

## Terms of reference for an environmental impact statement

### Final terms of reference (TOR) for the Codrilla Project EIS

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## Background

The proponent for the Codrilla Mine Project is the Bowen Basin Coal Joint Venture (BB Coal JV), which is a joint venture between BB Interests Pty Ltd (85%) and CITIC Bowen Basin Pty Ltd (15%). The project would involve the development of a conventional truck and excavator open cut coal mine producing an average of approximately 2.7 million tonnes a year of pulverised coal injection and thermal coal for export. The project is located approximately 45 km south south west of Nebo in Central Queensland and approximately 120 km south west of Mackay. The project would consist of at least two mining lease (ML) applications. The main ML would contain the mining operations and infrastructure, and be wholly located within the existing tenement of Exploration Permit Coal (EPC) 676. The second ML would be contain the haul road from the Codrilla Coal Mine either to the Olive Downs Coal Mine haul road located within ML 70355 (EPCs 676, 952, 1146 and 649), or to the Moorvale Mine on ML 70290 (EPCs 676, 1044, 1146 and 649).

Run of mine coal would be processed on site using conventional Coal Handling and Preparation Plant technologies. Process waste would be disposed of at on site facilities. While the method of process waste disposal is yet to be determined, it would likely consist of one or more of the following: separate disposal of tailings slurry and coarse reject; co-disposal of tailings slurry and coarse reject; and or dried tailings disposed of, combined with, or separately to coarse reject. Product coal would be transported approximately 31km to the existing Moorvale Mine train loading facility using road trains via a purpose built private haul road. Coal would then be transported to Dalrymple Bay Coal Terminal for export. It is anticipated that additional resources would be defined by the ongoing exploration program potentially extending the life of the mine beyond 16 years.

It is also anticipated that the project would involve significant associated civil works, including:

- realignment of the Fitzroy Development Road to enable full recovery of the economic coal resource;
- a grade separated crossing of the Fitzroy Development Road by an internal mine haul road;
- crossing of Devlin Creek or minor tributaries by the haul road; and
- diversion of Devlin Creek to enable full recovery of the economic coal resource.

### ***Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)***

The project is a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The State's EIS process has been accredited for the assessment under Part 8 of the EPBC Act in accordance with the Bilateral Agreement between the Commonwealth of Australia and the State of Queensland (2009). The controlling provisions are sections 18 and 18A (Listed threatened species and communities).

# CONTENT OF THE EIS

## Executive summary

The function of the executive summary is to 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 and avoid the use of jargon and esoteric terms. The structure of the executive summary should follow that of the EIS, and focus strongly on the key issues and conclusions.

## Glossary of terms

A glossary of technical terms, acronyms and abbreviations shall be provided before the main text of the EIS.

## 1 Introduction

The introduction should explain why the EIS has been prepared and what it sets out to achieve. In particular, the introduction should address the level of detail of information required to meet the level of approval being sought. It should define the audience to whom it is directed, and contain an overview of the structure of the document. Throughout the EIS, factual information contained in the document should be referenced.

### 1.1 Project proponent

This section should provide details of the Project proponents, including details of joint venture and partners.

### 1.2 Project description

A brief description of the key elements of the Project should be provided. Any major associated infrastructure requirements will be summarised with details of the Project presented in Section 3. The location of the Project and its infrastructure requirements will be described and mapped showing the location of the Project in relation to adjacent rail and road infrastructure, the existing and propose crossing points and access arrangements.

A brief description will be provided of studies or surveys that have been undertaken for the purposes of developing the Project and preparing the EIS. This will include reference to relevant baseline studies or investigations undertaken previously.

### 1.3 Project objectives and scope

This section will:

- provide a statement of the objectives which have led to the development of the proposal and a brief outline of the events leading up to the proposal's formulation, including alternatives, envisaged time scale for implementation and Project life, anticipated establishment costs and actions already undertaken within the Project area;
- describe the current status of the Project and outline the relationship of the Project to other developments or actions that may relate whether or not they have been approved; and
- discuss the consequences of not proceeding with the Project.

### 1.4 The environmental impact statement (EIS) process

The purpose of this section is to make clear the methodology and objectives of the environmental impact statement under the relevant legislation.

#### 1.4.1 Methodology of the EIS

This section should provide a description of the EIS process steps, timing and decisions to be made for relevant stages of the Project. A brief description should be provided of studies or surveys that have been undertaken for the purposes of developing the project and preparing the EIS. This should include reference to relevant baseline studies or investigations undertaken previously. This section should also indicate how the consultation process (which will be described in detail in section 1.5) integrates with the other components of the impact assessment, including the stages, timing and mechanisms for public input and participation. The information in this section is required to ensure:

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

### 1.4.2 Objectives of the EIS

Having described the methodology of the EIS, a succinct statement should be made of the EIS objectives. The structure of the EIS can then be outlined as an explanation of how the EIS will meet its objectives. The reader should be able to distinguish the EIS as the key environmental document providing advice to decision makers considering approvals for the Project.

While the terms of reference provide guidance on the scope of the EIS studies, they should not be seen as exhaustive or limiting. It is important for proponents and their consultants to recognise that there cannot be perfect knowledge in advance of undertaking an EIS of what the EIS studies may find.

**If it transpires during the preparation of the EIS that previously unforeseen matters not addressed in the terms of reference are found to be relevant to the assessment of impacts of the proposal, those matters should be included in the EIS.**

**In addition, it is essential that the main text of the EIS should address all relevant matters concerning environmental values, impacts on those values and proposed mitigation measures. No relevant matter should be raised for the first time in an appendix or the draft environmental management plan (EM plan).**

**The depth and scope of the assessment in the EIS will need to be commensurate with the values to be impacted and the scale of the impacts. When considering whether an impact is or is not significant, the proponent should take account of both the intensity of the impact and the context in which it would occur.**

The EIS is a public document. Its purpose is not only to provide information to regulatory agencies, but also to inform the public of the scope, impacts and mitigation measures of the proposal. As such, the main text should be written in plain English avoiding jargon as much as possible. Additional technical detail may be provided in appendices. The main text should not assume that a reader would have a prior knowledge of the Project site. It should not be necessary for the reader to have visited the site to understand the issues involved in the proposal.

In brief, the EIS objectives should be to provide public information on the need for and likely effects of the Project, to set out acceptable standards and levels of impacts (both beneficial and adverse) on environmental values, and demonstrate how environmental impacts can be managed through the protection and enhancement of the environmental values. Discussion of options and alternatives and their likely relative environmental management outcomes is a key aspect of the EIS.

The role of the EIS in providing the Project's draft EM Plan should also be discussed, with particular reference to the EM Plan's role in providing management measures that can be carried over into conditions that would attach to any approval(s), environmental authorities and permits for the Project.

### 1.4.3 Submissions

The reader should be informed as to how and when public submissions on the draft EIS can be made, and how they will be addressed and taken into account in the decision-making process.

## 1.5 Public consultation process

An appropriate public consultation program is essential to the impact assessment. This section should outline the methodology that will be adopted to identify and mitigate socio-economic impacts of the Project. Information about the consultation that has already taken place and the results of such consultation should be provided.

The submission of a list of affected persons and interested persons as well as a statement of how the proponent proposes to consult with those persons is a statutory requirement of the EIS process in the *Environmental Protection Act 1994* (EP Act) (See section 8). Similar requirements, though non-statutory, are usually applied to EIS processes under other State legislation.

The public consultation program should provide opportunities for community involvement and education. It may include interviews with individuals, public meetings, interest group meetings, production of regular summary

information and updates and other consultation mechanisms to encourage and facilitate active public consultation.

The public consultation process should identify broad issues of concern to local community and interest groups and should continue from Project planning through commissioning, Project operations and final decommissioning. Refer to the DERM guideline *Issue Identification and Community Consultation*.

## **1.6 Project approvals**

### **1.6.1 Relevant legislation and policy requirements**

This section should explain the legislation and policies controlling the approvals process. Reference should be made to the Queensland *Environmental Protection Act 1994*, *Sustainable Planning Act 2009* and other potentially relevant Queensland laws. Any requirements of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* should also be included.

The EIS should identify all environmentally relevant activities that would be undertaken at the project site, including those that would otherwise require a development approval if the project were not covered by an environmental authority for a mining or petroleum activity.

If any potentially relevant legislation (such as the *Water Act 2000* for taking water, the *Nature Conservation Act 1992* for protected wildlife and plants, or the *Vegetation Management Act 1999* (for clearing) is not applicable, this section of the EIS should explain why.

Local Government planning controls, local laws and policies applying to the development should be described, and a list provided of the approvals required for the project and the expected program for approval of applications.

This information is required to assess how the legislation applies to the proposal, which agencies have jurisdiction, and whether the proposed impact assessment process is appropriate.

### **1.6.2 Planning processes and standards**

This section should discuss the Project's consistency with existing land uses or long-term policy framework for the area (e.g. as reflected in local and regional plans such as the Central Queensland Strategy for Sustainability – 2004 and Beyond), and with legislation, standards, codes or guidelines available to monitor and control operations on site. This section should refer to all relevant State and regional planning policies. In particular, this section will highlight requirements of the EP Act, such as ESD, 'best practice environmental management', 'general environmental duty', relevant Environmental Protection Policies (EPPs) i.e. Air, Noise, Water and Waste Management, the *Environmental Protection Regulation 2008* (EP Reg) and *Environmental Protection (Waste Management) Regulation 2000*.

Local Government planning controls, local laws and policies applying to the development will also be described together with a list of the approvals required for the Project and the expected timetable for approval of the various applications.

This information is required to demonstrate how the proposal conforms to State, regional and local plans for the area.

## **1.7 Accredited process for controlled actions under Commonwealth legislation**

Projects that are undergoing an EIS under a State statutory process may also be controlled actions under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In which case, the Commonwealth may accredit the State's EIS process for the purposes of the Commonwealth's assessment under Part 8 of the EPBC.

When a State EIS process has been accredited, it will be necessary for the terms of reference to address potential impacts on the matters of national environmental significance (NES) that were identified in the 'controlling provisions' when the project was declared a controlled action. Schedule 4 of the Commonwealth's Environment Protection and Biodiversity Conservation Regulations 2000 sets out the matters to be addressed in the EIS. The EIS will provide separate discussions under subheadings in the relevant sections of the EIS that address the prescribed matters. Alternatively, a stand-alone report could be provided and presented as a separate chapter of the EIS that exclusively and fully addresses the matters relevant to the controlling provisions. Whichever method is used, those parts of the EIS addressing matters of NES should be readily identifiable from the table of contents.



## **2 Project need and alternatives**

### **2.1 Project justification**

The justification for the Project should be described, with particular reference made to the economic and social benefits, including employment and spin-off business development, which the Project may provide. The status of the Project should be discussed in a regional, State and national context.

### **2.2 Alternatives to the Project**

This section should describe feasible alternatives, including conceptual, technological and locality alternatives to the Project, and discussion of the consequences of not proceeding with the Project. Alternatives should be discussed in sufficient detail to enable an understanding of the reasons for preferring certain options and courses of action and rejecting others. Information should be provided on potential alternatives to the clearing of riparian vegetation, the diversion of Devlin Creek and the means of coal transport. Reasons for selecting the preferred options will be delineated in terms of technical, commercial, social and natural environment aspects. Comparative environmental impacts of each alternative should be summarised.

The interdependencies of the proposal components should be explained, explaining how the infrastructure requirements relate to the viability of the Project. Should water supply, power, transport and/or storage infrastructure be included as an element of the proposal, this section should include a description of and rationale for such infrastructure.

In particular, the principals of ESD and sustainable development should be included. The relationship of options chosen for waste management and any emissions produced should be detailed.

This information is required to assess why the scope of the proposal is as it is and to ensure that the ESD principles and sustainable development aspects have been considered and incorporated during the scoping and planning of the proposal.

### 3 Description of the Project

The objective of this section is to describe the Project through its lifetime of construction and operation and decommissioning. This information is required to allow assessment of all aspects of a proposal including all phases of the proposal from planning, construction and operation through to decommissioning.

It also allows further assessment of which approvals may be required and how they may be managed through the life of the Project. Maps or figures showing the position of features or boundaries should use latitudes and longitudes on the GDA94 datum. The GDA94 datum should also be used in the text to describe the locations of any features (such as discharge points) or boundaries that may be relevant to subsequent approvals.

#### 3.1 Location

##### 3.1.1 Regional context

The regional context of the Project should be described and illustrated on maps at suitable scales.

##### 3.1.2 . Local context

The local context of the Project should be described and include real property descriptions of the Project site and adjacent properties. Maps at suitable scales should be provided showing the precise location of the Project area, and in particular:

- the location and boundaries of land tenures, in place or proposed, to which the Project area is or will be subject;
- the location and boundaries of the Project footprint showing all key aspects; and
- the location of any proposed buffers;
- existing local and State road network systems, complete with road names;
- access locations to the project;
- existing and proposed locations of construction compounds and accommodation camps.

Information included on the maps will also show the location of existing habitable structures and facilities neighbouring the site including any schools

This section should also include a rectified air photo or satellite image (preferably at A3 size) to illustrate components of the project in relation to the land and mining tenures and natural and built features of the area.

#### 3.2 Construction

The extent and nature of the Project's construction phase should be described. The description should include the type and methods of construction, the construction equipment to be used and the items of plant to be transported onto the construction site. Any staging of the proposal should be described and illustrated showing site boundaries, development sequencing and timeframes.

The estimated numbers of people to be employed in the Project construction phase should also be provided with a brief description of where those people may be accommodated and/or how they will be transported to the site.

#### 3.3 Operations

The location and nature of the processes to be used should be described in the text and illustrated with maps, diagrams and artist's impressions as required. Operational issues to be addressed should include, but may not be limited to:

- a description of plant and equipment to be employed;
- the capacity of plant and equipment, and
- chemicals to be used.



Concept and layout plans should be provided highlighting proposed buildings, structures, plant and equipment associated with the processing operation. The nature, sources, location and quantities of all materials to be handled, including the storage and stockpiling of raw materials, should be described.

Indicative process flow-sheets should be provided showing material balances for the processing plant, and the anticipated rates of inputs, along with similar data on products, wastes and recycle streams.

The location of the proposed Project will be illustrated on maps and described, including the probable mining boundaries and development sequences or timeframes, the final void to be left at the cessation of mining and the processing of coal. The rationale for the preferred operational program will be explained.

