Port Facility Security Code (International Maritime Organization 2003).

The maritime security plan, which is to be developed in consultation with national and state maritime security representatives and incorporated in the EIS, should contain:

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

- specific requirements that are detailed in Regulation 3.20 of the Maritime Transport and Offshore Facilities Security Regulation.

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

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

All contractors will be required to hold a maritime security identification card and all goods, including vehicles, weapons and people, are required to be screened and cleared before entering cleared zones.

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 DSDIP to be in the region, to the greatest extent practicable.

Assess the project's contribution to cumulative impacts with respect to both geographic location and environmental values.

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).

Regarding local impacts and the contribution to regional cumulative impacts, matters of particular consideration include:

- transport network, including impacts to the local and state-controlled roads, port and air services (see also Part B, Section 5.10)
- shipping numbers and impacts on trading vessel density with in the inner route of the Great Barrier Reef
- housing availability and affordability (see also Part B, Section 6)
- workforce and skills availability, including workforce recruitment and training opportunities and local industry participation (see also Part B, Section 6)
- shipping impacts with existing commercial and recreational fishing operations
- recreational use

- assess the project's contribution to cumulative impacts with regard to geographic location, environmental and cultural values.

10. Environmental management plans

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

The EMPs 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, including strategies for:
  - continuous improvement
  - environmental auditing
  - monitoring
  - reporting
  - staff training
  - a rehabilitation program for land proposed to be disturbed under each relevant aspect of the proposal.

The recommended structure of each element of the EMPs is:

Element/issue	Aspect of construction or operation to be managed (as it affects environmental values).
Operational policy	The operational policy or management objective that applies to the element.
Performance criteria	Measurable performance criteria (outcomes) for each element of the operation.
Implementation strategy	The strategies, tasks or action program (to nominated operational design standards) that would be implemented to achieve the performance criteria.
Monitoring	The monitoring requirements to measure actual performance (e.g. specified limits to pre-selected indicators of change).
Auditing	The auditing requirements to demonstrate implementation of agreed construction and operation environmental management strategies and compliance with agreed performance criteria.
Reporting	Format, timing and responsibility for reporting and auditing of monitoring results.

Corrective action	The action (options) to be implemented in case a performance requirement is not reached and the person(s) responsible for action (including staff authority and responsibility management structure).

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

11. 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.

12. References

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

13. Appendices

Include the following as appendices to the EIS:

- the final TOR
- a cross-reference table that 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
- a consultation report, which includes the methodology used in the public consultation plan including:
  - criteria for identifying stakeholders and the communication methods used (the consultation plan)
  - a list of stakeholders identified, including the Australian government, state and local government agencies, and/or the affected parties (as defined by the EP Act)
  - a summary of the issues raised by stakeholders and the means by which the issues have been addressed
  - plans for ongoing consultation to be outlined and included in the EMP.
- a list of the relevant qualifications and experience of the key study team members and specialist sub-consultants
- a glossary of technical terms
- All reports generated on specialist studies undertaken as part of the EIS. These may include, but are not limited to:
  - air pollution

  - cultural heritage
  - cumulative impacts
  - economic studies and/or cost-benefit analyses
  - emergency plan
  - flora and fauna and biodiversity (including coastal and marine ecology)
  - flooding, groundwater and surface water hydrology (including coastal and marine)
  - geology, soils and geomorphology
  - hazard and risk studies
  - land use and land capability studies
  - marine hydrodynamics
  - mineral resources analysis in accordance with the JORC Code
  - noise and vibration
  - public consultation report
  - scenic amenity
  - social impact management plan (SIMP)
  - transport studies
- 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, together with a reference to the relevant section in the report.

