# QCoal Pty Ltd

# SONOMA COAL PROJECT

# DRAFT TERMS OF REFERENCE

**Prepared by**

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## BACKGROUND

QCoal Pty Ltd is a privately owned Queensland company based in Brisbane. QCoal has been active in the Queensland coal exploration and mining industry for over ten years. It has been responsible for the discovery of the Coppabella deposit which is now an open cut mine producing around 4.5 million tonnes per annum. Exploration in the Collinsville area over recent years has resulted in the discovery of a new shallow coal resource named Sonoma after the pastoral property on which it occurs. The Management of QCoal has extensive contacts with overseas steel mills, power stations and trading companies to assist in marketing of the coal.

QCoal Pty Ltd proposes to develop the Sonoma Coal Project, as an open cut coal mine located approximately 6 km to the south of the township of Collinsville in the Bowen Basin (Figure 1). The open cut will be mined through the use of a truck and shovel operation.

Exploration activities have defined a resource of approximately 40 million tonnes, (Mt) of economically recoverable coal. Mining operations will extract approximately three million tonnes per annum, (3Mtpa) of Run of Mine, (ROM) coal for processing. The resource is mainly coking coal, however, economic quantities of thermal coal are also contained within the deposit which will be mined for sale.

The average annual product output is expected to be approximately 2Mtpa, with an anticipated mine life of 15 years. The proposed mining area subject to an application for a mining lease covers approximately 3560 hectares.

The main features of the project are:

- The initial development of the Sonoma deposit, followed by ongoing mining operations;
- The construction of:
  - levees alongside Coral Creek to prevent ingress of floodwaters to pit operations;
  - environmental and cultural heritage buffer between Coral Creek and the mining operation;
  - coal preparation plant & handling facilities;
  - Rail loadout facilities;
  - topsoil stockpiles;
  - water supply infrastructure;
  - run-of-mine (ROM) coal stockpiles;
  - overburden dumps; and
  - basic support facilities, such as offices, crib rooms, electrical supply, access roads, and bath houses.

- The implementation of a water management strategy including sedimentation dams and water management infrastructure that minimises any impacts on surrounding water courses; and
- The rehabilitation of all mining disturbance as soon as practicable after mining.

**FIGURE 1 Sonoma Project Conceptual Layout**

*(Attached as Separate File)*

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## EXECUTIVE SUMMARY

The executive summary is to convey the most important aspects and options of the Sonoma Coal Project. The format of the executive summary should follow that of the Environmental impact Statement (EIS) and should present key issues and project details in a precise and readable format.

The executive summary should provide a brief overview of the proponents and the proposal, the location, objectives, schedules and summary of the study area including potential impacts and control measures.

# 1 INTRODUCTION

The introduction should explain the function of the EIS, why the EIS has been prepared and what it sets out to achieve. In particular, the introduction should outline the level of detail of information required to meet the level of approval being sought.

It should also define the audience to whom it is directed, and contain an overview of the structure of the document.

## *1.1 Project Proponent*

This section should provide details regarding QCoal and key project consultants and contractors to be involved.

## *1.2 Project Description*

A brief description of the key elements of the Sonoma project should be provided. Any major associated infrastructure requirements should also be summarised. The location of the project and its infrastructure requirements should be described and mapped.

A brief description should be provided of studies or surveys which 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.

## *1.3 Project Objectives and Scope*

This section should provide a statement of the objectives which have led to the development of the Sonoma 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.

The EIS should outline the current status of the project and an outline of the relationship of the project to other developments or actions that may relate whether or not they have been approved. The consequences of not proceeding with the project should also be discussed.

## *1.4 The Environmental Impact Assessment (EIA) Process*

The EIS should make clear the objectives of the environmental impact assessment process under the *Environmental Protection Act 1994*. This section should include a description of the impact assessment process steps, timing and decisions to be made for relevant stages

of the project. In particular, this section should outline mechanisms in the process for public input and the public release of an EIS.

This section should further outline the necessity for QCoal to undertake wide consultation as part of the impact assessment process.

The information required in this section is to ensure;

- The relevant legislation is addressed;
- Awareness of the process to be followed; and
- Stakeholders are aware of any opportunities for input and participation.

### 1.4.1 Objectives of the EIS

This section should provide a brief statement of the objectives of the EIS. The structure of the EIS should then be outlined as an explanation of how the EIS will meet its objectives. It should be made clear to the reader that the purpose of the EIS is to:

- provide public information on the need for, and likely effect of, the project;
- set out acceptable standards and levels of impacts (both beneficial and adverse) on environmental and social values; and
- demonstrate how environmental impacts can be managed through the protection and enhancement of the environmental values.

The reader should be able to distinguish the EIS as a key environmental document providing advice to decision makers considering approvals for the project. The role of the EIS in providing the projects Environmental Management Plan (EM Plan) and Environmental Authority (EA) licence conditions for ongoing regulation should also be discussed.

### 1.4.2 Submissions

Interested and affected persons should be made aware of how submissions regarding the draft EIS will be addressed and taken into account in the decision-making process.

## *1.5 Public Consultation Process*

This section of the EIS should outline the methodology to be used to identify and mitigate issues of concern of the local community and other interested persons. Information on public consultation that has already taken place and the results of this consultation should be provided.

A list of affected persons and interested persons as well as information on consultation with interested persons should be submitted as required by Section 41 of the *Environmental Protection Act 1994*. EPA Guidelines and DME Technical Guidelines on community consultation should be used as guidance for issue identification and the consultation process.

The key objectives of consultation should be:

- to inform the different interest groups about the project proposal;
- to seek an understanding of interest group concerns about the proposal;
- to explain the impact assessment research methodology and how public input might influence the final recommendations for the project;
- to provide an understanding of the regulatory approval process;
- to seek local information and input in the project; and
- to provide the community with a sense of ownership in the project.

The public consultation program should provide ongoing opportunities for community involvement, feedback and education. It may include public meetings, interest group meetings, production of regular summary information and updates, and other consultation mechanisms as required, to encourage and facilitate active public consultation.

The consultation process should continue from the planning stages of the project through commissioning, operation and final rehabilitation.

## *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 *Environmental Protection Act 1994, Water Act 2000, Queensland Mineral Resources Act 1989*, *Vegetation Management Act 1999* and other relevant Queensland laws. Any requirements of the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* should also be included.

Necessary approvals for the project should be identified and some consideration should be provided on the project's consistency with existing zoning or long term policy framework for the area. The legislation, standards, codes and guidelines available for monitoring and controlling site operations should be provided and the relevant regulating authorities should be identified.

### 1.6.2 Planning Processes and Standards

This section should highlight requirements of the *Environmental Protection Act 1994*, such as 'ecologically sustainable development' (ESD), 'best practice environmental management', and the 'general environmental duty' and any relevant Environmental Protection Policies. This section will include an outline of the EIS process that is adapted to the project requirements with appropriate timelines.

This section should refer to Commonwealth, 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). 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.