### **3.3.1 Tenements and tenures**

Describe and illustrate any existing mining tenements, petroleum, geothermal and greenhouse gas tenure and licences overlying and adjacent to the Project site, and any proposed applications required for this Project.

### **3.3.2 Resource base and mine life**

Summarise the results of studies and surveys undertaken to identify the mineral and natural resources required to implement the proposal (further detail should be provided in section 4.2.1.2, Geology).

The geological resource will be defined using formal terminology as recommended by the Australian Stock Exchange, the Australasian Institute of Mining and Metallurgy and the Australian Mining Industry Council.

Where relevant, maps will be provided showing the general location of the Project and coal resource.

The proposed mine life of the Project and an outline of the coal/mineral resource base including the total thickness of seams, extent of the resource and or reserve should also be described. The quantity of coal to be mined annually including any proposed ramping of production or staging of development should also be discussed.

The location, volume, tonnage and quality of other natural resources required by the Project should be described (e.g. land, water, timber, energy, etc.). Specific details should be provided of the following:

- the planned recovery of resources;
- locations of any resources that would be sterilised by the planned activities;

### **3.3.3 Mining methods and equipment**

Specific details should be provided 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 geotechnical character;
- chemicals to be used, including hydraulic fluids used and released in underground operations.

The description should refer to, and be complemented by, the figures previously presented in section 3.3.1 showing the locations of key aspects of the Project. Additional figures should be provided if required.

### **3.3.4 Mine sequencing**

Specific details should be provided 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/ reject to be handled during the Project's operation or left after mining ceases—the description should include 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.

### **3.3.5 Workforce**

Information should be provided on the workforce numbers to be employed in the facility's operations during its various phases (construction, commissioning, operation and decommissioning) and stages with a brief description of where those people may be accommodated and/or how they will be transported to the site. Comment should be made on the anticipated basis of employment (permanent, contract, etc).

### **3.3.6 Processing and products**

This section should describe the quantities and characteristics of the products produced on an annual basis. Indicative process flow-sheets should be provided showing material balances for the processing plant, and the anticipated rates of inputs, along with similar data on products, wastes and recycle streams.

### **3.3.7 Ongoing evaluation and exploration activities**

This section should describe the extent and nature of any proposed ongoing exploration or geological/geo-technical evaluation within the Project area that may be required over the life of the Project.

## **3.4 Product handling**

Describe and show on plans at an appropriate scale the proposed methods and facilities to be used for product storage and for transferring coal from the processing plant to the storage facilities and from the storage facilities to the transport facilities. Include discussion of any environmental design features of these facilities including bunding of storage facilities.

## **3.5 Infrastructure requirements**

Provide a description and layout plans identifying proposed buildings, structures, roads, alternative options such as railways, conveyors, dams, pipelines, powerlines, communications lines, plant, equipment and other infrastructure associated with the Project, as well as other existing infrastructure in the vicinity of the Project.

### **3.5.1 Transport—road/rail/ship**

Provide an overview of the arrangements for the transport of plant, equipment, material inputs, products, wastes and personnel during both the construction phase and operational phases of the Project. The description should cover the use of existing facilities and all requirements for the construction, upgrading, relocation or diversion of any transport related infrastructure including the Fitzroy Development Road.

### **3.5.2 Energy**

The EIS should describe all energy requirements for the construction and operation of the proposal. The locations of any easements should be shown on the infrastructure plan. Energy conservation should be briefly described in the context of any Commonwealth, State and local government policies. This section of the EIS should also give consideration to renewable energy options.

### **3.5.3 Water supply and storage**

The EIS should provide information on water usage by the Project, including the quality and quantity of all water supplied to the site i.e. demand for potable and process water. In particular, the proposed and optional sources of water supply should be described (e.g. bores, mine water and any surface storages such as dams, weirs and/or municipal water supply pipelines). Proposed or optional groundwater aquifer use and purpose should be described and include reference to any relevant moratorium.

Estimated rates of supply from each source (average and maximum rates) should be given. Any proposed water conservation and management measures should be described.

Determination of potable water demand should be made for the Project, including the temporary demands during the construction period. Details should be provided of any existing town water supply to meet such requirements. If water storage and treatment is proposed on site, for use by the site workforce, then this should be described.

### **3.5.4 Stormwater drainage**

A description should be provided of the proposed stormwater drainage system and the proposed disposal arrangements, including any off-site services. The description should be illustrated with figures with contours at suitable intervals (typically 1m contours) showing drainage pathways and the locations and discharge points of sediment detention basins and any other stormwater quality improvement devices.

### **3.5.5 Sewerage**

This section should describe, in general terms, sewerage infrastructure requirements and volume estimates of domestic effluent that will be produced and the proposed method of disposal.

### **3.5.6 Telecommunications**

This section should describe any impacts on existing telecommunications infrastructure (such as optical cables, microwave towers, etc.) and identify the owners of that infrastructure.

### **3.5.7 Accommodation and other infrastructure**

A description should be provided of any other developments directly related to the Project not previously described, such as:

- camps, townships or residential developments;
- fuel storage areas;
- equipment hardstand and maintenance areas; and
- technical workshops and laboratories.
- roads (both haul roads and access roads).

## **3.6 Waste management**

This section should provide an inventory of all wastes to be generated by the Project during the construction, operational and decommissioning phases. In addition to the expected total volumes of each waste produced, this section will include an inventory of the tonnage of coal processed; the amounts of resulting process wastes and any likely variability in amounts; the tonnage and volume of waste rock removed to extract the coal; and the volume and tonnage of any by-products left from the processing of the coal per unit volume of product coal.

The physical and chemical characteristics of the waste material from the mine and processing plant (including existing approved and proposed operations) should be provided. All other wastes, including regulated wastes, generated by the Project, e.g. tyres, packaging materials etc, should be described.

The EIS should describe waste management strategies having regard to the Environmental Protection (Waste Management) Policy 2000 (EPP Waste) including the concepts for waste avoidance, reuse, recycling, treatment and disposal.

Information should also be provided on the production rates of all major wastes generated from the Project and processing plant.

Schematic diagrams will be provided for each distinct stage of the Project (e.g. construction/site preparation, commissioning, operation and decommissioning) indicating the processes to be used and highlighting their associated waste streams (i.e. all waste outputs: solid, liquid and gaseous), including recycling efforts, such as stockpiling and reusing topsoil. The physical and chemical characteristics of the waste material from the process plant will be provided.

The schematic diagrams, or an associated table, should cross-reference the relevant sections of the EIS where the potential impacts and mitigation measures associated with each waste stream are described. The physical and chemical characteristics of waste material from the process plant should be provided.

Where relevant, cleaner production waste management planning should be detailed especially as to how these concepts have been applied to preventing or minimising environmental impacts at each stage of the Project. If applicable, details on natural resource use efficiency (e.g. energy and water), should be presented.

This information will be provided to enable the resource management agencies and other stakeholders to assess the efficiency of resource use.

### 3.6.1 Air emissions

Describe in detail the 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 disturbance from 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).

The methods to be employed in the mitigation of impacts from air emissions should be described in section 4.6.

### 3.6.2 Excavated waste

This section should describe and show the location, design and methods for constructing dumps for waste rock and subsoil. The location of the dumps should be shown on a map relative to topography and other natural features of the area. The following should be detailed and discussed:

- An estimated tonnage and/or volume of waste rock and subsoil to be produced annually.
- Results of waste rock and subsoil characterisation that includes the net acid producing potential of the mined waste rock (metals analysis, sulphides, pH, conductivity, Net Acid Generation (NAG) and Acid Neutralising Capacity (ANC)).
- Characterisation should also address the properties of waste rock and subsoil that affect their erosion potential. Sampling should be representative with profiles of all geological units included and based on accepted statistical procedures and be in accordance with recognised guidelines.
- Information on the range of quality and quantity of any likely leachate expected under varying rainfall conditions, including contaminants such as sulfate, pH, chloride, iron, major cations and anions, metals and any chemical species in sufficient quantity that is likely to be reactive and/or toxic.
- Measures to ensure stability of the waste dumps, particularly the management of drainage.
- Slope profiles that are consistent with intended land use and acceptable post-mining land management and maintenance.
- Alternatives for excavated waste disposal, including in-filling of voids, off-site options and treatment of any contaminated soil.

### 3.6.3 Tailings or fine rejects

This section should describe the tailings waste produced by preparation 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. Tailings characterisation information should also be presented in this section, including:

- physical properties of the fine reject tailings and coarse reject solids including percentage water content, specific gravity of solids, and the density of any slurry;
- geochemical properties of the fine reject tailings solids using static testing (CAN, Net Acid Production Potential (NAPP), NAG etc); and
- chemical properties of tailings pore-water including pH, conductivity, major cations and anions, and any chemical species in sufficient quantity that is likely to be reactive and/or toxic.

The construction of the tailings storage facility should be described with regards to construction material and design. The EIS should address how the tailings storage facility complies with relevant codes for the construction of such containment systems.

Describe the strategies to monitor and manage seepage into ground and surface waters. The location of the storage and/or disposal site with regard to adjacent creeks and rivers should be described and illustrated with contours at a suitable interval.

### 3.6.4 Solid waste disposal

Describe the quantity and quality of solid wastes (other than waste rock, subsoil and tailings addressed in other sections) and the proposed methods of their disposal. The proposed location, site suitability, dimensions and volume of any landfill, including its method of construction, should be shown.

### 3.6.5 Liquid waste

A description should be presented of the origin, quality and quantity of wastewater and any immiscible liquid waste originating from the Project other than that addressed in previous sections. Particular attention should be given 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 and to demonstrate the ability of the proposal to deal with variations potentially due to climate change.

The EIS should consider the following effects:

- groundwater from excavations;
- rainfall directly onto 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, and
  - domestic purposes;
- evaporation;
- domestic sewage treatment - disposal of liquid effluent and sludge; and
- water supply treatment plant - disposal of wastes.

### 3.7 Rehabilitation and decommissioning

This section should describe the strategies and methods for progressive and final rehabilitation of the environment disturbed by the Project. The strategic approach to progressive and final rehabilitation should be described. A preferred rehabilitation strategy should be developed with a view to minimising the amount of land disturbed at any one time. The final topography of any excavations, waste dumps, dam sites and co-disposal areas should be shown on maps at a suitable scale.

The strategies and methods presented for progressive and final rehabilitation of disturbed areas should demonstrate compliance with the objectives of the DERM Guideline 18, *Rehabilitation requirements for mining projects* and the *Technical guidelines for the environmental management of exploration and mining in Queensland* (1995) except where superseded by Guideline 18. In particular, the strategies and methods should have the following objectives:

- Mining and rehabilitation should aim to create a landform with land use capability and/or suitability similar to that prior to disturbance unless other beneficial land uses are pre-determined and agreed.
- Mine wastes and disturbed land should be rehabilitated to a condition that 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 to a significant extent. Current and future water quality should be maintained at levels that are acceptable for users downstream of the site.

The means of decommissioning the proposal, in terms of the removal of plant, equipment, structures and buildings should be described, and the methods proposed for the stabilisation of the affected areas should be given. Information should be provided regarding decommissioning and rehabilitation of the plant site, removal of processing plant, rehabilitation of concrete footings and foundations, hardstand areas, storage tanks and wharfrage (including any potential for reuse of these facilities). Options and methods for the disposal of wastes from the demolition of plant and buildings should be discussed in sufficient detail for their feasibility and suitability to be established.

Describe any proposals to divert creeks during operations, and, if applicable, the reinstatement of the creeks after operations have ceased. The description should make reference to DERM guidelines relating to watercourse diversions. Where dams are to be constructed, proposals for the management of these structures after the completion of the Project should be given and indicate that retention of any dam is subject to the

agreement of the post mining land owner and the administering authority. Also, the final drainage and seepage control systems and long-term monitoring plans should be described. The EIS should also demonstrate that final voids and uncompacted overburden and workings at the end of mining will be protected from the “probable maximum flood level” based on the Bureau of Meteorology’s “probable maximum precipitation” forecast for the locality.

A description of topsoil management should consider transport, storage and replacement of topsoil to disturbed areas. The minimisation of topsoil storage times (to reduce fertility degradation) should also be addressed.

Detail of the impacts of the preferred rehabilitation strategy should be discussed in the appropriate subsections of Section 4 (Environmental values and management of impacts) particularly with regard to such issues as final landform stability (section 4.2.2), rehabilitation of flora (section 4.8.2) and the long-term quality of water in any final voids (section 4.5.2). Implications for the long-term use and fate of the site should also be addressed, particularly with regard to the on-site disposal of waste and the site’s inclusion on the Environmental Management Register or Contaminated Land Register.



## 4 Environmental values and management of impacts

The functions of this section are to:

- Describe the existing environmental values of the area which may be affected by the proposal. Environmental values are defined in section 9 of the EP Act, environmental protection policies and other documents such as the Australian and New Zealand Environment and Conservation Council (ANZECC), *Guidelines For Fresh And Marine Water Quality 2000*. Environmental values may also be derived following recognised procedures, such as described in the ANZECC 2000 guidelines. Environmental values should be described by reference to background information and studies, which should be included as appendices to the EIS.
- Describe the potential adverse and beneficial impacts of the proposal on the identified environmental values. Any likely environmental harm on the environmental values (including listed threatened species and endangered threatened ecological communities, under the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth) (the EPBC Act), should be described.
- Describe any cumulative impacts on environmental values caused by the proposal, either in isolation or by combination with other known existing or planned development or sources of contamination.
- Propose environmental protection objectives and commitments. All environmental protection commitments must be measurable and auditable.
- Examine viable alternative strategies for managing impacts. These alternatives should be presented and compared in view of the stated objectives and standards to be achieved. Available techniques, including best practice, to control and manage impacts to the nominated objectives should be discussed. This section should detail the environmental protection measures incorporated in the planning, construction, operations, decommissioning, rehabilitation and associated works for the proposal. Measures should prevent, or where prevention is not possible, minimise environmental harm and maximise socio-economic and environmental benefits of the proposal. Preferred measures should be identified and described in more detail than other alternatives.
- Describe any computational model used to make predictions of impacts and/or outcomes of mitigation measures. The description should address the inputs, assumptions, limitations, sensitivities, accuracy and precision of the model.

Any maps or figures showing the position of features or boundaries should use latitudes and longitudes on the GDA94 datum. Latitudes and longitudes on the GDA94 datum should also be used in the text to describe the locations of any features (such as discharge points) or boundaries that may be relevant to subsequent approvals.

