Draft Terms of Reference
Kunioon Project

July, 2007

Rio Tinto Coal Australia

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NCSI Certified Quality System ISO 9001

2136520A-RPT005-G pf

Background

Tarong and Tarong North Power Stations are currently supplied with coal from the adjacent Tarong coal mine, operated by Rio Tinto Coal Australia (RTCA). This coal source will be exhausted by December 2010. A new reliable and competitively priced coal supply needs to be secured to replace this existing supply. RTCA is proposing to develop an open cut coal mine, near Kingaroy as a suitable long-term replacement for the Tarong Mine, (Kunioon Project).

The Kunioon Project is located in the South Burnett district centred around Goodger, a small community approximately 15 km south of Kingaroy, 17 km west of Nanango, and approximately 150km north-west of Brisbane. The Kunioon Project, referred to within the Terms of Reference (TOR) as the "Project", has the following key features:

- open cut coal mine
- 7.5 Mt/a of product coal
- coal production commencing late 2010
- life of mine is planned for 25 years
- a 15 km overland conveyor (to provide coal to Tarong Power Station)
- a coal wash plant
- ancillary facilities such as offices, workshops and ablutions.

For further information regarding the Kunioon Project, please refer to the *Initial Advice Statement Kunioon Project, April 2007*, which can be found on the Environmental Protection Agency's website.

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Executive summary

The executive summary is to convey the most important aspects of the Project to the reader in a concise and readable form. It should use plain English and avoid the use of jargon and esoteric terms. The structure of the executive summary should follow that of the EIS, and focus strongly on the key issues and conclusions.

Glossary of terms

A glossary of technical terms, acronyms and abbreviations should be provided.

1. Introduction

The introduction should explain the purpose of the EIS. It should also define the audience to whom it is directed, and contain an overview of the structure of the document. Factual information contained in the document should be referenced where possible.

1.1 Project proponent

This section should provide details of the Proponent, including the Proponent's environmental record and details of the Proponent's environmental policy and planning framework.

1.2 Project description

A brief description of the key elements and location of the Project should be provided and illustrated where appropriate. Any major associated infrastructure requirements should also be summarised. Detailed descriptions of the Project should follow in Section 3.

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

1.3 Project objectives and scope

This section should provide a broad statement of the objectives which have led to the development of the Project, and a brief outline of the events leading up to the Project's formulation, including alternatives, envisaged time scale for implementation and project life, anticipated establishment costs and actions already undertaken within the project area.

This section should also describe the current status of the Project and outline the relationship of the Project to other actions of which the proponent should reasonably be aware that have been or are being taken, or that have been approved in the area affected by the Project. The consequences of not proceeding with the Kunioon Project should also be discussed.

1.4 The environmental impact statement (EIS) process

This section should state the methodology, objectives and consultation processes of the environmental impact statement under the *Environmental Protection Act 1994 (EP Act)*.

1.4.1 Methodology of the EIS

This section should provide a description of the impact assessment process steps, timing and decisions to be made for relevant stages of the Project. This section should also describe the mechanisms for the public / community input to the approval process.

1.4.2 Objectives of the EIS

The objective of the EIS is to:

- provide the public with information on the project scope alternatives, and the associated environment impacts and mitigation measures
- outline the levels of impact (both beneficial and adverse) on the environmental values and relate these to applicable standards
- demonstrate how environmental impacts can be managed through reasonable and practicable measures to minimise the impact on, or protect and enhance the environmental values.

Discussion of options and alternatives and their likely relative environmental management outcomes is a key aspect of the EIS.

The role of the EIS in providing the project's draft EM plan should also be discussed, with particular reference to the EM plan's role in providing management measures that will assist development of conditions that would attach to the environmental authority and any other approvals or permits for the project.

1.4.3 Submissions

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

1.4.4 Statutory matters

The EIS must address the matters mentioned in Schedule 1AA of the *Environmental Protection Regulation 1998.*

1.5 Public consultation process

This section should outline the methodology adopted for the public consultation program, to identify and mitigate socio-economic impacts of the Project. Information about the consultation that has already taken place, and the results of such consultation, should be provided. This section should also outline:

- the affected and interested persons as well as a statement of how the proponent proposes to consult with those persons
- stakeholder issues identified during the consultation process
- a description of how the stakeholder issues have been addressed within the EIS process.

An overview of the public consultation strategy proposed for project stages after the approvals phase (i.e. construction, commissioning, operation and decommissioning) should also be provided.