As a minimum requirement, the terms of reference and the EIS should provide separate discussions under sub-headings in the relevant sections that describe the values and address the potential impacts on NES matters. The locations of those sub-headings should be readily identifiable from the Table of Contents. For example, if one of the controlling provisions was 'Listed threatened species and communities', then subsections, headed 'Matters of National Environmental Significance', should be placed in Section 4.6 (Nature conservation) under both the Description of environmental values and Potential impacts and mitigation measures headings. Those subsections should address exclusively and fully the issues relevant to the controlling provisions.

Alternatively, a stand-alone report could be provided as an appendix to the EIS that exclusively and fully addresses the issues relevant to the controlling provisions. In which case, it should follow the following template outline:

1. Introduction
2. Description of Proposed Action (as it would impact on NES matters)
3. Description of the Affected Environment Relevant to the Controlling Provisions (i.e. describe the features of the environment that are NES matters protected under the EPBC)
4. Assessment of Impacts on NES Matters and Mitigation Measures
5. Conclusions
6. References

## 2 PROJECT NEED AND ALTERNATIVES

### *2.1 Project socio-economic justification*

The justification for the Sonoma 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, locality and technological alternatives such as mining/processing and rehabilitation methods), to the proposed project including discussion of the consequences of not proceeding with the project. Alternatives should be discussed in sufficient detail to enable an understanding of the reason for preferring certain options and courses of action and rejecting others. Reasons for the preferred option should be outlined in terms of technical, commercial, social and comparative environmental impacts.

The interdependencies of the proposal components should be explained, particularly in regard to how each of any industrial developments or various combinations of industrial developments and any infrastructure requirements relate to the viability of the proposal. This section should include a description of the proposed water supply, power, transport and/or storage infrastructure and rationale for such infrastructure.

Reasons for selecting the preferred options in relation to the principals of ESD should be detailed. The relationship of preferred options in terms of waste management and emissions produced should also be detailed.

## 3 DESCRIPTION OF THE PROJECT

The objective of this section is to describe the project through its lifetime of construction, operation and decommissioning. This information is required to allow assessment of all aspects of the life of a proposal including all phases of the proposal from planning, construction, operation to decommissioning. It also allows further assessment of which approvals may be required and how they may be managed through the life of the proposal.

### *3.1 Location and General Description*

This section should include a detailed description of the proposed site, including plans of the area in relation to the surrounding features and land uses. Present land uses, zonings, and tenures, surrounding industries and other land uses should be included to define project in both a regional and local context.

### *3.2 Resource*

Summarise the results of studies and surveys undertaken to identify and delineate the coal resource. The location, tonnage and quality of the coal resource should be described. The geological reserves/resources should be defined using formal terminology as applicable within the mining industry and financial sector.

Maps should be provided showing the general location of the project area, and in particular:

- the location of the resource to be mined;
- the location and boundaries of the proposed mining tenures, to which the project area will be subject;
- the location for mine excavation(s);
- the location of any proposed buffers surrounding the working areas; and
- the location and boundaries of the plant site.

### *3.3 Overview of Operational and Infrastructure Requirements*

This section should provide a general summary of the proposed operation and infrastructure requirements, including identification of the key operational requirements and construction components. The purpose of this section is to provide the reader with sufficient information to develop an understanding of the construction requirements. Detailed information relating to operation and infrastructure should be provided in sections 3.5 to 3.10.

### *3.4 Construction*

The extent and nature of the project's construction phase should be described. The description should include:

- type and methods of construction to be employed;
- construction timetable, including expected start-up dates, hours of operation and commissioning of plant dates;
- construction equipment to be used;
- materials or plant to be transported onto the construction site;
- the extent of surface disturbance; and
- the estimated number of personnel to be employed during the construction phase.

### *3.5 Exploration Mineral Development and Mining*

The extent and nature of the Sonoma project's proposed ongoing exploration, mineral development and mining operations should be described, including:

- existing and proposed tenure of the project area;

- location of the resources;
- mine scheduling, quantities of coal to be mined and mine life;
- location and geometrical description of proposed pits, and mining waste dumps;
- type and methods of mining to be used and why these methods preferred to others;
- the equipment to be used in the various components of the operation;
- the proposed progressive backfilling of excavations and final voids to remain post mining;
- the area to be disturbed by mining related activities;
- Brief description of final landform and rehabilitation methods relating to the areas disturbed by mining activities;
- description of proposed ongoing exploration and mineral development, including methods and equipment to be used;
- the operational workforce to be employed within the project; and
- proposed hours of operation for exploration, mineral development and mining activities.
- proposals to divert creeks during operations, and if applicable, for the reinstatement of the creeks after operations have ceased.

### *3.6 Processing*

The location and nature of the processes to be used should be described, including:

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

Concept and layout plans should be provided highlighting proposed buildings, structures, plant and equipment associated with the coal 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 mine and processing plant, and the anticipated rates of inputs, along with similar data on products, wastes and recycle streams. A description should be provided of the quantities and characteristics of the products produced. Information should be provided on the workforce numbers employed in processing plant operations.

### *3.7 Product Handling*

This section will describe and show on plans at an appropriate scale, the proposed methods and facilities to be used for product storage and for transferring product 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 such as bunding.

### *3.8 Regional Infrastructure Requirements*

Major regional infrastructure to be associated with Sonoma should be discussed, including; Roads, Rail, Port, and Water Supply. Availability and access to the major infrastructure and associated services should be discussed, including contractual arrangements where applicable. Maps or plans showing the major infrastructure relative to the site should be included.

Site layout plans should be provided for each stage of the project with descriptions of the facilities proposed and their arrangement within and adjacent to the site, including:

- exit and entry locations;
- haul roads and access roads;
- plant, equipment and buildings;
- dams, sediment ponds and key water management structures;
- tailings and/or reject handling facilities;
- areas to be used for handling, storage, treatment and disposal of wastes; and
- facilities to be used for the transport, handling and storage of processed and raw materials.

#### 3.8.1 Transport - road/ rail/ ship

The EIS should detail requirements for the transport, to and from site, of plant, equipment, product coal, wastes and personnel during the construction and operational phases of the project.

The use of road and rail for transport of construction materials and product coal to and from the project site should be described. Details of the number of ships required to transport product coal and their size should be documented.

Information should be provided on transportation requirements on public roads during both the construction and operational phases of the project, including:

- the volume, composition, origin and destination of goods to be moved including construction materials, plant, raw materials, wastes, hazardous materials and finished products;
- the volume of traffic generated by workforce personnel, visitors and service vehicles;

- methods of movement (including vehicle types and number of vehicles likely to be used);
- anticipated times at which movements may occur;
- details of vehicle traffic and transport of heavy and oversize indivisible loads (including types and composition);
- the proposed transport routes; and
- any need for increased road maintenance and upgrading.

Details should be included on any new roads, road realignments or proposed road closures required as a result of the project.