Acronyms and abbreviations

Acronym/abbreviation	Definition
ACH Act	*Aboriginal Cultural Heritage Act 2003* (Qld)
AS/NZS	Australian standard/New Zealand standard
BIBO	bus-in bus-out
CAMBA	China–Australia Migratory Bird Agreement
CHMP	cultural heritage management plan
DEHP	Department of Environment and Heritage Protection (formerly DERM)
DERM	The former Department of Environment and Resource Management, Queensland
DIDO	drive-in drive-out
DSDIP	Department of State Development, Infrastructure and Planning, Queensland
EIS	environmental impact statement
EMP	environmental management plan
EP Act	*Environmental Protection Act 1994* (Qld)
EPA	former Queensland Environmental Protection Agency
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EPC	exploration permit for coal
EPP	environmental protection policy
ERA	environmentally relevant activity
FHMOP	fish habitat management operational policies
FIFO	fly-in fly-out
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
GBRWHA	Great Barrier Reef World Heritage Area
HAT	highest astronomical tide
ICOMOS	International Council on Monuments and Sites
JAMBA	Japan–Australia Migratory Bird Agreement
LAT	lowest astronomical tide
MNES	matters of national environmental significance (under the EPBC Act)
MRA	*Mineral Resources Act 1989* (Qld)
NC Act	*Nature Conservation Act 1992* (Qld)
NGA	National Greenhouse Accounts
NT agreement	native title agreement
NWQMS	National Water Quality Management Strategy
QASSIT	Queensland Acid Sulfate Soils Investigation Team
REDD	Regional Ecosystem Description Database
RIA	road impact assessment
RMP	road-use management plan
ROKAMBA	Republic of Korea–Australia Migratory Bird Agreement

SDPWO Act	*State Development and Public Works Organisation Act 1971* (Qld)
SEWPaC	Australian Government Department of Sustainability, Environment, Water, Population and Communities
SIA	social impact assessment
SPA	*Sustainable Planning Act 2009* (Qld)
The proponent	Aust-Pac Capital Pty Ltd
TMR	Department of Transport and Main Roads, Queensland
TOR	terms of reference
VM Act	*Vegetation Management Act 1999* (Qld)

References

Agriculture and Resource Management Council of Australia and New Zealand and Australian and New Zealand Environment Conservation Council 1995*, Guidelines for Groundwater Protection*, viewed 15 December 2010 <http://www.mincos.gov.au/__data/assets/pdf_file/0010/316099/guidelines-for-groundwater-protection.pdf>.

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>.

Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand 2000b, *Australian Guidelines for Water Quality Monitoring and Reporting*, viewed 15 December 2010, <http://www.mincos.gov.au/publications/australian_guidelines_for_water_quality_monitoring_and_reporting>.

Coalfields Geology Council of New South Wales and Queensland Mining Council 2003, *Australian Guidelines for the Estimating and Reporting of Inventory Coal, Coal Resources and Coal Reserves*, Joint Ore Reserves Committee, viewed 24 February 2012, <http://www.jorc.org/pdf/coalguidelines.pdf>.

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>.

——2009a, *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>.

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

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

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 7 June 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>.

——2011, *Major resource projects housing policy*, Department of Employment, Economic Development and Innovation, Brisbane, viewed 17 July 2012, <http://www.deedi.qld.gov.au/cg/resources/Major-Resource-Projects-Housing-Policy.pdf>.

Department of Environment 1998, *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland,* Department of Environment, Brisbane, viewed 17 July 2012, <http://www.ehp.qld.gov.au/register/p00090aa.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>.

——2010a, *Guideline: Coastal Protection and Management Act 1995—Reclaiming land under tidal water*, Department of Environment and Resource Management, Brisbane, viewed 16 January 2012, <http://www.derm.qld.gov.au/register/p00942aa.pdf>.

——2011a, *Guideline: Coastal development—Allocation of quarry material*, Department of Environment and Resource Management, Brisbane, viewed 16 January 2012, <http://www.derm.qld.gov.au/register/p00934aa.pdf>.

——2011b, *Guideline: Rehabilitation for mining projects*, Department of Environment and Resource Management, Brisbane, viewed 17 January 2011, <http://www.derm.qld.gov.au/register/p01673aa.pdf>.