1.6 Project regulatory approvals

1.6.1 State and Local Government

This section should explain the legislation and policies controlling the approvals process, including all State and Local Government approvals processes. Reference should be made to the *EP Act*, *Integrated Planning Act 1997* (IPA)*, Vegetation Management Act 1999, Water Act 2000* and other relevant Queensland laws. Local Government planning controls, local laws and policies applying to the development should be described, and a list provided of the approvals required for the Project and the expected program for approval of applications. This information should outline how the legislation applies to the Project, which agencies have jurisdiction, and whether the proposed impact assessment process is appropriate.

This section should also discuss the Project's consistency with existing land uses or long-term policy framework for the area (e.g. as reflected in local and regional plans), and with legislation, standards, codes or guidelines available to monitor and control operations on site. This section should refer to all relevant State and regional planning policies. This information is required to demonstrate how the Project conforms to State, regional and local plans for the area.

1.6.2 Federal Government

As the Project is a *controlled action* under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), approval from the Federal Minister for the Environment and Water Resources is required. The controlling provisions under Division 1, Part 3 of the EPBC Act are: section 18 and 18A (listed threatened species and communities) and section 20 and 20A (listed migratory species).

The preparation of a voluntary Environmental Impact Statement (EIS) under Chapter 3, Part 2 of the *Environmental Protection Act 1994* has been approved by Environmental Protection Agency. That EIS process is recognised under the Bilateral Agreement between the Federal and State Governments applicable to the assessment of controlled actions.

As a minimum requirement, the EIS should provide separate discussions under sub-headings in the relevant sections that describe the values and address the potential impacts on relevant matters of national environmental significance as identified by the controlling provisions. The locations of those sub-headings should be readily identifiable from the Table of Contents.

Alternatively, either a separate chapter in the EIS or a stand-alone report as an appendix to the EIS could be provided that exclusively and fully addresses the issues relevant to the controlling provisions. In that case Chapter or Report, the appendix should follow the following template outline:

1. Introduction

2. Description of the proposed action (which should include the location of works, structures or components of the Project that may have relevant impacts, how the works are to be

undertaken and design parameters for structures or components of the Project that may have relevant impacts).

3. Description of the affected environment relevant to the controlling provisions

4. Assessment of impacts on the matters of national environmental significance and mitigation measures

5. Conclusions

6. References.

2. Project needs and alternatives

2.1 Project justification

This section should describe the justification for the Project, with particular reference made to the economic and social benefits, including employment and spin-off business development. 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, and discuss the consequences of not proceeding with the Project. Alternatives should be discussed in sufficient detail to enable an understanding of the reasons for preferring certain options and courses of action and rejecting others including a comparative description of the impacts of each alternative considered.

The interdependencies of the 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. As water supply, power, transport and/or storage infrastructure will be included as elements of the Project, this section should include a description of and rationale for such infrastructure.

Reasons for selecting the preferred options should include technical, social and natural environment aspects. In particular, the principals of ESD should be included. The relationship between options chosen for waste management and any emissions produced should be detailed.

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

3. Project description

The section should describe the Project through its lifetime of construction, operation and decommissioning phases, to allow for assessment of the phases of the Project and approvals required and how these can be managed through the life of operations.

3.1 Project site

This section should outline the location of the Project site regionally and locally on maps with suitable scales. The site location, site layout (depicting the Project footprint), surrounding land uses, location of the nearest residences and townships, tenure information (including real property descriptions) should be described and illustrated. Additionally, the location of Barkers Creek and the associated riparian land and the location of the Tarong Power Stations should be provided.

Consideration should be given to providing a rectified air photo enlargement to illustrate components of the Project in relation to the land and mining tenures and natural and built features of the area.

3.2 Coal resource

This section should summarise the findings from coal feasibility studies regarding the coal resource. Information should include a description of the location, geology, coal formations and striations, coal quantity and quality, expected emissions profiles, and anticipated annual tonnage during the life span of the Project (i.e., commencement of the Project ramping up to full production). This should be presented on a 'seam by seam' basis and include the modifying factors and assumptions made in arriving at those estimates. The mineral resources should be estimated and reported in accordance with the *Australasian Code for Reporting of mineral resources and ore reserves* (the JORC Code), outlined in the *Australian guidelines for the estimating and reporting of inventory coal, coal resources and coal reserves*.

Consider describing the coal resource by including maps which illustrate some or all of the following:

- location of coal resource to be developed within the Project site
- location and boundaries of ancillary or infrastructure inside and outside the mineral development lease boundary (this includes waste/spoil dumps, water storage facilities and conveyor corridor)
- any part of the resource not intended to be mined and any part of the resource that may be sterilised by the proposed mining operations or infrastructure
- cross-sections of coal deposits showing seam by seam locations
- location of the proposed mine excavation(s)
- location and boundaries of the mining tenures, granted or proposed, in relation to the coal resource and ancillary activities
- location and boundaries of the open-cut mining areas in relation to the land tenures and mineral development lease Boundary

- areas not being mined due to resource locality and environmental constraints (i.e., sensitive areas).