### 3.8.2 Energy

Electricity supply requirements for the construction and operation of the project should be provided and locations shown on an infrastructure plan. Timeframes should be provided for the anticipated dates for the commencement of construction of supply facilities, testing and final commissioning. This section should also consider other energy sources such as gas, solid and liquid fuels. Details on energy demand and annual consumption of the various energy sources should be provided.

### 3.8.3 Water Supply and Storage

The EIS should provide information on water usage by the project, including the quality and quantity of all water to be supplied to the mine and processing plant. In particular, the proposed and optional sources of water supply should be described (eg. bores, mine water, any surface storages such as dams and weirs, municipal water supply pipelines, etc).

Information should be provided on requirements and estimated rates of supply from each source (average and maximum rates), including any water conservation and management measures. This section should include an assessment of the capacity of existing facilities to meet project water requirements.

A determination of potable water demand and supply requirements for each phase of the project should be made, including existing town water supply to meet such requirements. Any on site water storage and treatment proposals for use by the workforce should be described.

Stormwater management and waste water management is addressed in Section 3.9.2.

### 3.8.4 Sewerage

This section should describe the proposed sewage treatment methods for the project and identify the location of facilities on plans or maps. The capacity and design of the treatment and or disposal systems should be discussed.

This section should include details on estimated volumes and quality of effluent and the proposed treatment, disposal and/or storage methods.

### 3.8.5 Accommodation and Workforce

The EIS should provide information on the number of personnel to be employed during the construction and operational phases of the project. Estimates should be provided according to occupational groupings and expected dates when the workforce requirements will fluctuate for each stage of the project.

An assessment of the accommodation requirements for the workforce should be provided and include the ability of existing town facilities to support workforce fluctuations. Any additional accommodation and social infrastructure requirements to support the workforce should be detailed.

## *3.9 Waste Management*

An inventory should be provided of all wastes generated by the project through construction, mining and production stages, including the expected total volumes of each waste produced.

The EIS should detail each stage of the operation and the resultant waste products (construction, industrial, operational, mining, maintenance and processing wastes). The management of each waste stream should be described including the handling, storage, treatment and disposal methods. This should include a detailed description on the management of tailings and/or reject coal material.

Having regard for best practice waste management strategies and the *Environmental Protection (Waste Management) Policy 2000*, the proposals for waste avoidance, reuse, recycling, treatment and disposal should be described.

Waste management planning should begin early in the planning process to promote the prevention and minimisation of environmental impacts at each stage of the proposal.

### 3.9.1 Solid and Liquid Waste

The location, dimensions and volumes of overburden dumps and process waste facilities should be described, including their method of construction. If appropriate, the measures to prevent potential contaminated leachate from overburden dumps and process waste facilities should be detailed. Operational management of overburden dumps and process waste facilities should be discussed. Measures to ensure stability of the structures both during operation and post decommissioning should also be described.

The physical and chemical characteristics of waste material from the mine and process plant should be provided.

All other solid and liquid wastes, (other than waste water), including hazardous and regulated wastes generated by the project should be described.

Where off site disposal of wastes is to be used information should be provided on:

- any proposed re-use of waste materials;
- the location/s of the facilities to which each waste will be sent;
- confirmation that the facilities are capable of handling the type and quantities of waste generated; and
- transport details for the waste off site to the receiving facilities.

### 3.9.2 Wastewater

A description should be presented of the origin, quality and quantity of waste water originating from the project. Particular attention should be paid to the capacity of wastes to generate acid, saline or sodic waste water. A water balance for the project and processing plant is required to account for the estimated usage of water.

Where relevant, the EIS should consider the following:

- groundwater from mine pits and other excavations;
- rainfall directly onto disturbed surface areas;
- run-off from haul roads, plant and industrial areas, chemical storage areas;
- drainage (ie. run-off plus any seepage or leakage) from dumps and stockpiles;
- seepage from other waste storages;
- water usage for domestic purposes, process use, and dust suppression;
- evaporation; and
- water supply treatment plant - disposal of wastes.

### 3.9.3 Air Emissions

The EIS should provide details of the quantity and quality of all air emissions, including dust, fumes and odours from the project during construction and operation. Methods for the reduction and management of emissions should be provided.

## *3.10 Rehabilitation and Decommissioning*

This section should present the strategies and methods for progressive and final rehabilitation of the environment disturbed by mining activities. The final topography of excavations, waste dumps and process storage facilities should be shown. The post-mining land use suitability of the various land disturbance types should be described.

The decommissioning of the project, 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. Final rehabilitation of infrastructure, the plant site, waste

dumps and other areas of disturbance should be discussed in terms of ongoing land use suitability, management of any residual contaminated land and any other land management issues. Where dams are to be constructed, proposals for the management of these structures after the completion of the project should be given. Also, the final drainage and seepage control systems and long-term monitoring plans should be described.

## 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 mining activities. Environmental values are defined by the *Environmental Protection Act 1994* and Environmental Protection Policies. Environmental values should be described by reference to background information which may be included as appendices to the EIS;
- To describe the potential adverse and beneficial impacts of the mining activities on the environmental values. Any likely environmental harm to the environmental values of the proposal should be described. An analysis of any cumulative impacts caused by the proposal should be included;
- To present environmental protection objectives and the standards and measurable indicators to demonstrate the standards are being achieved; and
- To 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.

Environmental protection objectives may be derived from legislative requirements and planning frameworks which apply to the proposal including Commonwealth strategies, State Planning Policies, Local Authority Strategic Plans, Environmental Protection Policies under the *Environmental Protection Act 1994*, and any catchment management plans prepared by local water boards or Landcare 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 impact.

This section should address all elements of the environment (land, water, 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 topics to be addressed for each element are:

- **Environmental values affected:** describe the existing environmental values of the area to be affected including areas affected by any cumulative impacts (refer to any background studies in Appendices).
- **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 and in combination with other (all) impacts in the dimensions of scale, intensity, duration or frequency of the impacts. In particular, the requirements and recommendations of relevant State Planning Policies, Environmental Protection Policies, National Environmental Protection Measures and Integrated Catchment Management Plans should be addressed.
- **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 objectives as well as the numerical standard which defines the achievement of the objectives (this standard must be auditable). The measurable indicators and standards can be determined from legislation, support policies, government policies as well as the expected performance of control strategies. Objectives for progressive and final rehabilitation and management of contaminated land should also be included.
- **Control strategies to achieve the objectives:** describe the control principles, proposed practical actions and technologies to be implemented that are likely to achieve the environmental protection objectives.
- **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.
- **Management strategies:** describe the strategies to be used to ensure the environmental protection objectives are achieved and control strategies implemented.

Information given under each above elements should also state the sources of the information, how recent the information is, how any background studies were undertaken (eg intensity of field work sampling), how the reliability of the information was tested, and what uncertainties (if any) are in the information.

### *4.1 Land*

**A Environmental Values Affected**

The function of this section is to describe the existing environment of the land area which may be affected by the proposal in the context of environmental values as defined by the *Environmental Protection Act 1994* and Environmental Protection Policies.