Environmental protection objectives may be derived from legislative and planning requirements which apply to the proposal including Commonwealth strategies, State planning policies, local authority strategic plans, environmental protection policies under the EP Act, and any catchment management plans prepared by local water boards or land care groups. Special attention should be given to those mitigation strategies designed to protect the values of any sensitive areas and any identified ecosystems of high conservation value within the area of possible proposal impact.

This section should address all elements of the environment, (such as land, water, coast, air, waste, noise, nature conservation, cultural heritage, social and community, health and safety, economy, hazards and risk) in a way that is comprehensive and clear. To achieve this, the following issues should be considered for each environmental value relevant to the Project:

- Environmental values affected: describe the existing environmental values of the area to be affected including values and areas that may be affected by any cumulative impacts (refer to any background studies in appendices - note such studies may be required over several seasons). It should be explained how the environmental values were derived (e.g. by citing published documents or by following a recognised procedure to derive the values).
- Impact on environmental values: describe quantitatively the likely impact of the proposal on the identified environmental values of the area. The cumulative impacts of the proposal must be considered over time or in combination with other (all) impacts in the dimensions of scale, intensity, duration or frequency of the impacts. In particular, any relevant State planning policies, environmental protection policies, national environmental protection measures and integrated catchment management plans should be addressed.

- Cumulative impacts on the environmental values of land, air and water and cumulative impacts on public health and the health of terrestrial, aquatic and marine ecosystems must be discussed in the relevant sections. This assessment may include air and water sheds affected by the proposal and other proposals competing for use of the local air and water sheds.
- Where impacts from the proposal will not be felt in isolation to other sources of impact, it is recommended that the proponent develop consultative arrangements with other industries in the proposal's area to undertake cooperative monitoring and/or management of environmental parameters. Such arrangements should be described in the EIS.
- Environmental protection objectives: describe qualitatively and quantitatively the proposed objectives for enhancing or protecting each environmental value. Include proposed indicators to be monitored to demonstrate the extent of achievement of the objective as well as the numerical standard that defines the achievement of the objective. The measurable indicators and standards can be determined from legislation, support policies and government policies as well as the expected performance of control strategies. Objectives for progressive and final rehabilitation and management of contaminated land should be included.
- Control strategies to achieve the objectives: describe the control principals, proposed actions and technologies to be implemented that are likely to achieve the environmental protection objectives; include designs, relevant performance specifications of plant. Details are required to show that the expected performance is achievable and realistic.
- Environmental offsets: Information is required to show that measures have been taken to avoid and minimise potential adverse impacts of the proposal. Environmental offsets may be proposed to counterbalance any remaining loss of environmental values, consistent with the specific-issue offset policies under the framework of the *Queensland Government Environmental Offset Policy 2008*. Consideration will also be given to relevant State and Commonwealth draft offset policies. Consideration will also be given to the Fitzroy Basin Associations Publication *Mining Coal and Protecting Biodiversity, A solutions and options report for Queensland's Bowen Basin*.
- Monitoring programs: describe the monitoring parameters, monitoring points, frequency, data interpretation and reporting proposals.
- Auditing programs: describe how progress towards achievement of the objectives will be measured, reported and whether external auditors will be employed. Include scope, methods and frequency of auditing proposed.
- Management strategies: describe the strategies to be used to ensure the environmental protection objectives are achieved and control strategies implemented, such as by a continuous improvement framework, including details of corrective action options, reporting (including any public reporting), monitoring, staff training, management responsibility pathway, and any environmental management systems and how they are relevant to each element of the environment.
- Information quality: information given under each element should also state the sources of the information, how recent the information is, how any background studies were undertaken (e.g. intensity of field work sampling), how the reliability of the information was tested, and what uncertainties (if any) are in the information.

## 4.1 Climate

This section should describe the rainfall patterns (including magnitude and seasonal variability of rainfall), air temperatures, humidity, wind (direction and speed) and any other special factors (e.g. temperature inversions) that may affect management of the Project including air quality within the region of the proposal. Extremes of climate (droughts, floods, cyclones, etc) should also be discussed with particular reference to water management at the Project site. The vulnerability of the area to natural or induced hazards, such as floods, bushfires and landslides, should also be addressed. The relative frequency and magnitude of these events should be considered together with the risk they pose to management of the Project.

The potential impacts due to climatic factors should be addressed in the relevant sections of the EIS. The impacts of rainfall on soil erosion should be addressed in section 4.2. The impacts of storm events on the capacity of waste containment systems (e.g. site bunding/stormwater management and tailings dams) should be addressed in section 4.5 with regard to contamination of waterways and in section 4.4 with regard to the

design of the waste containment systems. The impacts of winds, rain, humidity, and temperature inversions on air quality should be addressed in section 4.6.

## 4.2 Land

### 4.2.1 Description of environmental values

This section should describe the existing environment values of the land area that may be affected by the Project. It should also define and describe the objectives and practical measures for protecting or enhancing land-based environmental values, describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

#### 4.2.1.1 Topography and geomorphology

The topography of the proposal site and any other potentially impacted area should be detailed with contours at suitable increments, shown with respect to Australian Height Datum (AHD). Significant features of the locality should be included on the maps. Such features would include any locations subsequently referred to in the EIS (e.g. the nearest noise sensitive locations) that are not included on other maps in section 4.2. Commentary on the maps should be provided highlighting the significant topographical features.

Aerial photographs will be provided showing the topographic features of the Project and the surrounding area, and with proposed mining areas and other associated surface disturbance areas marked and defined.

#### 4.2.1.2 Geology

The EIS should provide a description, map and a series of cross-sections of the geology of the proposal area, with particular reference to the physical and chemical properties of surface and sub-surface materials and geological structures within the areas to be mined. 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 proposal should be described.

The EIS will consider the possibility that fossil specimens may be located during construction/operations and propose strategies for the recovery of significant finds and propose strategies for protecting the specimens and alerting the Queensland Museum to the find.

#### 4.2.1.3 Mineral resources

The EIS should provide a summary of the results of studies and surveys undertaken to identify and delineate the coal resources and any ore reserves within the Project area (including any areas underlying related infrastructure).

The location, tonnage and quality of the coal resources and any ore reserves within the Project area should be described in detail as indicated below and where possible it should be presented on a 'seam by seam' basis and include the modifying factors and assumptions made in arriving at the estimates. The coal resources should be estimated and reported in accordance with the principles of the *Australasian code for reporting of mineral resources and ore reserves* (the JORC Code) and the principles outlined in the Australian guidelines for the estimating and reporting of inventory coal, coal resources and coal reserves as appropriate.

In addition, maps (at appropriate scales) should be provided showing the general location of the Project area, and in particular:

- the location and areal extent of the coal resources to be developed or mined;
- the location and boundaries of mining tenures, granted or proposed, to which the Project area is, or will be subject;
- the location of the proposed mine excavation(s);
- the location and boundaries of any Project sites;
- the location and boundaries of any other features that will result from the proposed mining including waste/spoil dumps, water storage facilities and other infrastructure;
- the location of any proposed buffers, surrounding the working areas; and
- any part of the resource or reserve not intended to be mined and any part of the resource or reserve that may be sterilised by the proposed mining operations or infrastructure.

#### **4.2.1.4 Soils**

A soil survey of the sites affected by the Project should be conducted at a suitable scale, with particular reference to the physical and chemical properties of the materials that will influence erosion potential, storm water run-off quality and rehabilitation. Information should also be provided on soil stability and suitability for construction of proposal facilities.

Soil profiles should be mapped at a suitable scale and described according to the *Australian soil and land survey field handbook* (McDonald et al, 1990) and *Australian soil classification* (Isbell, 1996). In the areas of proposed surface disturbance, an appraisal of the depth and quality of useable soil should be undertaken. Information should be presented according to the standards required in the *Planning guidelines: the identification of Good Quality Agricultural Land* (DPI, DHLGP, 1993), and the *State Planning Policy 1/92: Development and the conservation of agricultural land*.

#### **4.2.1.5 Land use**

The EIS should provide a description of current land tenures and land uses, including native title issues, in the proposal area, with particular mention of land with special purposes. The location and owner/custodians of native title in the area and details of native title claims should be shown.

Maps at suitable scales showing existing land uses and tenures, and the proposal location, should be provided for the entire proposal area and surrounding land that could be affected by the Project. The maps should identify areas of conservation value in any locality that may be impacted by the Project. The location of existing dwellings and the zoning of all affected lands according to any existing town or strategic plan should be included.

The land use suitabilities of the affected area should be described in terms of the physical and economic attributes. The assessment should set out soil and landform subclasses assigned to soil mapping units in order to derive land suitability classes. The limitations and land suitability classification system to use is that in Attachment 2 of *Land Suitability Assessment Techniques in the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland* (1995).

A land suitability map of the proposed and adjacent area should be provided which sets out land suitability and current land uses, e.g. for grazing of native and improved pastures and horticulture. Land classified as Good Quality Agricultural Land by the Department of Environment and Resource Management's (DERM) land classification system (formerly the Department of Natural Resources and Water) is to be shown in accordance with the *Planning guidelines: The Identification of Good Quality Agricultural Land*, which supports *State Planning Policy 1/92*.

#### **4.2.1.6 Infrastructure**

The location and owner/custodians of all tenures, reserves, stock routes and the like, roads and road reserves, railways, rail reserves, and the like, covering the affected land should be shown on maps of a suitable scale. Indicate locations of gas and water pipelines, power lines and any other easements. The environmental values affected by this infrastructure should be addressed.

#### **4.2.1.7 Sensitive environmental areas**

The proximity of the proposal to any environmentally sensitive areas should be shown on a map of suitable scale. This section of the EIS should then identify whether any of those environmentally sensitive areas could be affected, directly and indirectly, by the Project.

In particular, the EIS should indicate if the land affected by the proposal is, or is likely, to become part of the protected area estate, or is subject to any treaty. Consideration should be given to national parks, conservation parks, declared fish habitat areas, wilderness areas, aquatic reserves, heritage/historic areas or items, national estates, world heritage listings and sites covered by international treaties or agreements (e.g. Ramsar, JAMBA, CAMBA, ROKAMBA), areas of cultural significance and scientific reserves (see section 4.8 for further guidance on sensitive areas).

In addition, any sensitive environmental areas of significance protected under the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999* should be identified and described.

#### **4.2.1.8 Landscape character**

This section should describe in general terms the existing character of the landscape that will be affected by the proposal. It should comment on any changes that have already been made to the natural landscape since

European settlement. This section should describe the general scenic values and impression of the landscape as a whole.

#### **4.2.1.9 Visual amenity**

This section should describe existing landscape features, panoramas and views that have, or could be expected to have, value to the community whether of local, regional, state-wide, national or international significance. Information in the form of maps, sections, elevations and photographs is to be used, particularly where addressing the following issues:

- identification of elements within the proposal and surrounding area that contribute to their image of the town/city as discussed in any local government strategic plan - city image and townscape objectives and associated maps;
- major views, view sheds, existing viewing outlooks, ridgelines and other features contributing to the amenity of the area, including assessment from private residences in the affected area along the route;
- focal points, landmarks (built form or topography), gateways associated with the Project site and immediate surrounding areas, waterways, and other features contributing to the visual quality of the area and the Project site;
- character of the local and surrounding areas including character of built form (scale, form, materials and colours) and vegetation (natural and cultural vegetation) directional signage and land use;
- identification of the areas of the proposal that have the capacity to absorb land use changes without detriment to the existing visual quality and landscape character; and
- the value of existing vegetation as a visual screen.

#### **4.2.2 Potential impacts and mitigation measures**

This section defines and describes the objectives and practical measures for protecting or enhancing the land-based environmental values identified through the studies outlined in the previous section. It should describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

##### **4.2.2.1 Resource Utilisation**

With regard to resource stewardship, the EIS should analyse the effectiveness of the mining proposal in achieving the optimum utilisation of the mineral resources within the Project area and consider its impacts on other resources. It should 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.

The EIS should provide detail on how the company plans to manage low grade and/or current uneconomic material to ensure that non-sterilisation of this significant potential future resource is considered. The EIS should detail the basis for any non-stockpiling or sterilisation of current un-economic material. This section should also provide details and maps of expected residual or remnant resources within the Project area including: any low grade stockpiles; tailings; and current un-economic material.

##### **4.2.2.2 Land use suitability**

The potential for the construction and operation of the proposal to change existing and potential land uses of the Project site and adjacent areas should be detailed.

Post mining land use options should be detailed including suitability of the area to be used for agriculture, industry, or nature conservation. The factors favouring or limiting the establishment of those options should be given in the context of land use suitability prior to the proposal and minimising potential liabilities for long-term management.

Should it be determined that the development has potential for environmental impacts on adjacent areas currently used for agriculture, urban development, recreation, tourism, other business, these impacts will be described. Implications of the proposal for future developments in the impact area including constraints on surrounding land uses should also be described.



If the development adjoins or potentially impacts on good quality agricultural land, then an assessment of the potential for land use conflict is required. Investigations should follow the procedures set out in the *Planning guidelines: The Identification of Good Quality Agricultural Land*, which supports *State Planning Policy 1/92*.

Identify and outline incompatible land uses, whether existing or potential, adjacent to all aspects of the Project, including essential and proposed ancillary developments or activities and areas directly or indirectly affected by the construction and operation of these activities and discuss measures to avoid unacceptable impacts.

#### **4.2.2.3 Land disturbance**

A strategy should be developed that will minimise the amount of land disturbed at any one time. The strategic approach to progressive rehabilitation of landforms and final decommissioning should be described with particular regard to the impacts in the short, medium and long timeframes.

The methods to be used for the Project, including backfilling, covering, re-contouring, topsoil handling and revegetation, should be described. Any proposals to disturb land that would impede or divert overland flow or waterways and any subsequent reinstatement, during construction or operations should be described.

In addition to assessing the operational phase of land disturbance, the EIS should address the ultimate changes following implementation of the decommissioning and rehabilitation plan described in section 3.7. The EIS should detail the proposed long-term changes that will occur to the land after mining ceases compared to the situation before mining commences.

Those changes should be illustrated on maps at a suitable scale and with contours at intervals sufficient to assess the likely drainage pattern for ground and surface waters. The mitigation measures for land disturbance to be used on decommissioning the site should be assessed in sufficient detail to decide their feasibility. In particular, the EIS should 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.

Rehabilitation success criteria for land disturbance should be proposed in this section. The methodologies for developing the rehabilitation success criteria should be described.