3.3 Resource utilisation

The section should analyse the effectiveness of the mining component of the Project in achieving the optimum utilisation of the coal/mineral resources within the Project area and consider its impacts on other resources. It should demonstrate that the mining proposal will 'best develop' the mineral resources within the Project area, minimise resource wastage and avoid any unnecessary sterilisation of these or any other of the State's coal, mineral, and petroleum (including gas and coal seam methane) resources that may be impacted upon or sterilised by the mining activities or related infrastructure.

3.4 Construction

The extent and nature of the construction phase of the Project should be described. The description should include the type and methods of construction, the typical construction equipment to be used and the items of plant to be transported onto the construction site. Any staging of the construction of the Project should be described and illustrated showing site boundaries, development sequencing and timeframes. The estimated numbers of people to be employed in the Project construction phase should also be provided with a brief description of where those people may be accommodated and/or how they will be transported to the site.

3.5 Mining operations

This section should describe the proposed mining operations.

3.5.1 Location and mine concept

This section should outline the proposed location and nature of the processes to be used in the mine (concept and layout plans highlighting key aspects of the proposed mining and infrastructure activities should be included).

A description and layout of proposed environmental buffers from mining operations should be illustrated.

3.5.2 Mining sequences and schedules

This section should outline the proposed mining sequences and schedule, including:

- the proposed sequence and timing of mining of each seam/ore body within the mining lease
- the physical extent of excavations, location of stockpiles of overburden and/or coal/mineral reject to be handled during the Project's operation or left after mining ceases—the description should include the rate of throughput of stockpiles of product, reject and overburden
- the proposed progressive backfilling of excavations
- the area disturbed at each major stage of the Project.

An outline of the workforce numbers to be employed by the mine during its various phases (construction, commissioning, operation and decommissioning) should be included. This should also briefly describe where those people may be accommodated and/or how they will be transported to the site. Comment should be made on the anticipated basis of employment (permanent, contract, etc).

3.5.3 Mining methods and equipment

This section should describe the mining methods to be adopted at the Project site. Specific details should include mining type, outlining where different techniques will be adopted at various geographical and geo-technical characters.

This section should also describe the type of plant and equipment to be employed (including capacity of plant and equipment).

3.5.4 Coal processing and products storage

This section should outline indicative process flow-sheets (schematic) and materials balance sheets for the coal processing plant and storage areas. This should reference rates of inputs for raw materials / products, wastes and recycle streams.

A general description of the nature, sources, location and quantities of the materials to be stored or handled on-site, including the storage and stockpiling of raw materials, processing plant, storage facilities should be included. This should also discuss any environmental design features for purpose built storage facilities (including bunding).

3.5.5 Ongoing evaluation and exploration activities

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

3.5.6 Final void landforms

This should briefly describe the location of the final voids left after mining operations are ceased.

3.5.7 Site access

The location of site access points should be clearly outlined for both onsite and offsite emergency response planning.

3.6 Infrastructure requirements

This section should provide descriptions, with concept and layout plans, of all infrastructure requirements for the Project. Matters to be considered include roads, bridges, tracks and pathways, dams and weirs, bore fields, power lines and other cables, wireless technology (e.g. microwave telecommunications), and pipelines for any services (whether underground or above).

3.6.1 Ancillary transport requirements

This section should describe arrangements for transporting of plant, equipment, products, wastes and personnel during both the construction phase and operation phase of the Project. The description should address the use of existing facilities and all requirements for the construction, upgrading or relocation of any transport related infrastructure.

Information should be provided on how plant items will be transported to site during the construction and operation phases. This should include:

- the volume, composition (types and quantities), origin and destination of goods to be moved including construction materials, plant, raw materials, wastes, hazardous materials, finished products
- the volume of traffic generated by workforce personnel, visitors and service vehicles
- method 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
- need for increased road maintenance and upgrading.

3.6.2 Coal handling and transport

A description of the coal handling and coal transportation from the mine to the power station should be clearly outlined, including concept and layout plans.

This section should include a description of the capacity of the coal handling, washery, stockpiling and transport systems. A process flow diagram for the coal washing plant processes, showing inputs, outputs, wastes and recycled materials should be clearly defined. This should describe the criteria used for the conveyor's route selection, alternatives considered and how the preferred coal transport option relates to the feasibility of the project.

3.6.3 Coal rejects and tailings disposal

This section should describe the quantities and qualities (i.e. physical and chemical compositions) of the coal rejects and tailing materials. This should outline the methods for storage, transport (on and off site), and disposal during the mining operations. Environmental mitigation controls to contain these wastes should be outlined.