### 4.1.1 Land use

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

A map at a suitable scale showing existing land uses and tenures, and the proposed mine and infrastructure locations should be provided for the entire proposal area and surrounding land that could be affected by the development. The location of existing dwellings and the zoning of all affected lands according to any existing town or strategic plan should be included.

The potential harm on adjacent agricultural land, urban and recreational areas should be described, and any constraints on future developments in the mining area outlined.

Provide a land suitability map of the proposed and adjacent area, setting out land suitability and current land uses.

### 4.1.2 Sensitive environmental areas

The EIS should identify whether areas that are environmentally sensitive could be affected, directly and indirectly by the proposal. Also, areas sensitive to environmental harm caused by the proposal can be determined through site specific environmental impact assessment processes.

The provisions of the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* should be addressed in particular whether there are relevant national environmentally significant matters.

The proximity of the proposal elements to any of these areas should be identified.

### 4.1.3 Infrastructure

The location and owner/custodians of all tenures, reserves, roads and road reserves and stock routes covering the affected land should be shown. Indicate locations of water pipelines, power lines and any other easements. The environmental values affected by this infrastructure should be described.

### 4.1.4 Topography

Contour information for the proposal site should be detailed at suitable increments, with levels shown with respect to Australian Height Datum (AHD). The environmental values of

the cultural landscapes of the affected area in terms of the physical and cultural integrity of the landforms should be referenced to Section 4.7.

### 4.1.5 Geology

The EIS should provide a description, map and a series of diagrammatic 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 proposed areas of disturbance. Properties which may influence stability, occupational health and safety, rehabilitation programs, or the quality of waste water leaving any area disturbed by the proposal should be described.

### 4.1.6 Soils

A soil survey of the sites affected by the proposed mining proposal should be conducted at a suitable scale, with particular reference to the physical and chemical properties of the materials which will influence erosion potential, storm water run-off quality and rehabilitation.

Soil profiles should be mapped at a suitable scale that reflects the use of the area and be described according to accepted standards (for example the Australian Soil and Land Survey Field Handbook, McDonald et al, 1990 or the Australian Soil Classification ,Isbell, 1996). An appraisal of the depth and quality of useable soil should be undertaken.

The description of soils and overburden at the project site should include:

- profile description, including stability, soil structure and texture, erodibility, dispersivity and rockiness;
- salinity and sodicity;
- pH.

This information should then be used to:

- describe the present land suitability of soils on the site;
- discuss land suitability map of the proposed mining lease and adjacent area, prepared according to the Technical Guideline – Land Suitability Assessment Technique (QDME 1995) and showing land suitability and current land uses; and
- characterise the overburden to be stripped ahead of coal extraction.

### 4.1.7 Climate/natural disasters

The EIS should describe the air temperatures, humidity, wind (direction and speed) and any other special factors (e.g. temperature inversions) likely to affect air quality within the environs of the proposal. Rainfall patterns including magnitude and seasonal variability of rainfall must be considered. Extremes of climate (droughts, floods, cyclones, etc) should also be discussed with particular reference to water management at the proposal site. The vulnerability of the area to natural or induced hazards, such as floods and bushfires should

also be addressed. The relative frequency, magnitude and risk of these events should be considered.

### 4.1.8 Scenic values

Provide an analysis and assessment of the visual impact in terms of the extent and significance of the changed skyline as viewed from the sensitive locations (residences, roads, community infrastructure) during day and night for all stages of the project.

The assessment should address the local visual impacts of the project structures and associated infrastructure during construction, operation and post mining, including final landforms. Special consideration is to be given to public roads and places of residence, community infrastructure which are within the line-of-sight of the project.

**Lighting**:

An assessment of potential impacts of lighting of the project during all stages is to be provided. This should include references to:

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

## B. Management of Impacts on Environmental Values

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

### 4.1.9 Land use suitability

The potential for the construction and operation of the Sonoma Mine to change existing and potential land uses of the proposal site and adjacent areas should be detailed. Post mining land use options should be detailed including suitability of the area mined to be used for agriculture, industry, or nature conservation and the factors favouring or limiting the establishment of those options, should be given in the context of land use capability or suitability prior to the proposal. Post mining land use options should be assessed, in terms of long term stability and minimising long term management liabilities, using the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (1995).

### 4.1.10 Land disturbance

A strategy should be developed with a view to minimising the amount of land disturbed at any one time. The strategic approach to progressive and final decommissioning, including strategies for all site infrastructure (plant, hard stand areas, storage facilities, etc), should be described.

The methods to be used for the proposal, including backfilling, covering, re-contouring, topsoil handling and revegetation, should be described.

Where dams and roads and other infrastructure are to be constructed, proposals for the management of these structures after the completion of the proposal should be given. A contour map of the area should be provided (if relevant). Also, the final drainage and seepage control systems and any long term monitoring plans should be described.

Proposed decommissioning should be described, including consolidation, revegetation, fencing and monitoring.

A description of topsoil management should consider transport, storage and replacement of topsoil to disturbed areas. Strategies for the minimisation of topsoil handling and storage should also be addressed. (Reference Section 4.1.15)

### 4.1.11 Land contamination

The EIS should describe the possible contamination of land from aspects of the proposal including waste, reject product and spills at chemical and fuel storage areas.

The means of preventing land contamination (within the meaning of the *Queensland Environmental Protection Act 1994*) should be addressed. Methods proposed for preventing, recording, containing and remediation any contaminated land should be outlined. Intentions should be stated concerning the classification (in terms of the Queensland Contaminated Land Register) of contamination on the land, processing plant site and product storage areas after project completion.

Where applicable, the EIS must include:

- mapping of areas listed on Environmental Management Register or Contaminated Land Register under the *Environmental Protection Act 1994*;
- identification of any potentially contaminated sites not on the register which may require remediation; and
- a description of the nature and extent of contamination at each site.

The EIS should address management of any existing or potentially contaminated land in addition to preventing and managing land contamination resulting from project activities.

### 4.1.12 Soil erosion

For all permanent and temporary land forms, possible erosion rates and management techniques should be described. For each soil type identified, erosion potential and erosion

management techniques should be outlined. An erosion monitoring program, including rehabilitation measures for erosion problems identified during monitoring, should be outlined. Mitigation strategies should be developed to achieve acceptable soil loss rates and levels of sediment in rainfall runoff.

The report should include an assessment of likely erosion effects, especially those resulting from the removal of vegetation for all disturbed areas such as:

- the infrastructure area including buildings;
- access roads or other transport corridors;
- any waste dumps; and
- dams, banks and creek crossings.

Methods proposed to prevent or control erosion should be specified and should be developed with regard to (a) preventing soil loss in order to maintain land capability/suitability, and (b) preventing significant degradation of local waterways by suspended solids.

### 4.1.13 Scenic Values

Options for the management of scenic values and how these will mitigate or avoid the identified impacts should be detailed.

**Lighting**

An assessment of all potential impacts of 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, including that on nearby public roads;
- 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.