#### **4.2.2.4 Land contamination**

The EIS should describe the possible contamination of land from aspects of the proposals including waste, coal reject product, acid generation from exposed sulfidic material and spills at chemical and fuel storage areas.

The means of preventing land contamination should be addressed. Methods proposed for preventing, recording, containing and remediating any contaminated land should be outlined. Intentions should be stated concerning the classification (in terms of the Queensland Contaminated Land Register) of land contamination on the land, processing plant site and product storage areas after proposal completion.

Where appropriate, a preliminary site investigation (PSI) of the site consistent with the Department of Environment and Resource Management's *Draft guidelines for the assessment and management of contaminated land in Queensland* should be undertaken to determine background contamination levels. The results of the PSI should be summarised in the EIS and provided in detail in an appendix.

If the results of the preliminary site investigation indicate potential or actual contamination, a detailed site investigation progressively managed in accordance with the stages outlined in Appendix 5 of the *Draft guidelines for the assessment and management of contaminated land in Queensland* should be undertaken.

In short, the following information may be required in the EIS:

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

In addition to the prevention and management of contamination resulting from mining activities, the EIS will address management of any existing or potentially contaminated land.

#### **4.2.2.5 Erosion and stability**

For all permanent and temporary landforms, possible erosion rates and management techniques should be described. For each waste rock and soil type identified, erosion potential (wind and water) and erosion management techniques should be outlined. An erosion-monitoring program, including rehabilitation measures for erosion problems identified during monitoring, should also be outlined. Mitigation strategies should be



developed to achieve acceptable soil loss rates, levels of sediment in rainfall runoff and wind-generated dust concentrations.

The report should 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; and
- access roads or other transport corridors.

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

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

The mitigation measures should 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 should be developed into an erosion and sediment control plan for inclusion in the EM plan.

#### **4.2.2.6 Landscape character**

The potential impacts of the Project on landscape character of the site and the surrounding area should be described. Particular mention should be made of any changes to the broad-scale topography and vegetation character of the area, such as due to spoil dumps, excavated voids and broad-scale clearing.

Details should be provided of measures to be undertaken to mitigate or avoid the identified impacts.

#### **4.2.2.7 Visual amenity**

This section should analyse and discuss the visual impact of the proposal on particular panoramas and outlooks. It should be written in terms of the extent and significance of the changed skyline as viewed from places of residence, work and recreation, from road, cycle and walkways, from the air and other known vantage points day and night, during all stages of the Project as it relates to the surrounding landscape. The assessment is to address the visual impacts of the Project structures and associated infrastructure, using appropriate simulation. Sketches, diagrams, computer imaging and photos are to be used where possible to portray the near views and far views of the completed structures and their surroundings from visually sensitive locations. Special consideration is to be given to public roads, public thoroughfares, and places of residence or work, which are within the line-of-sight of the Project.

Detail should be provided of all management options to be implemented and how these will mitigate or avoid the identified impacts.

#### **4.2.2.8 Lighting**

Management of the lighting of the Project, during all stages, is to be provided, with particular reference to objectives to be achieved and management methods to be implemented to mitigate or avoid:

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

### **4.3 Transport**

The transport section of the EIS should have separate subsections describing infrastructure associated with the various modes of transport, such as road, rail, pipeline, conveyor, air and sea.

### 4.3.1 Description of existing infrastructure and values

Provide details of existing infrastructure that is proposed to be used for the transport of materials, products or wastes to and from the project site. The EIS should provide details of any assets within the jurisdiction of any transport authority that could be impacted by the project. Also provide details, either in the transport section of the EIS or by cross reference to other sections, of the environmental values that would be affected by the altered use of existing transport infrastructure or the construction of new or altered infrastructure.

For road, rail or conveyor transport, describe separately and in detail the existing networks that would be used by the project. This description should include any coal transport alternatives mentioned in section 2.2. The description should cover any stock routes potentially affected by the project. Provide illustrations of the networks at suitable scales.

In relation to air transport, describe the existing air fields and associated infrastructure that would be used by the project.

In relation to the importation or export of materials and products, the EIS should identify any port that would be used by the project. Details should be provided of those ports, including: the berths to be used; the size and types of vessels that the berths can accommodate; the typical turnaround time for vessels; and the associated infrastructure that moves and stores materials between the ships and the rail and/or road networks.

### 4.3.2 Potential impacts and mitigation measures

For each mode of transport and each phase of the project, the EIS should describe the:

- proposed construction, realignment, structural alteration, or changed use of any access and haul roads, conveyor easements, rail loops and load-out facilities, and rail crossings (over or under the track) used by any transport associated with the project
- expected volumes and weights of materials, products, hazardous goods or wastes;
- types of vehicles, rolling stock, vessels and craft to be used; and
- likely number and timing of trips.

The EIS should provide sufficient information to make an independent assessment of how transport infrastructure will be affected by each phase of the project at a local and regional level. Similarly, sufficient information should be provided to make an independent assessment of how transport used by the project will impact on environmental values. In both cases, the impacts along the whole length of each affected route should be discussed and measures proposed to avoid or mitigate the impacts.

Details should be provided of the:

- results of any modelling of transport impacts;
- assessment methodology used, including a summary of consultation undertaken with transport authorities regarding the scope of the impact assessment and methodology to be used;
- base data assumptions, including an assessment of the current condition of the affected network and its performance;
- possible interruptions to transport operations; and
- likelihood and nature of spills of products or hazardous materials during transport, prevention measures to be used, and the requirements for dealing with any spills.

This section of the EIS should also discuss any impacts to bus routes as a result of any changes to the Fitzroy Development Road's alignment.

The EIS should assess any impacts on stock routes due to the projects activities. Mitigation measures should be proposed for any disruptions to movement of travelling stock on stock routes. This section of the EIS should also outline, and cross-reference to more detailed descriptions with the EIS, the impacts of transport associated with the project on amenity, human health and ecological values as a result of dust, noise, vibration and any other environmental effects.

The assessment of road impacts should be in accordance with the latest version of the Department of Transport and Main Road's *Guidelines for Assessment of Road Impacts of Development*, available from the website: <http://www.mainroads.qld.gov.au>. Provide details of any heavy or oversized loads, including the number and

type of vehicles, with a description of the likely timing and routes of those loads highlighting any vulnerable bridges or other structures along the proposed routes. Also provide details of the likely traffic to be generated by workforce personnel and service providers.

In relation to road impacts, the EIS should include an assessment of impacts on:

- the safety, efficiency and condition of road operations and assets, including driver fatigue;
- the additional travel time if a significant deviation of the Fitzroy Development Road is proposed;
- any existing public transport networks (assets and services); and
- watercourses and overland flows, and their interaction with the current and future road network (note: impacts on water values due to transport infrastructure should be outlined in the transport section of the EIS and cross-referenced to a detailed assessment in the water resources section).

The assessment of impacts on the rail network itself, or on environmental values affected by changes in rail traffic (e.g. due to dust, noise and vibration) should also consider the following matters:

- the likely size of trains and the number of train paths needed to move materials, products or wastes to or from the project site;
- new or altered rail transport infrastructure to meet demand from the project;
- impacts on rail freight and other transport services (e.g. variability on existing train path availability);
- impacts on passenger transport and services;
- impacts at interface points with other private and public transport pathways such as roadway level crossings or occupational crossings (i.e. those crossings which form part of private access pathways to and from residential or business sites); and
- the requirements for any approvals needed for rail crossings by roads or other infrastructure.

In addition to these potential impacts to the rail network, the EIS needs to consider potential impacts resulting from temporary closure of the coal transport network.

The EIS should assess the impacts of the construction and operation of any conveyors. The direct impacts on any other transport infrastructure, such as due to road or rail crossings, should 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.

In relation to the importation or export of materials and products, the EIS should identify any aspects of the project that will increase the shipment of materials through any port. Details should be provided of the likely size and number of additional vessels that would use the port.

The EIS should assess any impacts on any port due to the import or export of materials or products. Matters to be assessed should include the need for:

- new coastal works, such as berth construction or alteration, land reclamation, etc.;
- any dredging for shipping channels and swing basins;
- new or altered stockpile areas; and
- new, altered, or increased use of existing, infrastructure to handle materials between ships and road or rail transport.

The EIS should also assess any impacts on nearby areas due to the handling or storage of materials at ports (e.g. because of dust, noise or lighting).

Any potential impacts of the project on water traffic in rivers and dams should be assessed.

In relation to air transport, describe the new, and/or altered air fields and associated infrastructure that would be needed for the project. Describe the likely additional number of flights, frequency, timing (particularly any increase in night arrivals or take-offs), and size of aircraft. Describe any features of the project that could impact on air transport (e.g. the placement of waste dumps, stacks or flares beneath flight paths).

The EIS should assess any impacts on environmental values due to the need to redevelop or construct new airfields; and any impacts on amenity due to increased air traffic. The proposal and assessment should have regard to State Planning Policy 1/02: *Development in the Vicinity of Certain Airports and Aviation Facilities*.

With regard to air safety, matters to be assessed include the raising of landforms or the construction of stacks, flares or lighting within flight paths.

If the works that could result in impacts, or the associated mitigation works for identified impacts, are the responsibility of the proponent then the EIS should fully assess those impacts, detail the mitigation works and carry the environmental protection commitments forward into the project's EM plan.

If the proponent will not be responsible for the works associated with the impacts (e.g. for dredging at a port) the EIS should clearly identify the entity that will be responsible and what approvals would be needed. Nevertheless, in this case, the EIS should provide enough assessment of the likely impacts of all associated activities for the regulatory authorities to have confidence that approval of the project subject to this EIS process would not have unacceptable flow-on impacts due to necessary works farther down the transport chain.

The proponent should detail measures to avoid or mitigate impacts on each transport mode. The mitigation measures should ensure the safety, efficiency and condition of each mode is maintained. These mitigation measures are to be prepared by the proponent in close consultation with the relevant transport authorities. Any residual impacts that cannot be avoided should be identified and quantified.

Mitigation strategies must include:

- consideration of any transport authority's works program and forward planning;
- proposed construction plans of all required transport infrastructure works in accordance with relevant and accepted authority standards and practices;
- the responsible parties for any works;
- estimates of costs;
- details on the timing of the works; and
- a summary of relevant approvals and legislative requirements needed to implement mitigation strategies and transport infrastructure works required by the project.

The EIS should also consider public transport requirements and links to, or development of pedestrian and cycle networks.

## **4.4 Waste**

This section should complement other sections of part 4 of the EIS by providing technical details of waste treatment and minimisation, with proposed emission, discharge and disposal criteria, while other sections describe how those emissions, discharges and disposals would impact on the relevant environmental values. The purpose of this format is to concentrate the technical information on waste management into one section in order to facilitate its transfer into the EM plan.

The description of waste disposal should provide details and design parameters and address the stability of proposed containment systems for rejects from the Coal Handling Processing Plant (CHPP) whether on or off the Project site.

### **4.4.1 Description of environmental values**

This section should introduce and briefly describe the existing environment values that may be affected by the Project's wastes. Refer to each of the waste streams described in section 3.6 and provide references to more detailed descriptions of the relevant environmental values in other sections of part 4 of the EIS.

### **4.4.2 Potential impacts and mitigation measures**

The purpose of this section is to bring together a description of the preferred methods (and discuss any alternatives) to be used to deal with waste streams and outline their impacts. The full description of the magnitude and nature of impacts on particular environmental values due to the management of waste should be provided in the relevant sections of part 4 of the EIS.

This section defines and describes the objectives and practical measures for protecting or enhancing environmental values from impacts by wastes, describes how nominated quantitative standards and indicators may be achieved for waste management, and how the achievement of the objectives will be monitored, audited and managed.

This section should assess the potential impact of all wastes to be generated and provide details of each waste in terms of:

- operational handling and fate, including storage;
- proposed on-site treatment methods;
- proposed methods of disposal (including the need to transport wastes off-site for disposal) for any liquid and solid wastes;
- the potential level of impact on environmental values;
- proposed discharge/disposal criteria for liquid and solid wastes; and
- design criteria to be used to ensure that waste containment and/or storage facilities perform satisfactorily.

Measures to ensure stability of the process waste disposal areas should be described and methods to prevent, seepage and contamination of groundwater from stockpiles should be given.

The EIS should also address waste minimisation techniques and processes proposed; the market demand for recyclable waste (where appropriate) and decommissioning of the site. The EIS should indicate the results of investigations into the feasibility of using waste minimisation and cleaner technology options during all phases of the Project having regard to the EPP Waste and Environmental Protection (Waste Management) Regulation 2000, and the draft guidelines covering aspects for waste management under the EPP Waste and Environmental Protection (Waste Management) Regulation 2000.

## 4.5 Water resources

### 4.5.1 Description of environmental values

This section describes the existing environment for water resources that may be affected by the proposal in the context of environmental values as defined or considered in such documents as:

- EP Act;
- Environmental Protection (Water) Policy 1997 (EPP Water);
- the ANZECC, *Guidelines For Fresh And Marine Water Quality, 2000*;
- the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) and ANZECC, *National Water Quality Management Strategy (NWQMS)*; and
- the Department of Environment and Resource Management (formerly Environmental Protection Agency) *Guideline: Establishing draft environmental values and water quality objectives* and the *Queensland Water Quality Guidelines 2006*.

The definition of waters in the EPP Water includes the bed and banks of waters, so this section should address benthic sediments as well as the water column. Subject to further evaluation, the following topics may be required to be addressed (note - the topics are not exhaustive).

#### 4.5.1.1 Surface waterways

A description should be given of the number of surface watercourses and their quality in the area affected by the Project, together with an outline of the significance of these waters to the surrounding catchment and an assessment of the impact of the Project.

Information provided should include a description of existing surface drainage patterns, wetlands and flows in major streams. Details of the likelihood of flooding, history of flooding including extent, levels and frequency and a description of present and potential water uses downstream of the areas affected by the Project should be provided.

An assessment of existing water quality in surface waters and wetlands upstream and downstream of the proposed site as well as within the site likely to be affected by the proposal should be provided. The basis for this assessment should be a monitoring program, with sampling stations located upstream and downstream of the proposal and at reference locations i.e. non impacted sites. Downstream monitoring will include sites located near to the proposed discharge points in addition to relevant downstream locations. Sites will include permanent and semi permanent waterholes, known aquatic habitat or weirs/reservoirs. Complementary stream-flow data should also be obtained from historical records (where available) to aid in interpretation. The condition

of the water environment should be assessed by making comparison against water quality objectives and relevant water quality guidelines based on *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC & ARMCANZ, 2000) and *Queensland Water Quality Guidelines* (2009)

The water quality should be described, including seasonal variations or variations with flow where applicable. Monitoring of ephemeral streams will primarily focus on times of natural flow. A relevant range of physical, chemical and biological parameters should be measured to gauge the environmental harm on any affected creek or wetland system. This will include, but not necessarily be limited to, water quality indicators likely to be affected by the proposal such as electrical conductivity, metals (dissolved), turbidity, suspended sediments and pH. Biological indicators should include macroinvertebrate assessment at appropriate locations according to published methods. All sampling should be performed in accordance with the *Water Quality Sampling Manual* (EPA, 1999) or the most current edition.