——2011c, Policy for Vegetation Management Offsets, version 3, Department of Environment and Resource Management, Brisbane, viewed 17 July 2012, <http://www.derm.qld.gov.au/environmental_management/environmental-offsets/pdf/policy-for-vegetation-management-offsets.pdf>.

——2011d, State Planning Policy 3/11: Coastal Protection, Department of Environment and Resource Management, Brisbane, viewed 17 July 2012, <http://www.ehp.qld.gov.au/coastalplan/pdf/qcp-web-coastal-protection.pdf>.

——2011e, State Policy: Coastal Management, Department of Environment and Resource Management, Brisbane, viewed 17 July 2012, <http://www.ehp.qld.gov.au/coastalplan/pdf/qcp-web-coastal-management.pdf>.

——2011f, Queensland Biodiversity Offset Policy, version 1, Department of Environment and Resource Management, Brisbane.

——2012a, *Queensland Coastal Plan*, Department of Environment and Resource Management, Brisbane, viewed 17 July 2012, <http://www.ehp.qld.gov.au/coastalplan/pdf/qcp-web.pdf>.

Department of Infrastructure and Planning 2010, *Social impact assessment: Guideline to preparing a social impact management plan*, Department of Infrastructure and Planning, Brisbane, viewed 17 July 2012, <http://www.deedi.qld.gov.au/cg/resources/guideline/simp-guideline.pdf>.

Department of Local Government and Planning and Department of Emergency Services 2003a, State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide, viewed 22 December 2010, <http://www.emergency.qld.gov.au/publications/spp/pdf/spp.pdf>.

——2003b, *State Planning Policy 1/03: Guideline for Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*, Department of Local Government and Planning and Department of Emergency Services, Brisbane, viewed 19 July 2012, <http://www.emergency.qld.gov.au/publications/spp>.

Department of Main Roads 2006, *Guidelines for Assessment of Road Impacts of Development*, Department of Main Roads, Brisbane, viewed 20 December 2010, <http://www.tmr.qld.gov.au/~/media/ace67ef2-b6c3-46a3-91a7-39f790c309fe/garid_guidelines_200406.pdf>.

Department of Mines and Energy 2007a, State Planning Policy 2/07: Protection of Extractive Resources, viewed 3 August 2011, <http://mines.industry.qld.gov.au/assets/land-tenure-pdf/dme_stateplan_policy_1.pdf >.

——2007b, *State Planning Policy 2/07 Guideline: Protection of Extractive Resources*, Department of Mines and Energy, Brisbane, viewed 3 August 2011, <http://mines.industry.qld.gov.au/assets/land-tenure-pdf/dme_stateplan_guideline.pdf>.

Department of Minerals and Energy 1995, *Tailings Management Guideline*, Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland, Department of Minerals and Energy, Brisbane, viewed 16 January 2012, <http://www.derm.qld.gov.au/register/p01206ar.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 17 July 2012, <http://www.dsdip.qld.gov.au/resources/policy/ass-spp-oct-02.pdf>.

——2002b, 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 17 July 2012, <http://www.dsdip.qld.gov.au/resources/policy/spp-guidelines-oct-02-v2.pdf>.

Department of Planning (NSW) 2008, *Hazardous Industry Planning Advisory Paper No. 4: Risk Criteria for Land Use Safety Planning*, consultation draft, Sydney, viewed 21 December 2010, <http://www.planning.nsw.gov.au/plansforaction/pdf/hazards/haz_hipap4_rev2008.pdf>.

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

Department of Primary Industries and Department of Housing, Local Government and Planning 1992, State Planning Policy 1/92: Development and the Conservation of Agricultural Land, viewed 17 March 2011, <http://www.dlgp.qld.gov.au/docs/ipa/spp1_92.pdf>.

——1993, *Planning guidelines: The identification of good quality agricultural land*, Department of Primary Industries and Department of Housing, Local Government and Planning, Brisbane, viewed 17 July 2012, <http://www.dsdip.qld.gov.au/resources/policy/plng-guide-identif-ag-land.pdf>.