**Landscape Character**

Describe how the impacts of the project on the visual quality and landscape character of the site and the surrounding area are to be mitigated or avoided. Particular reference should be made to the following:

- impacts on existing land use that contribute to the character of the local area;
- potential impacts to scenic amenity of any conservation area (eg National Park); and
- the visual absorption capacity of the site - its ability to absorb the impact of the proposed development.

**Visual Amenity**

An assessment is to be made of the existing visual quality/landscape character of the project site and the surrounding area and it's prominence including local and regional significance. Information in the form of maps, sections, elevations and photographs is to be utilised, particularly addressing the following:

- identification of elements within the proposal and surrounding area that contribute to their image of the Town/City as discussed in the 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 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 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
- value of existing vegetation as a visual screen.

### 4.1.14 Transport

The EIS should provide sufficient information for the Department of Main Roads and local government to make an independent assessment of how the state-controlled and local government road networks will be affected. Sufficient information should also be provided to enable Queensland Rail to make an independent assessment of how the rail network (including infrastructure) will be affected.

The EIS needs to indicate the corrective measures necessary to address adverse road impacts and the costs involved. Information on the impacts and the measures for dealing with those impacts should be prepared in close consultation with the local Department of Main Roads.

The EIS also needs to provide details of the impact on any current or proposed rail infrastructure and indicate whether there is any need to upgrade facilities based on increased frequency of traffic and volumes to be transported.

### 4.1.15 Rehabilitation and Decommissioning

The strategies and methods for progressive and final rehabilitation of the environment disturbed by the mining activities should be described in the context of the expected final

landforms for nominated final land uses. The final topography of excavations, waste dumps and tailings dam/co-disposal sites should be shown. The post mining land suitability of the various land disturbance types should be described.

The means of decommissioning the project, in terms of removal of plant, equipment, structures and buildings should be described. The methods proposed for the stabilisation of the affected areas should be given including rehabilitation of concrete footings and foundations, hard stand areas and storage tanks (including any potential for reuse of these facilities). Final rehabilitation of the plant site should be discussed in terms of ongoing land use suitability, stability, sustainability and management of any residual contaminated land and other land management issues.

A rehabilitation strategy should be developed with a view to minimising the amount of land disturbed at any one time. The strategic approach to progressive and final rehabilitation should be described.

The rehabilitation methods to be used for the project, including backfilling, covering, re-contouring, topsoil handling and revegetation should be described. Consideration should be given to the use of threatened plant species during revegetation. The techniques to be employed to dispose of overburden, especially any potentially acid-forming spoil or waste and the methods employed to rehabilitate those areas should be described. Discuss how settling or subsidence of rehabilitated areas may affect the use of the land in its agreed post mine form.

A description of topsoil management should consider pre-stripping, transport, storage and replacement of topsoil to mined areas. The minimisation of topsoil storage periods (to reduce fertility degradation) should also be addressed.

Where dams are to be constructed, proposals for the management of these structures after the completion of the project should be given. A contour map of the lease area after the proposed mining operation is completed should be provided. Also, the final drainage and seepage control systems and long term monitoring plans should be described.

Rehabilitation of process waste storage facilities should be described in detail, including consolidation, capping, revegetation, fencing, and monitoring.

Rehabilitation of any voids remaining after mining should be described in detail including land use, void water quality, suitability for use by stock, safety of access, and stability of void walls. Voids should be, where possible, backfilled.

Measures to ensure stability of the dumps and impoundments should be described. Methods to prevent seepage and contamination of groundwater from stockpiles, impoundments and/or dumps should be given.

### *4.2 Water resources*

#### A. Environmental Values Affected

The function of this section is to describe the existing environment for water resources which may be affected by the proposal in the context of environmental values.

#### 4.2.1 Surface Waterways

A description should be given of the surface water courses and their quality and quantity in the area affected by the proposal with an outline of the significance of these waters to the river catchment system in which they occur. Details provided should include a description of existing surface drainage patterns and flows in major watercourses. Also provide 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 proposal. Flood studies should include a range of annual exceedance probabilities for affected waterways where data permits.

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.

An assessment is required of existing water quality in surface waters (Coral Creek and other small tributaries) likely to be affected by the project. The basis for this assessment should be a baseline water quality monitoring program, with sampling stations located upstream and downstream of the project.

The water quality should be described, including seasonal variations or variations with flow where applicable. A relevant range of physical, chemical and biological parameters should be measured to gauge the environmental harm on any affected creek or wetland system.

Details provided should include a description and map(s) of existing surface drainage patterns and flows in major watercourses. A description of the environmental values of the surface waterways of the project site and surrounding land is required, including:

- values identified in the *Environmental Protection (Water) Policy 1997*;
- 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.

### 4.2.2 Groundwater

The EIS should review the quality, quantity and significance of groundwater in the proposal area, together with groundwater use in neighbouring areas. The review should include a survey of existing groundwater supply facilities such as bores, wells or excavations. The information should include:

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

A network of observation points which would satisfactorily monitor groundwater resources both before and after commencement of operations should be developed.

This section of the EIS should include references to:

**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;
- Possible sources of recharge; and
- Vulnerability to pollution.

Data obtained from survey should be sufficient to enable specification of major ionic species present, pH, electrical conductivity and total dissolved solids.

The environmental values of the underground waters of the affected area should be described in terms of:

- values identified in the *Environmental Protection (Water) Policy 1997*;
- sustainability, including both quality and quantity; and
- physical integrity, fluvial processes and morphology characteristics.

**B. Management of Impacts on Environmental Values**

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

**General**

The EIS should describe the possible environmental harm caused by the proposal to environmental values for water.

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.

Monitoring programs should be described which will assess the effectiveness of management strategies for protecting water quality during the construction, operation and decommissioning of the proposal.

Extremes of climate (droughts, floods, cyclones, etc) should also be discussed with particular reference to water management at the proposal site.

The EIS should include a risk assessment of the potential for uncontrolled discharges to water due to system or catastrophic failure, implications of such discharges for human health and natural ecosystems, and strategies to prevent, minimise and contain impacts.

### 4.2.3 Surface Water and Water Courses

An assessment should be made of the potential impacts the proposed project may have on the flow and the quality of surface waters from all phases of mining activities, with particular reference to their suitability for the current and potential downstream uses. The impacts of surface water flow on existing infrastructure should be considered. Reference should be made to the *Environmental Protection (Water) Policy 1997* and *Water Act 2000.*

Quality characteristics discussed should be appropriate to the downstream and upstream water uses that may be affected. Chemical and physical properties of any waste water at the point of discharge into natural surface waters should be discussed, including the toxicity of effluent to flora and fauna.

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

In relation to water supply, usage and wastewater disposal, the EIS should asses:

- anticipated flows of water to and from the proposal area;
- investigate the effects of predictable climatic extremes (droughts, floods) upon the structural integrity of containment walls where dams, weirs or ponds are proposed;
- quality of water contained in dams, flows and quality of water discharged;
- the use of the site water management technical guidelines in the design of all water storage facilities; and
- the need or otherwise for licensing any dams (including referable dams), under the *Water Act 2000*.