The environmental values of the surface waterways potentially affected by the proposed activity should be described in terms of:

- values identified in the EPP Water;
- sustainability, including both quality and quantity;
- physical integrity, fluvial processes and morphology of watercourses, including riparian zone vegetation and form; and
- any water resource plans, land and water management plans relevant to the affected catchment such as the Water Resource (Fitzroy Basin) Plan 1999 and subsequent amendments.

Surface water quality objectives should be determined after consideration of the *Queensland Water Quality Guidelines* (2009) and ANZECC & ARMCANZ,(2000).

Flood studies should be conducted if appropriate and include a range of annual exceedence probabilities for affected waterways. The flood modelling assessment should include local flooding due to short duration events from contributing catchments on site, as well as larger scale regional flooding including waterways downstream.

The EIS should provide a description, with photographic evidence, of the geomorphic condition of any watercourses likely to be affected by disturbance or stream diversion. The results of this description should form the basis for the planning and subsequent monitoring of rehabilitation of the watercourses during or after the operation of the proposal.

Stormwater contributions should be assessed based on relevant contributing catchments, at risk levels consistent with relevant Queensland and Australian technical codes and guidelines and current best practice. In particular the Queensland technical guideline on Site Water Management, and the Code of Environmental Compliance for Environmental Authorities for High Hazard Dams Containing Hazardous Waste (and successors to these guidelines and codes) should be complied with to the extent they are applicable in this Project.

#### **4.5.1.2 Groundwater**

The EIS must include a groundwater investigation study to assess the impacts of the project on existing groundwater users and the aquifers in the area. The report should review the quality, quantity and significance of groundwater in the proposal area, together with groundwater use in neighbouring areas. The report will include a survey of existing groundwater supply facilities (bores, wells, or excavations, users and uses), with the information gathered including:

- location;
- usage and significance of use;
- pumping parameters;
- drawdown and recharge at normal pumping rates; and
- seasonal variations (if records exist) of groundwater levels and dissolved solids concentrations or electrical conductivity.

A network of observation points which would satisfactorily monitor groundwater resources both before and after commencement of operations should be developed and described in the EIS. This section of the EIS should address the nature and hydrology of the aquifers and provide a description of the:

*Nature of the aquifer/s*



- geology/stratigraphy - such as alluvium, volcanic, metamorphic;
- aquifer type - such as confined, unconfined; and
- depth to and thickness of the aquifers.

#### *Hydrology of the aquifer/s*

- depth to water level and seasonal changes in levels;
- groundwater flow directions (defined from water level contours);
- interaction with surface water;
- interaction with saline water;
- possible sources of recharge; and
- vulnerability to pollution.

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. A description of the environmental values of the underground waters of the affected area should be provided in terms of:

- values identified in the EPP Water;
- sustainability, including both quality and quantity; and
- physical integrity, and morphology of groundwater resources.

### **4.5.2 Potential impacts and mitigation measures**

This section is to assess potential impacts on water resource environmental values identified in the previous section. It will also define and describe the objectives and practical measures for protecting or enhancing water resource environmental values, describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

The EIS should describe the possible environmental harm caused by the Project to environmental values for water as expressed in the EPP Water. The DERM Operational Policy *Waste water discharge to Queensland waters* may be consulted for guidance on how discharge proposals will be assessed.

Water management controls should be described, addressing surface and groundwater quality, quantity, drainage patterns and sediment movements. The beneficial (environmental, production and recreational) use of nearby surface and groundwater should be discussed, along with the proposal for the diversion of affected creeks during mining, and the stabilisation of those works.

Monitoring programs should be described to assess the effectiveness of the management strategies for protecting water quality, protecting water quality during the construction, operation and decommissioning of the Project with the key water management strategy objectives including:

- the protection of any important local aquifers and their waters; and
- maintenance of sufficient quantity and quality of surface waters to protect existing beneficial downstream uses of those waters (including maintenance of in-stream biota and the littoral zone); and
- minimisation of impacts on flooding levels and frequencies both upstream and downstream of the Project.

Conduct a risk assessment for uncontrolled emissions to water due to system or catastrophic failure, implications of such emissions for human health and natural ecosystems, and list strategies to prevent, minimise and contain impacts.

#### **4.5.2.1 Surface water and water courses**

The potential environmental harm to the flow and the quality of surface waters from all phases of the Project should be discussed, with particular reference to their suitability for the current and potential downstream uses (including the requirements of any affected riparian area, wetland and any in-stream biological uses). The impacts of surface water flows on existing infrastructure should be considered with reference to the EPP Water and *Water Act 2000*.

The EIS should include sufficient information on the watercourse diversion to demonstrate that any diversion can be constructed to meet engineering requirements and relevant regulatory guidelines. Such information should address the following:

- requirement for the diversion;
- feasibility of the diversion to be designed, constructed and monitored in accordance with ACARP reports and Department of Environment and Resource Management guidelines relating to watercourse diversions; and
- end of mine life strategies for diversion.

The EIS must contain an outline of the impacts on all surface water resources and changes to flow immediately downstream of the project by:

- describing local overland flow catchment characteristics and estimated change to median or 50<sup>th</sup> percentile annual runoff from local overland flow catchments;
- considering existing and emerging literature relative to the Fitzroy Basin, particularly reports arising post February 2008 flooding events;
- considering future literature and activities relative to coordinated approaches to local water quality management; and
- describing changes to flows, including median or 50<sup>th</sup> percentile annual flow, in watercourses immediately downstream of the site.

The hydrological impacts of the proposal should be assessed, particularly with regard to: stream diversions; scouring and erosion; the consequent impacts of subsidence and changes to flooding levels and frequencies both upstream and downstream of the Project. When flooding levels will be affected, modelling of afflux should be provided and illustrated with maps. The EIS should describe and illustrate how an operating pit would be protected from flooding. It should similarly address the flood protection level of any final void without the need to maintain levees.

Quality characteristics discussed should be those appropriate to the downstream and upstream water uses that may be affected. Chemical and physical properties of any waste water (including concentrations of constituents) at the point of entering natural surface waters should be discussed along with toxicity of effluent constituents to flora and fauna.

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

In relation to water supply and usage and wastewater disposal, the EIS should discuss anticipated flows of water to and from the proposal area. Where dams, weirs or ponds are proposed, the EIS should investigate the effects of predictable climatic extremes (storm events, floods and droughts) on: the capacity of the dams to retain contaminants; the structural integrity of the containing walls and the quality of water contained and flows and quality of water discharged.

The need or otherwise for licensing of any dams (including referable dams) or creek diversions, under the *Water Act 2000* should be discussed. Water allocation and water sources should be established in consultation with the Department of Environment and Resource Management (formerly the Department of Natural Resources and Water).

Also, consideration should be given for the authorisation of regulated dams pursuant to the EP Act.

All approvals required for the Project under the Water Act will be identified and discussed. i.e. referable dams, riverine protection permits, water licences for groundwater and surface water, operational works, etc.

Reference should be made to the *Fitzroy Basin Resource Operations Plan 2006* and identified demand for surface water from watercourses should be considered and if required, addressed (licences are only available through unallocated water tender purchase).

Having regard for the requirements of the EPP Water, the EIS should present the methods to avoid stormwater contamination by raw materials, wastes or products and present the means of containing, recycling, reusing, treating and disposing of stormwater. Where no-release water systems are to be used, the fate of salts and particulates derived from intake water should be discussed.

The ANZECC & ARMCANZ, *Australian Water Quality Guidelines for Fresh and Marine Waters (2000)* and the EPP Water should be used as a reference for evaluating the effects of various levels of contamination. Stream flow data will be used in combination with proposed discharge rates to estimate instream dilution and water quality. Consideration will be given to the available assimilative capacity of the receiving waters given existing background levels and other potential point source discharges in the catchment. Options for controlled discharge under times of natural stream flow should be investigated to ensure that adequate dilution of waste water is achieved.

Options for mitigation and the effectiveness of mitigation measures will be discussed with particular reference to sediment, acidity, salinity and other emissions of a hazardous or toxic nature to human health, flora or fauna.

Where it is proposed that creeks will be diverted, the EIS should detail how rehabilitation will affect both the physical and ecological condition of the creek bed and banks and the quality of water in it. Furthermore, the EIS should describe the monitoring that will be undertaken after decommissioning and who will have responsibility for management measures and corrective action, to ensure that rehabilitated creeks do not degrade.

#### **4.5.2.2 Groundwater**

The EIS should include an assessment of the potential environmental harm caused by the proposal to local groundwater resources.

The EIS should include recommendations for mitigating any impacts of the project on existing users and the aquifers in the area. Where water supply is identified as likely to be affected the proponent will be required to enter into agreements with the landholders to mitigate these impacts by providing alternate water supply or other arrangements.

The impact assessment should define the extent of the area within which groundwater resources are likely to be affected by the proposed operations and the significance of the proposal to groundwater depletion or recharge and proposed management options available to monitor and mitigate these effects. The response of the groundwater resource to the progression and finally cessation of the proposal should be described.

An assessment should be undertaken of the impact of the proposal on the local ground water regime caused by the altered porosity and permeability of any land disturbance. An assessment of the potential to contaminate groundwater resources and measures to prevent, mitigate and remediate such contamination should be addressed.

## **4.6 Air**

### **4.6.1 Description of environmental values**

This section describes the existing air environment that may be affected by the Project.

A description of the existing air shed environment should be provided having regard for particulates and gaseous and odorous compounds. All monitoring of the existing air shed environment will be carried out using appropriate equipment operated according to the relevant Australian Standards. The EIS should discuss the background levels and sources of suspended particulates, SO<sub>x</sub>, NO<sub>x</sub> and any other relevant constituent, whether major or minor, including greenhouse gases of the air environment that may be affected by the proposal.

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

A description of the environmental values of the airshed for the affected area should be provided in terms of the *Environmental Protection (Air) Policy 2008* (EPP Air).

#### **4.6.1.1 Greenhouse gas emissions**

This section of the EIS should:

- provide an inventory of projected annual emissions for each relevant greenhouse gas, with total emissions expressed in 'CO<sub>2</sub> equivalent' terms;
- estimate emissions from upstream activities associated with the Project, including fossil fuel based electricity consumed;

- provide an estimate of coal seam methane to be released as well as emissions resulting from such activities as transportation of products and consumables, and energy use; and
- briefly describe method(s) by which estimates were made.

The Australian Government Department of Climate Change's *National Greenhouse Accounts (NGA) Factors* should be used as a reference source for emission estimates and supplemented by other sources where practicable and appropriate.

#### 4.6.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for protecting or enhancing environmental values for air, describes how nominated quantitative standards and indicators may be achieved and how the achievement of the objectives will be monitored, audited and managed. Information should be submitted on the use of new technologies to reduce air emissions from emission sources.

The objectives for air emissions should be stated in respect of relevant standards (stack and ground level concentrations), relevant emission guidelines and any relevant legislation and the emissions modelled using a recognised atmospheric dispersion model. The potential for interaction between the emissions from the processing plant and emissions in the air shed and the likely environmental harm from any such interaction, should also be detailed.

Where appropriate, the predicted ground level concentrations in nearby areas should be provided. These predictions should be made for both normal and expected maximum emission conditions and the worst case meteorological conditions should be identified and modelled where necessary. Ground level predictions should be made at any residential, schools, industrial and agricultural developments believed to be sensitive to the effects of predicted emissions. Proposed controls for coal rail-transport related dust mitigation measures should consider the *QR Coal Dust Management Plan*. The techniques used to obtain the predictions should be referenced and key assumptions and data sets explained. The assessment of the proposal's impact on air quality should include at least the following matters:

- Air quality predictions compared to the relevant goals in the National Environment Protection Measure (Ambient Air Quality NEPM) and the relevant goals specified in the EPP Air ;
- Airshed management and the contribution of the Project to airshed capacity, i.e. in view of existing and future users of the airshed, for assimilation and dispersion of emissions.
- A description of the pollution control equipment and pollution control techniques to be employed at the Project and along transport routes and the features of the Project designed to suppress or minimise emissions, including dusts and odours.
- The environmental impact/nuisance of coal dust caused by the transportation of coal by road/rail. The EIS will describe measures designed to minimise coal dust emissions from both road trains to the Moorvale rail load out facility and from rail trains during haulage of coal to proposed ports.
- A description of the back up measures to be incorporated that will act in the event of failure of primary measures to minimise the likelihood of plant upsets and adverse air impacts.
- Provide an air emission inventory of the proposed site for all potential point, line, area and volume sources including fugitive emissions such as from rail or road transport of product or wastes. Provide a complete list of emissions to the atmosphere including SO<sub>x</sub>, NO<sub>x</sub>, VOC, CO, CO<sub>2</sub>, particulates (including dust), PM<sub>10</sub>, trace metals, odours and any toxic, persistent and/or hazardous substances that would be emitted by the project.
- The proposed level of emissions must be compared with the best practice national and international source emission standards.
- Evaluate the cumulative impacts of the proposed emissions on the receiving environment by considering the Project in conjunction with existing and known likely future emission sources within the region. Describe air shed management and the contribution of the proposal to air shed capacity in view of existing and future users of the air shed for assimilation and dispersion of emissions.
- Identify 'worst case' emissions that may occur during construction and operations. If these emissions are significantly higher than those for normal operations, it will be necessary to evaluate the worst-case impact, as a separate exercise to determine whether any planned buffer distance(s) between the facility and neighbouring sensitive receptors will be adequate.