Derbyshire, K 2006, *Fisheries Guidelines for Fish-Friendly Structures—Fish Habitat Guideline 006*, Department of Primary Industries and Fisheries, viewed 3 August 2011, <http://www.dpi.qld.gov.au/documents/Fisheries_Habitats/FHG006-Fish-Habitat-Guideline.pdf>.

Dixon, M and Beumer, J 2002, *Mitigation and Compensation for Works or Activities Causing Marine Fish Habitat Loss: Departmental procedures*, *Fish Habitat Management Operational Policy FHMOP 005*, Queensland Fisheries Service, Department of Primary Industries, Brisbane, viewed 17 July 2012, <http://www.dpi.qld.gov.au/documents/Fisheries_Habitats/FHMOP005-Fish-Hab-Manage.pdf>

Environmental Protection Agency 2000, *Noise Measurement Manual*, 3rd edn, Environmental Protection Agency, viewed 3 August 2011 <http://www.derm.qld.gov.au/register/p00367aa.pdf>.

——2001, *State Coastal Management Plan – Queensland's Coastal Policy*, Environmental Protection Agency, viewed 3 August 2011, <http://www.derm.qld.gov.au/environmental_management/coast_and_oceans/coastal_management/state_coastal_management_plan/>.

——2002, *Establishing Draft Environmental Values and Water Quality Objectives,* viewed 21 February 2012, <http://www.derm.qld.gov.au/register/p01551aa.pdf>

——2004, *Guideline: Planning for Noise Control*, Environmental Protection Agency, viewed 3 August 2011, <http://www.derm.qld.gov.au/services_resources/item_details.php?item_id=200539>.

——2006, *Guideline: Noise and vibration from blasting*, Environment Protection Agency, viewed 20 December 2010, <http://www.derm.qld.gov.au/register/p01382aa.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 17 July 2012, <http://www.ehp.qld.gov.au/register/p02501aa.pdf>.

Great Barrier Reef Marine Park Authority 2009, *Water Quality Guidelines for the Great Barrier Reef Marine Park*, viewed 15 December 2010, <http://www.gbrmpa.gov.au/__data/assets/pdf_file/0016/33802/Water_Quality_Guidelines_for_the_GBR.pdf>.

Hopkins, E, White, M and Clarke A 1998, *Restoration of fish habitats: Fisheries guidelines for marine areas*, Fisheries Habitat Guideline 002, Department of Primary Industries, viewed 3 August 2011, <http://www.dpi.qld.gov.au/documents/Fisheries_Habitats/FHG002-Fish-Habitat-Guideline.pdf>.

Hopkins, E and White, M 1998, *Dredging, Extraction and Spoil Disposal Activities: departmental procedures for provision of fisheries comments*, Queensland Department of Primary Industries, Fish Habitat Management Operational Policy FHMOP 004, viewed 10 February 2012, <http://www.dpi.qld.gov.au/documents/Fisheries_Habitats/FHMOP004-Fish-Hab-Manage.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 Council on Monuments and Sites 2004, *International Charter for Conservation and Restoration, Monuments and Sites*, International Council on Monuments and Sites, Munchen.

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

Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia 2004, *Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore reserves*, Joint Ore Reserves Committee, viewed 22 December 2010, <http://www.jorc.org/main.php>.

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.

Queensland Acid Sulfate Soils Investigation Team 2002, *Queensland Acid Sulfate Soil Technical Manual*, viewed 27 February 2012, <http://www.derm.qld.gov.au/land/ass/products.html>.

Standards Australia 1990, *Evaluation of human exposure to whole-body vibration – Continuous and shock-induced vibration in buildings (1 to 80 Hz)* (AS 2670.2-1990), Standards Australia, Sydney.

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).

PO Box 15517
City East Qld 4002 Australia

Tel. 13 25 23 or +61 7 3404 6999
www.projects.industry.qld.gov.au

Queensland Government