The Australian and New Zealand Environment and Conservation Council (ANZECC) 'National Water Quality Management Strategy, Australian Water Quality Guidelines for Fresh and Marine Waters' (2000) and the *Environmental Protection (Water) Policy 1997* should be used as a reference for evaluating the effects of various levels of contamination.

Management strategies should be adequately detailed to demonstrate best practice management and that environmental values of receiving waters will be maintained to nominated water quality objectives. Management strategies should be discussed with particular reference to sediment , acidity, salinity and other emissions of a hazardous or toxic nature to human health, flora and fauna. The relevant Water Resource Plan (WRP) and Resource Operations Plans (ROP's) for the area should be taken into consideration for management strategies.

### 4.2.4 Groundwater

The EIS should include an assessment of the potential environmental harm caused by the proposal to local groundwater resources. 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 groundwater quality. Management options available to monitor and mitigate these effects should be proposed. 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 groundwater 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 also be discussed.

### *4.3 Air*

#### A. Environmental Values Affected

The function of this section is to describe the existing air environment which may be affected by the proposal in the context of environmental values as defined by the *Environmental Protection Act 1994* and Environmental Protection Policies.

A description of the existing air shed environment (in terms of the *Environmental Protection (Air) Policy 1997*) should be provided having regard for particulates, gaseous and odorous compounds. Background levels and sources of suspended particulates, greenhouse gases, NOx, SOx and any other major constituents that may be affected by the proposal should be discussed.

The EIS should describe the air temperatures, wind (direction and speed) and any other special factors (eg mixing depths) likely to affect air quality within the environs of the mining proposal. Rainfall patterns including magnitude and seasonal variability of rainfall must be considered.

#### B. Management of Impacts on Environmental Values

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

The objectives for air emissions should be stated in respect of relevant standards (ambient and ground level concentrations), relevant emission guidelines and any relevant legislation. The proposed levels of emissions should be compared with the National Environment Protection Measure for ambient air quality and the *Environmental Protection (Air) Policy 1997*.

Where appropriate, the predicted average 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, industrial and agricultural developments believed to be sensitive to the effects of predicted emissions. 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 consider the following:

- features of the proposal designed to suppress or minimise emissions, including dusts and odours;

- the proposed levels of emissions of dust, fumes and odours should include emissions during normal and upset conditions. Consideration should be given to the range of potential upset condition scenarios including the air emissions that may be generated as a result; and
- air quality predictions should be compared to the relevant goals in the National Environmental Protection Council (Ambient Air Quality) Measure and the *Environmental Protection (Air) Policy 1997* goals.

**Greenhouse gas abatement**

An assessment of greenhouse gas emissions from the proposal should be provided including:

- an inventory of proposed future annual emissions for each Greenhouse Gas and total emissions expressed in 'CO2 equivalent' terms for each component of the proposal and for the combined total proposal;
- the intended measures to avoid and minimise greenhouse emissions;
- methodologies by which estimates were made; and
- opportunities for offsetting greenhouse gas emissions, such as through forestry plantations, investing in renewable energy projects, and purchase of renewable energy or support for relevant research.

Greenhouse gas emission assessments should include reviews of existing national and state protocols, agreements and strategies.

Environmental management documents for the proposal should include a section which addresses abatement of greenhouse emissions including:

- a list of specific actions and commitments taken to avoid and minimise emissions;
- consideration of alternatives to the release of greenhouse gases to the atmosphere;
- benchmarking against other similar or comparable facilities to indicate whether the most efficient technologies are being adopted;
- consideration of opportunities for offsetting greenhouse gas emissions, such as through forestry plantations or support for relevant research; and
- consideration of any additional voluntary initiatives consistent with the strategies outlined in the National Greenhouse Strategy or proposals undertaken as a component of the Commonwealth Greenhouse Challenge program.

### *4.4 Waste*

#### A. Environmental Values Affected

The function of this section is to describe the existing environmental values that may be affected by wastes from mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and the *Environmental Protection (Waste Management) Policy 2000*.

#### B. Management of Impacts on Environmental Values

The function of this section is to define and describe the objectives for protecting or enhancing environmental values from impacts by wastes, to describe 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. The management of wastes at each stage of the project should be detailed.

With reference to the waste streams identified in Section 3.9, 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 of all wastes including storage;
- methods of disposal (including the need to transport wastes off-site for disposal) proposed to be used for any trade wastes, liquid wastes and solid wastes;
- level of impact on environmental values; and
- waste minimisation strategies.

Having regard for the *Environmental Protection (Waste Management) Policy 2000*, the EIS should indicate the results of investigations into the feasibility of using waste minimisation and cleaner technology options during the construction and operating phases of the project.

### *4.5 Noise and Vibration*

#### A. Environmental Values Affected

The function of this section is to describe the existing environmental values that may be affected by noise and vibration from mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection (Noise) Policy 1997*.

The results of any baseline monitoring of noise and vibration in the vicinity of the proposal should be described. Baseline monitoring should include a selection of sensitive areas affected by the proposal. These locations should be shown on a map at suitable scale.

Monitoring methods should adhere to relevant Environmental Protection Agency Guidelines or Australian Standards, and any relevant requirements of the *Environmental Protection (Noise) Policy 1997*.

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

**B. Management of Impacts on Environmental Values**

The function of this section is to define and describe the objectives for protecting or enhancing environmental values from impacts by noise and vibration, to describe 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.

Anticipated noise levels from on-site construction, production activities and from project related activities, such as traffic movements, should be included. Off-site transport noise and vibration factors due to road or rail should be described. Information (noise contours, modelling results) should be submitted on the proposed generation of noise.

The potential environmental harm of noise and vibration at all potentially sensitive places such as places of work or residence should be quantified in terms of objectives, standards and indicators to be achieved. This should include environmental harm on terrestrial animals and avifauna particularly migratory species. Proposals to minimise or eliminate these effects including details of any screening, lining or bunding should be provided. Timing schedules for operations should be discussed with respect to minimising environmental nuisance from noise.

Information should be supplied on blasting which might cause ground vibration or fly rock on or adjacent to the site with particular attention given to places of work or residence, recreation and public amenity. The magnitude, duration and frequency of any vibration should be discussed. Measures to prevent of minimise environmental harm, including nuisance, should be discussed. Reference should be made to the EPA Guideline: Noise and vibration from blasting.

### *4.6 Nature Conservation*

**A. Environmental Values Affected**

The function of this section is to describe the existing environmental values for nature conservation that may be affected by the mining activities in the context of environmental

values as defined by the *Environmental Protection Act 1994,* Environmental Protection Policies, *Vegetation Management Act 1999* and the *Nature Conservation Act 1992*.

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;
- aquatic and terrestrial ecosystems;
- remnant native vegetation; and
- conservation status of regional 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, waterways, riparian zones, 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, regional and state perspective.

The EIS should identify issues relevant to sensitive areas, or areas which may have low resilience to environmental change. Areas of special sensitivity include any significant habitat or relevant bird flight paths for migratory species, bat roosting and breeding areas, and habitat of threatened plants, animals and communities. The capacity of the environment to assimilate discharges/emissions should be assessed. Proposal proximity to any biologically sensitive areas should be described.