- The averaging period for ground level concentrations of pollutants that are modelled should be consistent with the relevant averaging periods for air quality indicators and goals in the EPP Air and the Ambient Air Quality NEPM. For example, the modelling of sulfur dioxide must be conducted for 10-minutes, 1-hour, 24-hours and annual averaging periods.
- Modelled air quality concentrations at the “most exposed existing or likely future off-site sensitive receptors” must be compared with the appropriate national and international ambient air quality standards including the EPP Air and the Ambient Air Quality NEPM.
- The human health risk associated with emissions from the facility should be assessed e.g. the health impact from PM<sub>10</sub> dust.
- Where there is no single atmospheric dispersion model that is able to handle the different atmospheric dispersion characteristics exhibited in the proposal area (e.g. sea breezes, strong convection, terrain features, temperature inversions and pollutant re-circulation), a combination of acceptable models will need to be applied.
- The limitations and accuracy of the applied atmospheric dispersion models should be discussed. The air quality modelling results should be discussed in light of the limitations and accuracy of the applied models.

Should the proposal not meet the EPP Air quality objectives, the proponent should undertake a risk assessment to demonstrate that there will be no adverse impact off site. Risk management strategies should also be developed to identify options that will reduce exposure of local communities to levels of indicators that may be of concern and how to meet the objectives of the EPP Air progressively over the long-term.

#### **4.6.2.1 Greenhouse gas abatement**

This section of the EIS should propose and assess greenhouse gas abatement measures. It should include:

- a description of the proposed measures (alternatives and preferred) to avoid and/or minimise greenhouse gas emissions directly resulting from activities of the Project, including such activities as transportation of products and consumables and energy use by the Project;
- an assessment of how the preferred measures minimise emissions and achieve energy efficiency;
- an indication of how the preferred measures for emission controls and energy consumption compare with the relevant sector of industry with a view to achieving best practice environmental management;
- a description of any opportunities for further reducing or offsetting greenhouse gas emissions through indirect means.
- a detailed assessment of the potential viability of extracting coal seam methane (CSM) and its use eg for on-site electricity generation (with the sale of excess electricity) to the regional electricity grid or supply to a local CSM pipeline (including staged connection), within the context of the overlapping petroleum lease tenure which gives the holder priority to the CSM.

Direct means of reducing greenhouse gas emissions could include such measures as:

- minimising clearing at the site (which also has imperatives besides reducing greenhouse gas emissions);
- integrating transport for the Project with other local industries such that greenhouse gas emissions from the construction and running of transport infrastructure are minimised;
- maximising the use of renewable energy sources; and
- co-locating coal seam methane use for energy production with coal extraction.

Indirect means of reducing greenhouse gas emissions could include such measures as:

- carbon sequestration at nearby or remote locations, either:
  - above ground by such means as vegetation establishment to achieve greater biomass than that cleared for the Project;
  - below ground by geosequestration; or
- carbon trading through recognised markets.

The environmental management plan in the EIS should include a specific module to address greenhouse abatement. That module should include:



- commitments to the abatement of greenhouse gas emissions from the Project with details of the intended objectives, measures and performance standards to avoid, minimise and control emissions;
- commitments to energy management, including undertaking periodic energy audits with a view to progressively improving energy efficiency;
- a process for regular review of new technologies to identify opportunities to reduce emissions and use energy efficiently, consistent with best practice environmental management;
- any voluntary initiatives or research into reducing the lifecycle and embodied energy carbon intensity of the Project's processes or products;
- opportunities for offsetting greenhouse emissions, including, if appropriate, carbon sequestration and renewable energy uses; and
- commitments to monitor, audit and report on greenhouse emissions from all relevant activities and the success of offset measures.

#### **4.6.2.2 Climate change adaptation**

Climate change, through alterations to weather patterns and rising sea level, has the potential to impact in the future on developments designed now. Most developments involve the transfer to, or use by, a proponent of a community resource in one form or another, such as the granting of a non-renewable resource or the approval to discharge pollutants to air, water or land. Therefore, it is important that the Project design be adaptive to climate change so that community resources are not depreciated by projects that would be abandoned or require costly modification before their potential to provide a full return to the community is realised.

Consequently, the EIS should provide an assessment of the Project's vulnerabilities to climate change and describe possible adaptation strategies for the activity including:

- a risk assessment of how changing patterns of rainfall and hydrology, temperature, extreme weather and sea level (where appropriate) may affect the viability and environmental management of the Project.
- the preferred and alternative adaptation strategies to be implemented; and
- commitments to undertaking, where practicable, a cooperative approach 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.

Nonetheless efforts towards incorporation of adaptation to climate change should be provided in the EIS and Project design.

## **4.7 Noise and vibration**

### **4.7.1 Description of environmental values**

This section describes the existing environment values that may be affected by noise and vibration from the proposal.

Baseline monitoring should be undertaken at a selection of sensitive sites affected by the proposal. Sensitive receptors are defined in the Environmental Protection (Noise) Policy 2008 (EPP Noise). Long-term measured background noise levels that take into account seasonal variations are required. The locations of sensitive sites should be identified on a map at a suitable scale. The results of any baseline monitoring of noise and vibration in the proposed vicinity of the proposal should be described.

Sufficient data should be gathered to provide a baseline for later studies. The daily variation of background noise levels at nearby sensitive sites should be monitored and reported in the EIS, with particular regard given to detailing variations at different periods of the night. Monitoring methods should adhere to accepted best practice methodologies, relevant Department of Environment and Resource Management guidelines and Australian Standards, and any relevant requirements of the EP Reg and the EPP Noise.

Comment should be provided on any current activities near the Project area that may cause a background level of ground vibration.



## 4.7.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for protecting or enhancing environmental values from impacts by noise and vibration, describes how nominated quantitative standards and indicators may be achieved for noise and vibration management and how the achievement of the objectives will be monitored, audited and managed. The assessment of noise impacts should include matters raised in the document *The health effects of environmental noise – other than hearing loss* published by the enHealth Council, 2004 (or later editions), ISBN 0 642 82304 9. Mapped noise contours from a suitable acoustic model, and other relevant information, will also be presented to describe the noise generated by the mining activities.

The potential environmental harm of noise and vibration at all potentially sensitive receptors, in particular any place of work, school or residence, should be quantified in terms of objectives, standards and indicators to be achieved. Particular consideration should be given to emissions of low-frequency noise; that is, noise with components below 200Hz.

The assessment should also include environmental impacts on terrestrial animals and avifauna, particularly migratory species. Proposed measures for the minimisation or elimination of impacts should be provided, including details and illustrations of any screening, lining, enclosing or bunding. If appropriate, timing schedules for the proposed construction activities will be discussed with respect to minimising environmental impacts from noise.

Information should be supplied on blasting which might cause ground vibration or fly rock on, adjacent to, the site with particular attention given to places of work, residence, recreation, education, worship and general amenity. The magnitude, duration and frequency of any vibration should be discussed. A discussion should be provided of measures to prevent or minimise environmental nuisance and harm. Reference should also be made to the DERM Guideline: *Noise and vibration from blasting*.

The assessment should also address off-site noise and vibration impacts that could arise due to increased road or rail transportation directly resulting from the Project.

## 4.8 Nature conservation

### 4.8.1 Description of environmental values

This section describes the existing environment values for nature conservation that may be affected by the proposal.

Describe the environmental values of nature conservation for the affected area in terms of:

- integrity of ecological processes, including habitats of rare and threatened species;
- conservation of resources;
- biological diversity, including habitats of rare and threatened species;
- integrity of landscapes and places including wilderness and similar natural places; and
- aquatic and terrestrial ecosystems.

A discussion should be presented on the nature conservation values of the areas likely to be affected by the proposal. The flora and fauna communities which are rare or threatened, environmentally sensitive localities including the waterways, riparian zone and littoral zone, wilderness and habitat corridors should be described. The description should include a plant species list, a vegetation map at appropriate scale and an assessment of the significance of native vegetation, from a local and regional and State perspective. The description should indicate any areas of State or regional significance identified in an approved biodiversity planning assessment (BPA) produced by the DERM (e.g. see the draft Regional Nature Conservation Strategy for SE Qld 2001-2006). Reference will be made to the *Vegetation Management Act 2000* (VM Act), including the findings of any Regional Vegetation Management Plan, and the *Nature Conservation Act 1992* (NC Act).

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

The EIS should identify issues relevant to sensitive areas, or areas which may have low resilience to environmental change. Areas of special sensitivity include the wildlife breeding or roosting areas, any significant habitat or relevant bird flight paths for migratory species, bat roosting and breeding caves including

existing structures such as adits and shafts and habitat of threatened plants, animals and communities. The capacity of the environment to assimilate discharges/emissions should be assessed. The proposal's proximity to any biologically sensitive areas should be described.

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

- protected areas, including nature refuges, which have been proclaimed under the *Nature Conservation Act 1992* and *Marine Parks Act 1982* or are under consideration for proclamation;
- critical habitat identified under the *Nature Conservation Act 1992*;
- vegetation mapped as essential habitat;
- sites listed under international treaties such as Ramsar wetlands and World Heritage areas;
- important habitats of species listed under the NC Act and/or EPBC Act as presumed extinct, endangered, vulnerable or rare;
- regional ecosystems listed as 'endangered' or 'of concern' under State legislation, and/or ecosystems listed as presumed extinct, endangered or vulnerable under the EPBC Act;
- good representative examples of remnant regional ecosystems or regional ecosystems which are described as having 'medium' or 'low' representation in the protected area estate as defined in the Regional Ecosystem Description Database (REDD) available at the Department of the Environment and Resource Management's website;
- high value regrowth vegetation;
- 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 Japan (JAMBA), between Australia and China (CAMBA) and between Australia and the Republic of Korea (ROKAMBA);
- sites containing common species which represent a distributional limit and are of scientific value or which contains feeding, breeding, resting areas for populations of echidna, koala, platypus and other species of special cultural significance;
- sites containing 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); and/or
  - degraded vegetation or other habitats that still supports high levels of biodiversity or acts as an important corridor for maintaining high levels of biodiversity in the area;
- a site containing other special ecological values, for example, high habitat diversity and areas of high endemism;
- ecosystems which 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;
- sites of palaeontologic significance such as fossil sites;
- sites of geomorphological significance, such as lava tubes or karst;

Reference should be made to both State and Commonwealth endangered species legislation and the proximity of the area to any World Heritage property.

The VM Act and the findings of any regional vegetation management plan should also be referenced.

The occurrence of pest plants and animals in the Project area should be described.

Key flora and fauna indicators should be identified for future ongoing monitoring.

#### 4.8.1.1 Terrestrial flora

For terrestrial vegetation a map at a suitable scale should be provided, with descriptions of the units mapped. Sensitive or important vegetation types should be highlighted, including any riparian vegetation and their value as habitat for fauna and conservation of specific rare floral and faunal assemblages or community types. The existence of rare or threatened species should be specifically addressed. The surveys should include species structure, assemblage, diversity and abundance. 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.

The existence of important local and regional weed species should also be discussed.

Vegetation mapping should be provided for all relevant Project sites including new transport infrastructure. 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.

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

- location and extent of vegetation types using the DERM's regional ecosystem type descriptions in accordance with the REDD;
- location of vegetation types of conservation significance based on DERM's regional ecosystem types and occurrence of species listed as protected plants under the *Nature Conservation (Wildlife) Regulation 2006* 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);
- any plant communities of cultural, commercial or recreational significance should be identified; and
- location and abundance of any exotic or weed species.

Within each defined (standard system) vegetation community, a minimum of three sites (numbers should be discussed with the DERM) should be surveyed for plant species, preferably in both summer and winter, as follows:

- site data should be recorded in a form compatible with the Queensland Herbarium CORVEG database.
- the minimum site size should be 10 by 50 metres;
- a complete list of species present at each site should be recorded;
- the relative abundance of plant species present should be recorded;
- any plant species of conservation, cultural, commercial or recreational significance should be identified; and
- specimens of species listed as protected plants under the *Nature Conservation (Wildlife) Regulation 2006*, other than common species, are to be submitted to the Queensland Herbarium for identification and entry into the HERBRECS database.

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

#### 4.8.1.2 Terrestrial fauna

The terrestrial and riparian fauna occurring in the areas affected by the proposal should be described, 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, including amphibians, birds, reptiles, mammals and bats;
- any species that are poorly known but suspected of being rare or threatened;
- habitat requirements and sensitivity to changes; including movement corridors and barriers to movement;

- the existence of feral or exotic animals;
- existence of any rare, threatened or otherwise noteworthy species/communities 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); and
- use of the area by migratory birds, nomadic birds, fish and terrestrial fauna.

A comprehensive vertebrate fauna survey of the Project area, using a methodology recognised as appropriate by regulatory agencies, should be undertaken at a sampling intensity that supports the scale of vegetation mapping (i.e. 1:10 000 or better). Apart from the species recorded in the survey, an indicative list of all known and potential species and threatened species in the Project area should be provided, by reference to the regional ecosystems within the Project area and a 100km buffer and knowledge of species present in the local bioregion. The occurrence of fauna of conservation significance should be geocoded to mapped vegetation units or habitats, which can then be used in section 4.8.2 to propose areas to be protected.

The EIS should indicate how well any affected communities are represented and protected elsewhere in the province of the proposal.

#### **4.8.1.3 Aquatic biology**

The aquatic flora and fauna occurring in the areas affected by the proposal should be described, noting the patterns and distribution in the waterways and any associated wetlands. The description of the fauna and flora present or likely to be present in the area should include:

- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways within the affected area;
- aquatic plants;
- aquatic and benthic substrate and stream type including the locations and extent of any permanent and semi-permanent water holes or streams potentially affected by the mine and its operation; and
- habitat downstream of the Project or potentially impacted due to currents in associated lacustrine and marine environments.

The EIS should provide a description to Order or Family taxonomic rank of the presence and nature of stygofauna occurring in groundwater likely to be affected by the Project. Sampling and survey methods should follow the best practice guideline which is currently that published by the Western Australian Environmental Protection Authority - *Guidance for the Assessment of Environmental Factors No.54 (December 2003) and No. 54a (August 2007)*.

#### **4.8.1.4 Matters of National Environmental Significance**

This section describes the Matters of NES (listed under the EPBC Act) identified within the Project area. The issues relevant to the controlling provisions relevant to the Project should be addressed in this section in addition to the information required in the above sections 4.8.1.1 to 4.8.1.3.

### **4.8.2 Potential impacts and mitigation measures**

This section defines and describes the objectives and practical measures for protecting or enhancing nature conservation values, describes how nominated quantitative standards and indicators may be achieved for nature conservation management, and how the achievement of the objectives will be monitored, audited and managed.

The EIS should 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.

The discussion should cover all likely direct and indirect environmental harm due to the Project on flora and fauna particularly sensitive areas as listed below. Terrestrial and aquatic (freshwater) environments should also be covered. Also include human impacts and the control of any domestic animals introduced to the area.