Reference should be made to both State and Commonwealth 'endangered' species legislation, the *Vegetation Management Act 1999* and the findings of any Regional Vegetation Management Plan.

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. Surveys of flora and fauna need to be conducted throughout the year to reflect seasonal variation in communities and to identify migratory species. The EPA should be consulted on the scope of any biological studies before they are undertaken.

### 4.6.1 Terrestrial Flora

The terrestrial vegetation communities within the affected areas should be described and include mapping of sensitive or important vegetation types, 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. 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.

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

- location and extent of vegetation types using the EPA's regional ecosystem type descriptions in accordance with The Conservation Status of Queensland's Bioregional Ecosystems. (Sattler P.S. & Williams R.D. 1997 in prep.).and the EPA's web site listing the conservation status of regional ecosystems;
- location of vegetation types of conservation significance based on EPA's regional ecosystem types and occurrences of species listed as Protected Plants under the *Nature Conservation (Wildlife) Regulation 1994* and subsequent amendments;
- classification of vegetation types in accordance with the Queensland Herbarium for the *Vegetation Management Act 1999* with discussions of any discrepancies with site mapping;
- assessment of the condition of vegetation communities and impacting or threatening processes;
- 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 EPA) 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 1994, other than common species, are to be submitted to the Queensland Herbarium for identification and entry into the HERBRECS database.
- Design and implementation of appropriate management strategies for pasture grasses.

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

### 4.6.2 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, fish, birds, reptiles, mammals and bats;
- any species which 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 (eg any requirements of Protected Area Management Plans); and
- use of the area by migratory birds, nomadic birds, fish and terrestrial fauna.

The EIS should indicate how well any affected communities are represented and protected elsewhere in the region in which the proposal occurs.

Fauna survey methodology should be stated and should be consistent with current practices.

### 4.6.3 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. 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 area;
- any rare or threatened species;
- aquatic plants;
- aquatic substrate and stream type; and
- downstream habitat.

**B. Management of Impacts on Environmental Values**

The function of this section is to define and describe the objectives for protecting or enhancing nature conservation values, to describe 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 discussion should cover all likely direct and indirect environmental harm on flora and fauna particularly sensitive areas as listed in the EPA Guideline 11 – Terms of Reference and Preparation of an Environmental Impact Statement. Terrestrial and aquatic (freshwater) environments, human originated impacts and the control of any domestic animals introduced to the area should also be included.

The potential environmental harm to the ecological values of the area affected by the construction, operation and decommissioning of the project including clearing, salvaging or removal of vegetation should be described and the indirect effects on vegetation not cleared should be discussed. Short term and long term durations should be considered and whether the effects are reversible or irreversible. Mitigation measures and/or offsets should be proposed for adverse impacts. Any departure from no net loss of ecological values should be described.

The potential environmental harm on flora and fauna of any alterations to the local surface and ground water environment should be discussed with specific reference to environmental harm on riparian vegetation or other sensitive vegetation communities. Measures to mitigate the environmental harm to habitat or the inhibition of normal movement, propagation or feeding patterns, and change to food chains should be described.

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

Weed control strategies aimed at containing existing weed species (eg. Parthenium, prickly acacia and other noxious weeds) and ensuring no new invasive weeds are introduced to the area are required. Feral animal management strategies should be addressed including

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 authorities Pest Management Plan when determining control strategies.

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

Areas which would be regarded as sensitive with regard to flora and fauna are outlined in the EPA Guideline 11 – Terms of Reference and Preparation of an Environmental Impact Statement.

### *4.7 Cultural Heritage*

#### A. Environmental Values Affected

The function of this section is to describe the existing environment values for cultural heritage that may be affected by the mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994,* and the *Aboriginal Cultural Heritage Act 2003*.

A cultural heritage study should describe indigenous and non-indigenous cultural heritage sites and places, and their values. In accordance with the above legislation such a study should be conducted by appropriately qualified personnel and the Aboriginal parties and should include the following:

- Liaison with relevant indigenous community/communities concerning:
    1) places of significance to that community (including archaeological sites, natural sites, story sites etc);
    2) appropriate community involvement in field surveys;
- Any requirements by communities and /or informants relating to confidentiality of site data must be highlighted. Non-indigenous communities may also have relevant information;
- A systematic survey of the proposed development area to locate and record indigenous and non- indigenous cultural heritage places;
- Assessment of the significance of cultural heritage areas and objects located;
- The impact of the proposed development on cultural heritage values; and
- A report of work done which includes background research, relevant environmental data and methodology, as well as results of field surveys, significance assessment and recommendations.

**B. Management of Impacts on Environmental Values**

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

The environmental harm to cultural heritage values in the vicinity of the project should be managed under a Cultural Heritage Management Plan (CHMP) developed specifically for the project. The CHMP should provide a process for the management of cultural heritage places both identified and sub-surface at the project sites. The CHMP should be based on information contained in archaeological/ anthropological reports on the survey area and cultural reports and/or information from affiliated traditional owners. The CHMP should address and include the following:

- A process for including Indigenous people associated with the development 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 areas, including associated infrastructure developments, both during the construction and operational phases of the project;
- Provisions for the management of the accidental discovery of cultural material, including burials;
- The monitoring of foundation excavations and other associated earthwork activities for possible sub-surface cultural material;
- Cultural awareness training or programs for project staff; and
- A conflict resolution process.

Any collection of artefact material as part of a mitigation strategy will need to be done by an appropriately qualified cultural heritage practitioner holding a permit under provisions of the *Aboriginal Cultural Heritage Act 2003*. The EPA regional manager should be consulted for the provision of general advice including the appropriate conduct of cultural heritage surveys and the necessary permits.

### *4.8 Social*

**A. Environmental Values Affected**

The function of this section is to describe the existing social values that may be affected by the mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and Environmental Protection Policies.

The amenity and use of the proposal area and adjacent areas for rural, agricultural, forestry, recreational, industrial, educational or residential purposes should be described. Consideration will be given to:

- Bowen Shire community infrastructure and services, access and mobility;
- population and demographics of the affected community;
- local community values, vitality and lifestyles;
- recreational, cultural, leisure and sporting facilities and activities in relation to the affected area;
- health and educational facilities;
- farm activities near the proposed mining activities;
- number of properties directly affected by the project; and
- number of families directly affected by the project, this should include not only property owners but families of workers either living on the property or workers where the property is their primary employment.

Describe the environmental values of social attributes for the affected area in terms of:

- the integrity of social conditions, including amenity and liveability, harmony and well being, sense of community, access to recreation, and access to social and community services and infrastructure; and
- public health and safety.

## B. Management of Impacts on Environmental Values

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

The social impact assessment of the project should consider the project's impact, both beneficial and adverse, on the local community through the information gathered in the community consultation program and the analysis of the existing socio-economic environment. The impacts of the project on local and regional residents, community services and recreational activities are to be analysed and discussed for all stages of the development. The nature and extent of the community consultation program is to be described and a summary of the results incorporated in the EIS.

The EIS should describe the likely response of affected communities and identify possible beneficial and adverse impacts (both direct and cumulative). These impacts should be considered both at the regional and local level and during construction and operations phases of the proposal. Attention should be paid to:

- impacts on demographic, social, cultural and economic profiles;
- impacts on local residents, current land uses and existing lifestyles and enterprises;
- impacts on local and state labour markets, with regard to the source of the workforce;
- impacts on local residents values and aspirations, and
- impacts of both construction and operational workforces and associated contractors on housing demand, community services and community cohesion are to be addressed. The capability of the existing housing stock, including rental accommodation, to meet any additional demands created by the project is to be discussed.

The potential environmental harm on the amenity of adjacent areas used for cropping, grazing, forestry, recreation, industry, education, aesthetics, or scientific or residential purposes should be discussed. The implications of the proposal for future developments in the local area including constraints on surrounding land uses should be described.

For identified impacts to social values, suggest mitigation and enhancement strategies and facilitate initial negotiations towards acceptance of these strategies. Practical monitoring regimes should also be recommended.

### *4.9 Health and Safety*

#### A. Environmental Values Affected

The function of this section is to describe the existing community values for health and safety that may be affected by the mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and Environmental Protection Policies.

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. This should include any impacts from additional road traffic generated by the mining operation during the construction and operational phases. A basic outline of on site health and safety management should also be included.

#### B. Management of Impacts on Environmental Values

This section should include an assessment of health and safety risks to employees, the community and the general public. This will include defining and describing the objectives for protecting or enhancing health and safety community values, to describe how nominated quantitative standards and indicators may be achieved for social impacts management, and how the achievement of the objectives will be monitored, audited and managed.

The EIS should assess the effects on project workforce of occupational health and safety risks and impacts on the community in terms of health, safety, and quality of life from project operations and emissions.

Practical monitoring regimes should be recommended in this section.

### *4.10 Economy*

#### A. Environmental Values Affected

The function of this section is to describe the existing economic environment that may be affected by the mining activities in the context of environmental values as defined by the *Environmental Protection Act 1994* and Environmental Protection Policies.

Describe the economic attributes for the affected area in terms of the integrity of economic conditions and the economic benefits to the affected communities. An analysis of the economy of the impacted areas is to be undertaken, covering the following:

- economic viability (including economic base and economic activity, future economic opportunities, current local and regional economic trends, in particular drought and 'rural downturn etc);
- types and numbers of businesses;
- existing property and land values;
- availability and prices of goods and services;
- existing housing market, particularly rental accommodation which may be available for the project workforce; and
- historical descriptions of large scale resource developments and their effects in the region.

#### B. Management of Impacts on Environmental Values

The function of this section is to define and describe the objectives 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.

The effect on local and State labour markets should be discussed with regard to the source of the workforce. In relation to the source of the workforce, clarification is required as to whether the proponent or contractors are likely to employ locally or through other means and whether there are initiatives for local employment opportunities.

The impacts of both construction and operational workforces and associated contractors on housing demand should be addressed. The ability of the existing housing stock, particularly rental accommodation, to meet any additional demands created by the project should be discussed.

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.

The analysis is to include:

- the significance of this proposal on the local and regional economic context;
- the long and short-term beneficial (eg. job creation) and adverse (eg. competition with local small business) impacts that are likely to result from implementation of the proposed development;
- implications for future development in the locality (including constraints on surrounding land uses and existing industry);
- 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 land-use of the surrounding area and existing industries, regional income and employment and the state economy.

### *4.11 Hazard and Risk*

#### A. Environmental Values Affected

The function of this section is to describe the potential hazards and risk that may be associated with the mining activities in the context of their potential effect on environmental values.

The EIS will detail the environmental values likely to be affected by any hazardous materials and actions incorporated in the proposal. The degree of risk and sensitivity of the environmental values at risk should be detailed.

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 forests, water reserves, State and local Government controlled roads, places of residence and work, and recreational areas.

#### B. Management of Impacts on Environmental Values

The function of this section is to define and describe the objectives for protecting or enhancing environmental values from hazards and risk, to 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.

Where possible the EIS should provide an anticipated inventory for each class of substances listed in the Australian Dangerous Goods Codes to be held on-site.

The EIS (or references to the site Safety Management System as required by the *Coal Mining Safety and Health Act 1999*) should also provide details 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 (eg 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 Department of Emergency Services, Queensland Fire and Rescue Authority, and Queensland Ambulance Service. The preliminary hazard analysis should incorporate:

- all relevant majors 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; and
- 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 plan should include the following components:

- operational hazard analysis;
- regular hazard audits;
- fire safety, emergency;
- response plans;
- qualitative risk assessment; and
- construction safety.

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

# 5 ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan (EM Plan) (formerly known as Environmental Management Overview Strategy (EMOS)) for the proposed mining project should be submitted with the EIS and should be developed from the preceding information in the EIS. It should set out the proponents commitments to environmental management, i.e. how environmental values will be protected and enhanced.

The EM Plan should be prepared in accordance with the Environmental Protection Agency Guideline 8 – "Preparation of an Environmental Management Overview Strategy Plan".

Protection of environmental values should be achieved by preventing or minimising environmental harm in accordance with the commitments made in the text of the EIS (in Part B of each environmental value addressed).

The EM Plan is an integral part of the EIS but should be capable of being read as a stand-a-lone document. The general contents of the EM Plan should comprise:

- the proponent's commitments to acceptable levels of environmental performance, including environmental objectives, i.e. levels of expected environmental harm, performance standards and associated measurable indicators, including progressive and final rehabilitation, performance, monitoring and reporting; and
- control strategies to implement the commitments.

# 6 REFERENCES

All references consulted should be presented in the EIS.

# 7 RECOMMENDED APPENDICES

## A1. Development Approvals

A list of the development approvals required by the project should be presented.

## A2. The Standard Criteria

A brief summary of the proposal's compatibility with ESD policy and other relevant policy instruments such as the Standard Criteria as defined by the *Environmental Protection Act 1994* should be presented. Consideration should focus on 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.

## A3. Final Terms of Reference for this EIS

A copy of the final Terms of Reference should be included in the EIS. A summary cross-referencing specific items of the Terms of Reference to the relevant section of the EIS should also be provided. For this purpose the ToR should be line numbered (as shown in the generic ToR).

## A4. Research

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

## A5. Consultation Report

A list of referral agencies should be provided in a summary Consultation Report, which should also list the Commonwealth, state and local government agencies consulted, and the individuals and groups of stakeholders consulted. A summary of the issues raised by these groups, and the means by which the issues have been addressed, should be provided in the text of the EIS. It should describe how any 'affected parties' as defined in the EPBC Act, were identified.

The EIS 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. Study Team

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

### A7. Glossary of Terms

A glossary of technical terms and acronyms should be provided.

### A8. Specialist Studies

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