Strategies for protecting the any World Heritage Properties, and any rare or threatened species should be described, and any obligations imposed by State or Commonwealth legislation or policy or international treaty obligations (i.e. JAMBA, CAMBA or ROKAMBA) should be discussed.

In any groundwater aquifers found to contain stygofauna, describe the potential impacts on stygofauna of any changes in the quality and quantity of the groundwater and describe any mitigation measures that may be applied.

The potential environmental harm to the ecological values of the area arising from the construction, operation and decommissioning of the Project including clearing, salvaging or removal of vegetation should be described and the indirect effects on remaining vegetation should be discussed. Short-term and long-term effects should be considered with comment on whether the impacts are reversible or irreversible. The capacity of the environment to assimilate discharges/emissions should be assessed.

Key flora and fauna indicators should be identified for future ongoing monitoring.

The EIS should propose and describe in detail measures to be taken to avoid and minimise potential adverse impacts of the proposal on nature conservation and biodiversity values. Any potential net loss of environmental values should be identified and quantified. Environmental offsets should be described that would counterbalance the remaining loss of environmental values. Proposed environmental offsets should be consistent with the requirements set out in the specific-issue offset policies under the framework of the Queensland Government's *Environmental Offset Policy (2008)*, and the draft DEWHA Policy Statement: *Use of environmental offsets under the Environment Protection and Biodiversity Conservation Act 1999*.

The potential environmental harm on flora and fauna due to any alterations to the local surface and ground water environment should be discussed with specific reference to environmental impacts on riparian vegetation or other sensitive vegetation communities. Any proposed disturbance(s) to areas of 'Endangered' vegetation will be discussed with respect to onsite alternatives and the respective viability of the alternatives. A monitoring program and measures to mitigate the environmental harm to habitat and remaining endangered ecosystems; the inhibition of normal movement, propagation or feeding patterns and change to food chains will be described if appropriate.

The provision of buffer zones and movement corridors and strategies to minimise environmental harm on migratory, nomadic and aquatic animals should be discussed, if relevant.

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. Feral animal management strategies and practices should also be addressed. The study should develop strategies to ensure that the Project does not contribute to increased encroachment of a feral animal species. Reference should be made to the local government authority's pest management plan when determining control strategies. The strategies for both flora and fauna should be discussed in the main body of the EIS and provided in a working form in a Pest Management Plan as part of the overall EM plan for the Project.

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

Where relevant, issue specific- policies should be addressed including:

- Vegetation management – *Policy for Vegetation Management offsets*, September 2007, Department of Natural Resources and Water;
- Marine fish habitat – *Mitigation and Compensation for Works or Activities Causing Marine Habitat Loss*, 2002, Department of Primary Industries and Fisheries;
- Koala habitat – *Offsets for Net Benefit to Koalas and Koala Habitat*, 2006, Environmental Protection Agency; and
- Offsets framework – Queensland Government's *Environmental Offset Policy (2008)*.

#### **4.8.2.1 Matters of National environmental significance**

This section will outline the objectives and practical measures for protecting or enhancing the matters of NES identified in section 4.8.1.4. It should describe how nominated quantitative standards and indicators may be achieved and how the achievement of the objectives will be monitored, audited and managed.



## 4.9 Cultural heritage

### 4.9.1 Description of environmental values

This section describes the existing cultural heritage values that may be affected by the proposal. Describe the environmental values of the cultural landscapes of the affected area in terms of the physical and cultural integrity of the landforms.

An indigenous cultural heritage study must be undertaken in accordance with the requirements of Part 7 of the *Aboriginal Cultural Heritage Act 2003* (ACH Act).

An historical cultural heritage study should also be undertaken of the known and potential historical cultural heritage values of the affected area. The study will, as a minimum, include a desktop analysis and an archaeological investigation (i.e. a physical investigation) of the area potentially affected by the Project.

This desktop component of the study should, as a minimum, review the following sources for information on historical cultural heritage values within the region of the Project site:

- the Queensland Heritage Register, for places already protected under the *Queensland Heritage Act 1992* (QH Act);
- local government heritage registers, lists or inventories; and
- the results of previous cultural heritage studies conducted within the region of the Project.

The scope of the archaeological investigation should be based upon the results of the desktop analysis. The archaeological investigation is to be conducted by an appropriately qualified person, and should address all types of historical cultural heritage places located within the Project area (i.e. built, archaeological and cultural landscape values).

The discovery and protection of any previously unidentified archaeological artefacts or archaeological places during the course of the historical cultural heritage study must comply with Part 9 of the QH Act.

### 4.9.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for managing, protecting or enhancing cultural heritage values that may be affected by the proposal. It describes how practices may be implemented for the appropriate management of those values and how the achievement of the objectives will be monitored, audited and managed.

#### 4.9.2.1 Indigenous cultural heritage

Unless an exemption applies under section 86 of the ACH Act, the potential impacts on Indigenous cultural heritage values in the vicinity of the Project must be managed under a cultural heritage management plan (CHMP) developed and approved under Part 7 of the ACH Act. Development of the CHMP should follow the guidelines made under section 85 of the ACH Act. The development of the CHMP should be negotiated with the relevant Aboriginal Party(s) and the lead agency for indigenous cultural heritage, the Department of Environment and Resource Management. The Department of Environment and Resource Management EIS Coordinator must be made aware of the progress of the CHMP approval process and of any related issues that should be addressed in the EIS assessment report.

The CHMP will address and include the following:

- A process for including Aboriginal people associated with the Project areas in protection and management of Indigenous cultural heritage;
- Processes for mitigation, management and protection of identified cultural heritage places and material in the Project site, including associated infrastructure developments, both during the construction and operational phases of the Project;
- Provisions for the management of any cultural material accidentally discovered, e.g. including burial sites;
- The monitoring of foundation excavations and other associated earthwork activities for possible subsurface cultural material;
- Cultural awareness training or programs for Project staff; and
- A conflict resolution process.



The development of the CHMP will be discussed with the lead government agency and all stakeholder representatives.

Any collection of artefact material as part of a mitigation strategy will be undertaken in accordance with the CHMP.

#### **4.9.2.2 Non-indigenous historical cultural heritage**

Unless an exemption applies under section 86 of the ACH Act, the potential impacts on non-indigenous historical cultural heritage values and their avoidance or mitigation should also be addressed in a management plan. The historical heritage management plan will specifically address identified values and provide a process for managing yet undiscovered values should they become apparent during development of the Project.

The development of a historical heritage management plan should be negotiated with the lead agency (the Cultural Heritage Branch, Department of Environment and Resource Management) and any other relevant stakeholders.

The historical heritage management plan should as a minimum address the following issues:

- Processes for the mitigation, management and protection of identified historical cultural heritage values during excavations of the construction, operational, rehabilitation and decommissioning phases of the Project;
- Processes for reporting, as required by section 89 of the QH Act, the discovery of any archaeological artefact not previously identified in the historical cultural heritage study;
- Procedures for the collection of any artefact material, including appropriate storage and conservation; and
- Historical cultural heritage awareness training or programs for Project staff.

The historical heritage management plan should be incorporated into the Project's draft EM plan.

## **4.10 Social**

The description of the social and cultural values potentially impacted by the project, and the assessment of the impacts on those values, should be conducted in consultation with relevant local, State and Federal government bodies.

### **4.10.1 Description of social and cultural values**

This section of the EIS should define and describe the social and cultural area of influence of the project and any associated activities. It should identify key social and cultural organisations, including relevant government, quasi-non-government and non-government organisations, and other community groups. This section of the EIS should also describe the community engagement process and present its findings to date.

The EIS should describe the current population and demographics of the potentially affected communities within the project's social and cultural area of influence. Such communities include all communities likely to be impacted directly and indirectly by the project, such as the potential host communities and the source communities for the project workforce and their families. Separate population figures and demographics should be provided for affected indigenous and non-indigenous populations and communities. Characteristics to be described include:

- the community size, history, age structure, ethnic characteristics, and gender composition;
- average income profiles, including the number and proportion of low income households;
- education and skill level by age and gender;
- prevalence of disability;
- health and wellbeing indicators;
- major trends and changes in the population make-up that may be occurring irrespective of the project; and
- any additional information identified as relevant through engagement with the communities.

Describe and analyse the current employment patterns, rates and trends within the social and cultural area of influence, for the indigenous and non-indigenous populations, including:

- the locations and types of other significant places of employment;
- numbers employed in relevant industry sectors and demographic cohorts (including disadvantaged groups);
- shift patterns and hours of work;
- type and level of qualifications and skills;
- unemployment rates or shortage levels within relevant skill levels and sectors; and
- any other relevant historical or anticipated changes or shifts in these employment patterns, rates and trends.

The EIS should describe the settlement patterns and residential profile of communities within the social and cultural area of influence, including:

- household size;
- type of occupancy (e.g. families versus singles house sharing);
- length of occupancy, including generational continuity (e.g. of farming properties);
- current property values and trends;
- home ownership rates;
- the size of the private rental market;
- typical rents for the area, including trends;
- the vacancy rate of rental accommodation with an assessment of seasonal fluctuations;
- rates of housing stress, e.g. availability, affordability, and adequacy;
- comparative affordability for ownership and renting relative to other towns and centres; and
- constraints and opportunities for new housing construction in the local communities, including the capacity of the local land development and housing construction industries to provide new housing and accommodation.

The EIS should provide a profile of the current social and cultural values and the characteristics of communities, groups and individuals likely to be impacted by the proposal. The social and cultural values for the affected communities and populations should be described in terms of:

- the use of the area on and around the project site for business (including industry, agriculture, forestry, fishing, aquaculture, and education), cultural purposes (including the gathering of natural products for food, medicine or ceremonial purposes), or residential purposes;
- the historical, aesthetic, social and cultural significance of places to people who use, or have used, potentially affected places in the area;
- the sense of community;
- the integrity of social conditions, including perceptions of community cohesion and personal safety; and
- amenity, liveability, harmony and well being.

Describe the current availability of community access to recreational facilities and sites, and to social and community services and infrastructure.

Outline the current rates of crime against persons and property, and the likely rate of substance abuse as far as it is known.

Social, economic and cultural values are not as easily separated as physical and ecological values. Therefore it may be necessary for some material in this section to be cross-referenced with sections 4.10 and 4.12.

#### **4.10.2 Potential impacts and mitigation measures**

The assessment of impacts (both beneficial and adverse) must be supported by evidence-based discussions, and be developed in consultation with all relevant government agencies and community groups. It should include information obtained so far through the project's community engagement process, and provide a description of how consultation feedback has identified and informed the assessment of impacts and the

development of mitigation measures. The assessment should not consider the impacts of the project in isolation, rather it should discuss the likely direct, indirect and cumulative impacts of the project in conjunction with all known existing and planned projects within the area of influence. The assessment should address not only impacts on people and families directly affected by those matters, but also impacts on associated people and communities, such as those whose livelihoods would be affected by loss or gain of direct or indirect (e.g. service provision) employment.

With regard to its timeframe, the assessment of social impacts should cover:

- the state of affairs immediately before the project was proposed;
- the period from when people first became aware of the project until it is commissioned, should approval be given;
- the proposed active phases of the project (e.g. construction, operation and decommissioning); and
- the phase after the project ceases to the extent that there may be residual impacts.

Describe the likely impacts on population numbers in the social and cultural area of influence and the associated demographic shifts.

Describe the social impacts of changes in land use, the alienation of property and loss of connection with the land. It should also address the impacts and stresses associated with relocations.

Describe likely recruitment schedules and locations, and how recruitment during the various phases of the project will impact on employment patterns, rates, and trends within the social and cultural area of influence. The assessment should at least address the following matters:

- estimated employment rates including the number of staff to be employed, with an estimate of the numbers in the various trades and sectors (e.g. clerical staff, unskilled labour, etc.);
- estimated impacts on unemployment levels, including creation of labour shortages within skilled, semi-skilled and unskilled trades and sectors;
- employment trends such as attraction (cross-over) of workforce between trades and sectors or changes to sector numbers due to the influx of new workers or the redeployment of existing workers within the area;
- Indigenous education, training and employment initiatives;
- recruitment of people from disadvantaged groups through programs such as the Queensland Government's Skilling Queenslanders for Work initiative and other inputs from the Department of Employment and Economic Development and Innovation; and
- to the extent that information is available, include cumulative effects of other major employers in the area and their likely recruitment schedules.

Describe likely lay-off schedules and how reductions in the workforce at various stages will impact on employment patterns in the social and cultural area of influence. To the extent that information is available, include the cumulative effects of other major employers in the area and their likely lay-off schedules.

Describe the training opportunities to be provided during the various phases of the project, particularly for indigenous people, or people from disadvantaged groups, and describe the provisions to be made for apprenticeship and worker training schemes.

Describe where staff and their immediate families are likely to reside during the construction and operational phases, and assess the likely impacts on housing availability and affordability, including:

- the likely changes to residential patterns in the social and cultural area of influence during all stages of the project;
- the effects of the commuting model, e.g. FIFO and/or DIDO versus local residency;
- locations, size and type of any workers camps;
- purchase of existing housing for mine staff;
- changes to residential occupation patterns, e.g. families versus house sharing by groups of singles;
- construction of new family housing;

- availability of existing housing for purchase and rent, and the capability of the existing housing stock, including rental accommodation, to meet any additional demands created by the project;
- effects on property values and rents;
- effects on property marketability;
- the potential displacement of existing residents who may no longer be able to afford accommodation; and
- impacts of the project on the availability of low cost housing within the social and cultural area of influence (e.g. assess whether pressure on rents would create a need for a local authority to build low cost housing for those in the community who would not benefit economically from the project).

The assessment should address not only the impacts on residential issues due to the accommodation of workers directly employed by the project, but also those due to the numbers of contractors and service providers that may be attracted by the opportunities offered by the project. The EIS should assess the impacts arising from alternative options for accommodation and develop a preferred accommodation strategy. Identify any approvals needed for the preferred option for new worker camps or housing, and cross-reference to those sections of the EIS that assess the potential impacts of new camps or housing.

The EIS should assess, for the various stages of the project, the demand for community services and the likely impacts on social infrastructure provided by local, State and Federal governments. The assessment should provide sufficient information for affected government authorities to make informed decisions about how the proposal may affect their business and enable them to plan for the continuing provision of social infrastructure including health, education, community services, recreational activities and other services in the region.

Assess the likely cultural pressures and shifts both for indigenous and non-indigenous cultural groups. Particular attention should be paid to the effects on:

- likely changes to cultural identities in the social and cultural area of influence;
- the ability of both indigenous and non-indigenous people, to live in accordance with their own values and priorities; and
- the use of, and access to, culturally important areas and landscapes.

The EIS should assess the likely impacts on lifestyle and amenity in the social and cultural area of influence, including:

- effects on families (and the demand for family support services) of parents being absent while on-roster;
- changes to perceptions of safety and community in the established population;
- changes to health and social wellbeing of families and communities including household consumption patterns; social dysfunction including alcohol and drugs, crime, violence, and social or cultural disruption due to population influx.
- impacts on amenity of any changes in household composition patterns, such as sharing singles replacing families in residential areas, increased noise from social activities, and contractors parking commercial vehicles and machinery in residential areas.

Describe likely effects on the prevalence of crimes against the person and against property in the social and cultural area of influence based on evidence of equivalent social changes elsewhere.

Assess the likely adverse and beneficial social impacts of the project on local and regional service industries and the families that depend in whole or part on the income that comes from those service industries (the financial effects should be discussed in the Economy section of the EIS).

Describe the implications of the proposal for future developments in the social and cultural area of influence including constraints on surrounding land uses.

The EIS should summarise the net adverse or beneficial social impacts of the proposed project with an estimation of the overall significance of those impacts.

For identified social impacts, social impact mitigation strategies and measures should be presented to address:

- the demographic changes in the profile of the social and cultural area of influence;

- the recruitment and training of the construction and operational workforces and the social and cultural implications this may have for the host community;
- housing and accommodation issues, in consultation with relevant local authorities and state government agencies, with proposals for accommodating the project workforce and their families that avoid, mitigate or offset any short and medium term adverse effects on housing affordability and availability, including the rental market, in the social and cultural area;
- capacity of current social infrastructure, particularly health and welfare, education, policing (including police resources, facilities, assets & infrastructure) and emergency services; and
- the adequate provision of education, training and employment for all groups, including women, people with a disability, and Indigenous people.

The proponent should describe any consultation with government agencies and the communities regarding the acceptability of proposed mitigation strategies and the implementation of practical management and monitoring regimes. The EIS should clearly indicate whether any nominated party other than the proponent accepts responsibility for implementing the measure(s).

A draft social impact management plan should be presented that promotes an active and ongoing role for impacted communities, local authorities and government agencies through the project life cycle from planning, construction, operations and decommissioning. The draft plan should cover:

- action plans for the implementation of mitigation strategies and measures;
- assignment of accountability and resources;
- reporting mechanism for 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; and

practical mechanisms to monitor and adjust mitigation strategies and action plans to achieve best outcomes.

## **4.11 Health and safety**

### **4.11.1 Description of environmental values**

This section describes the existing community values for public health and safety that may be affected by the Project. Nearby and other potentially affected populations should be identified and described when assessing air, noise and odour emissions and other impacts such as changes to traffic regimes resulting from the Project. Particular attention should be paid to those sections of the population, such as children and the elderly, that are especially sensitive to environmental health factors.

### **4.11.2 Potential impacts and mitigation measures**

This section defines and describes the objectives and practical measures for protecting or enhancing health and safety community values, describes how nominated quantitative standards and indicators may be achieved for health impacts management, and how the achievement of the objectives will be monitored, audited and managed.

The EIS should assess the effects on the Project workforce of occupational health and safety risks and the impacts on the community in terms of health, safety, and quality of life from Project operations and emissions. Any impacts on the health and safety of the community, workforce, suppliers and other stakeholders should be detailed in terms of health, safety, quality of life from factors such as air emissions, odour, dust and noise.

Map(s) should be provided showing the locations of sensitive receptors, such as, but not necessarily limited to, kindergartens, schools, hospitals, aged care facilities, residential areas and centres of work (e.g. office buildings, factories and workshops). The EIS, illustrated by the maps, should discuss how planned discharges from the Project could impact on public health in the short and long term and should include an assessment of the cumulative impacts on public health values caused by the proposal, either in isolation or by combination with other known existing or planned sources of contamination.

The EIS should address the Project's potential for providing disease vectors. Measures to control mosquito and biting midge breeding should be described. Any use of recycled water should be assessed for its potential to cause infection by the transmission of bacteria and/or viruses by contact, dispersion of aerosols, and ingestion (e.g. via use on food crops). Similarly, the use of recycled water should be assessed for its potential to cause harm to health via the food chain due to contaminants such as heavy metals and persistent organic chemicals. Practical monitoring regimes should also be recommended in this section.

## **4.12 Economy**

### **4.12.1 Description of environmental values**

This section describes the existing economic environment that may be affected by the Project. The character and basis of the local and regional economies should be described including:

- economic viability (including economic base and economic activity, future economic opportunities, current local and regional economic trends, in particular drought and rural downturn etc); and
- historical descriptions of large-scale resource developments and their effects in the region.

The economic impact statement should include estimates of the opportunity cost of the Project and the value of ecosystem services provided by natural or modified ecosystems to be disturbed or removed during development.

### **4.12.2 Potential impacts and mitigation measures**

The function of this section is to define and describe the objectives and practical measures for protecting or enhancing economic values, to describe how nominated quantitative standards and indicators may be achieved for economic management and how the achievement of the objectives will be monitored, audited and managed.

An economic analysis, including a cost-benefit analysis, should be presented from national, State, regional and local perspectives as appropriate to the scale of the Project. The general economic benefits from the Project should be described including the full scope of upstream and downstream linkages, economic costs and benefits and ensure:

- The scope of the economic assessment of the project is sufficient to identify all complementary and associated business and industry opportunities e.g. service industries.
- Consideration of other projects in the assessment of the potential economic costs/benefits of a proposed development at both a local and regional scale e.g. other complementary projects that may capitalise on the project, and
- Any catalytic effect of the project on other business and industry in the region is identified and considered e.g. benefits arising from provision of common user infrastructure; opportunities for clusters and technology transfer.

All assumptions used in undertaking the economic assessment should be clearly described and where applicable a sensitivity analysis undertaken.

At a level of detail appropriate to the scale of the Project, the analysis is to consider:

- the significance of this proposal in the local and regional economic context;
- the long and short-term beneficial (e.g. job creation) and adverse (e.g. competition with local small business) impacts that are likely to result from the development;
- the potential, if any, for direct equity investment in the Project by local businesses or communities;
- the cost to all levels of government of any additional infrastructure provision;
- implications for future development in the locality (including constraints on surrounding land uses and existing industry);
- the potential economic impact of any major hazard identified in section 4.13;
- the distributional effects of the proposal including proposals to mitigate any negative impact on disadvantaged groups;



- the value of lost opportunities or gained opportunities for other economic activities anticipated in the future; and
- impacts on local property values.

Consideration of the impacts of the Project in relation to energy self-sufficiency, security of supply and balance of payments benefits may be discussed. Attention should be directed to the long and short-term effects of the Project on the surrounding land use,, existing industries, regional income and employment and the State economy. The scope of any studies should be referred to the government for input before undertaking the studies.

For any adverse impacts identified to economic values, mitigation and enhancement strategies should be identified. Practical monitoring regimes should also be recommended.

#### **4.13 Hazard and risk**

This section describes the potential hazards and risk to people and property that may be associated with the Project as distinct from hazards and risk to the natural environment, which should be addressed in other sections of the TOR. When addressing natural hazards, particularly in regard to place where people would work and live (such as a mine's accommodation camp), the EIS should consider the principles of natural hazard management in State Planning Policy 1/03 (SPP1/03), *Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*.

##### **4.13.1 Description of environmental values**

Detail the values related to people and property that could be affected by any hazardous materials and actions associated with the proposal.

##### **4.13.2 Potential impacts and mitigation measures**

This section of the EIS should describe the potential hazards and risk that may be associated with the Project, including consideration of both natural and man-made hazards. This section should also define and describe the objectives and practical measures for protecting people and places from hazards and risk, describe how nominated quantitative standards and indicators may be achieved for hazard and risk management and how the achievement of the objectives will be monitored, audited and managed.

An analysis is to be conducted into the potential impacts of both natural and induced emergency situations and counter disaster and rescue procedures as a result of the proposal on sensitive areas and resources such as water reserves, State and local government controlled roads, places of residence and work and recreational areas. The degree and sensitivity of risk should be detailed.

The EIS should provide an inventory for each class of substances listed in the Australian Dangerous Goods Codes to be held on-site. This information should be presented by classes and should contain:

- chemical name;
- concentration in raw material chemicals;
- concentration in operation storage tank;
- U.N. number;
- packaging group;
- correct shipping name; and
- maximum inventory of each substance.

Details should be provided of:

- safeguards proposed on the transport, storage, use, handling and on-site movement of the materials to be stored on-site;
- the capacity and standard of bunds to be provided around the storage tanks for classified dangerous goods and other goods likely to adversely impact upon the environment in the event of an accident; and
- the procedures to prevent spillages and the emergency plans to manage hazardous situations.

The proponent should develop an integrated risk management plan for the whole of the life of the Project including construction, operation and decommissioning phases. The plan should include a preliminary hazard analysis (PHA), conducted in accordance with appropriate guidelines for hazard analysis (e.g. HAZOP Guidelines, NSW Department of Urban Affairs and Planning (DUAP)). The assessment should outline the implications for and the impact on the surrounding land uses and should involve consultation with the Department of Community Safety (formerly the Departments of Emergency Services, Queensland Fire and Rescue Authority, Queensland Police Service and Queensland Ambulance Service). The preliminary hazard analysis should incorporate:

- all relevant major hazards both technological and natural;
- the possible frequency of potential hazards, accidents, spillages and abnormal events occurring;
- indication of cumulative risk levels to surrounding land uses;
- life of any identified hazards;
- a list of all hazardous substances to be used, stored, processed, produced or transported;
- the rate of usage;
- description of processes, type of the machinery and equipment used;
- potential wildlife hazards such as crocodiles, snakes, and disease vectors; and
- public liability of the State for private infrastructure and visitors on public land.

The integrated risk management plan should include the following components:

- operational hazard analysis;
- regular hazard audits;
- fire safety, emergency;
- response plans;
- qualitative risk assessment;
- construction safety; and
- fatigue management plan for workers/contractors travelling to and from the workers village.

Where relevant, each of these components should be prepared in accordance with the relevant NSW DUAP Hazardous Industry Planning Advisory Paper (HIPAP).

#### **4.14 Cross-reference with the terms of reference**

This section provides a cross reference of the findings of the relevant sections of the EIS, where the potential impacts and mitigation measures associated with the Project are described, with the corresponding sections of the TOR.

## 5 Environmental management plan

The environmental management plan (EM plan) should be developed from the mitigation measures detailed in part 4 of the EIS. Its purpose is to state the proponents' environmental protection commitments in a way that allows them to be measured and audited.

The EM plan is an integral part of the EIS, but should be capable of being read as a stand-alone document without reference to other parts of the EIS. For a mining project the EM plan must meet the content requirements of section 203 of the EP Act, while the EM plan for a petroleum project must meet the content requirements of section 310D of that Act. The general contents of the EM plan should comprise:

- the environmental values likely to be affected by the proposed activities;
- the potential adverse and beneficial impacts of the activities on the environmental values;
- the proponents' commitments to acceptable levels of environmental performance, including environmental objectives, i.e. levels of expected environmental harm, performance standards and associated measurable indicators, performance monitoring and reporting;
- impact prevention or mitigation actions to implement the commitments; and
- corrective actions to rectify any deviation from performance standards.

Through the EM plan, the proponent's commitments to environmental performance can be used to develop regulatory controls as conditions to apply to Project approvals. Therefore, the EM plan is a relevant document for Project approvals, environmental authorities and permits and may be referenced by them. The EM plan may suggest conditions that will form the basis for developing the draft environmental authority. Water conditions should be consistent with the DERM Final Model Water Conditions for Coal Mines in the Fitzroy Basin.

## 6 Commitments not included in the EM plan

In circumstances where the proponent has made commitments that are not included in the EM plan (such as a commitment to assist a local government authority mitigate social impacts), this section of the EIS should summarise those commitments. It should be clear how and when the commitment will be fulfilled.

## 7 References

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

## 8 Recommended appendices

### A1. Final terms of reference for this EIS

A copy of the final TOR should be included in the EIS.

A summary, cross-referencing specific items of the TOR to the relevant section of the EIS, should also be provided in Section 4.14 of the EIS. For this purpose the TOR should be line numbered.

### A2. Development approvals

A list of the relevant approvals required by the Project should be presented.

### A3. Study team

The qualifications and experience of the study team and specialist sub-consultants and expert reviewers should be provided.

### A4. The standard criteria

A brief summary should be presented of the proposal's compatibility with the standard criteria as defined by the EP Act, which include the principles of ESD and other relevant policy instruments.

With regard to the principles of ESD, as listed in The National Strategy for Ecologically Sustainable Development, published by the Commonwealth Government in December 1992 (available from the Australian Government Publishing Service), each principle should be discussed and conclusions drawn as to how the proposal conforms. A life-of-project perspective should be shown.

## A5. Consultation report

The summary Consultation Report appendix for an EIS under the EP Act should commence by including the details of affected and interested persons and the statement of planned consultation with those persons, originally provided with the draft TOR. It should describe how 'interested' and 'affected persons,' and any 'affected parties' as defined in the EPBC Act, were identified.

A further list should be provided that includes the Commonwealth, State and local government agencies consulted, and the individuals and groups of stakeholders consulted.

The Consultation report appendix should summarise the results of the community consultation program, providing a summary of the groups and individuals consulted, the issues raised and the means by which the issues were addressed. The discussion should include the methodology used in the community consultation program including criteria for identifying stakeholders and the communication methods used.

## A6. Specialist studies

All reports generated on specialist studies undertaken as part of the EIS are to be included as appendices. These are likely to include:

- geology;
- soil survey and land suitability studies;
- waterway and surface hydrology;
- groundwater;
- flora and fauna studies;
- economic studies, CBA; and
- hazard and risk studies.


## A7. Research

Any proposals for researching alternative environmental management strategies or for obtaining any further necessary information should be outlined in an appendix.

### Disclaimer

While this document has been prepared with care, it contains general information and does not profess to offer legal, professional or commercial advice. The Queensland Government accepts no liability for any external decisions or actions taken on the basis of this document. Persons external to the Department of Environment and Resource Management should satisfy themselves independently and by consulting their own professional advisors before embarking on any proposed course of action.

## Approved By



Signature

17 December 2009

Date

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