3.6.4 Energy requirements

This section should describe all energy requirements, including electricity, natural gas, and/or solid and liquid fuel requirements for the construction and operation of the Project. The locations of any easements for energy requirements should be shown on the infrastructure plan. Energy conservation should be briefly described in the context of any Commonwealth, State and local government policies.

3.6.5 Flood mitigation, site drainage and dewatering infrastructure

This section should outline any infrastructure required for flood mitigation and dewatering the open cut pits.

A description should be provided of the proposed stormwater drainage system and the proposed disposal arrangements, including any off-site services should also be included.

3.6.6 Water supply, consumption and storage

The section should outline information on water usage by the Project, and where this water will be obtained (e.g. bores, any surface storages such as dams and weirs, municipal water supply pipelines). Estimated rates of use of supply from each source (average and maximum rates) should be given, along with the water quality suitability for purpose. In particular, this section should outline where the proponent will use existing water entitlements located within the mineral development lease for the Project (i.e. water allocations and water licences).

Any proposed water conservation and management measures should be described. Consideration should be given for the water requirements during construction, operation and decommissioning phases.

3.6.7 Sewerage

This section should describe, the sewerage infrastructure required by the Project.

3.6.8 Telecommunications

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

3.6.9 Accommodation and other infrastructure

This section should describe any other development directly related to the Project not described in other sections, such as:

- camps, townships or residential developments
- fuel storage areas
- equipment hardstand and maintenance areas
- technical workshops and laboratories.

3.7 Waste management

This section should provide an inventory of wastes (i.e., gaseous, liquid or solid wastes) to be generated by the proposal during the construction, operational and decommissioning phases. In addition to the expected total volumes of each waste produced, the inventory should include per unit volume of product directly produced by the Project:

- the tonnage of raw materials processed
- the amount of resulting process wastes

- the volume and tonnage of any re-usable by-products
- chemical and physical properties of the wastes.

A schematic diagram outlining the processes used and wastes produced (i.e., solid, liquid and gaseous) at each stage of the Project (e.g., construction/site preparation, commissioning, operation and decommissioning) should be provided. This should also include any waste recovery or recycling of product as part of the overall process (eg, stockpiling and reusing topsoil. The schematic diagrams, or an associated table, should cross-reference the relevant sections of the EIS where the potential impacts and mitigation measures associated with each waste stream are described. The physical and chemical characteristics of waste material from the process plant should be provided.

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

Air emissions

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

The methods to be employed in the mitigation of impacts from air emissions shall be described in section 4.5.

Excavated waste

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

An estimated tonnage and/or volume of waste rock and subsoil to be produced annually;

Results of waste rock and subsoil characterisation that includes the net acid producing potential of the mined waste rock (metals analysis, sulfides, pH, conductivity, Net Acid Generation (NAG) and Acid Neutralising Capacity (ANC)).

Characterisation should also address the properties of waste rock and subsoil that affect their erosion potential. Sampling should be representative with profiles of all geological units included and based on accepted statistical procedures and be in accordance with recognised guidelines.

Details of any likely leachate quality expected under field conditions, including contaminants such as sulfate, pH, chloride, iron, major cations and anions, and any chemical species in sufficient quantity that is likely to be reactive and/or toxic.

Tailings

This section should describe the tailings waste produced by preparation and/or processing plants and the proposed methods for its disposal.

Describe the approximate quantity of tailings to be produced by the project and its processing plant annually for the life of the mine. Tailings characterisation information should also be presented in this section, including:

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

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

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

Solid waste

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

Liquid waste

A description should be presented of the origin, quality and quantity of wastewater and any immiscible liquid waste originating from the project other than that addressed in previous sections. Particular attention should be given to the capacity of wastes to generate acid, and saline or sodic wastewater. A water balance for the proposal and processing plant is required to account for the estimated usage of water.

The EIS may need to consider the following effects:

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

3.8 Rehabilitation and decommissioning

This section should describe the options, strategies and methods for decommissioning the Project (including any potential for reuse of components of the Project) progressive and final rehabilitation of the environment disturbed by the Project, with the aim of recommending a preferred rehabilitation strategy developed in the manner provided for in Eco Access Guideline 18: Rehabilitation Requirements for Mining Projects. The preferred rehabilitation strategy should minimise the amount of land disturbed at any one time to the extent reasonably practicable. The final topography of any excavations, waste areas and dam sites should be shown on maps at a suitable scale.

The preferred rehabilitation strategy should address, to the extent reasonable practicable, the general rehabilitation goals provided for in the guideline, namely that the site will be:

- safe to humans and wildlife
- non polluting
- stable
- able to sustain a post mining land use.

Detail of the impacts of the preferred rehabilitation strategy should be discussed in the appropriate subsections of Section 4 (Environmental values and management of impacts) particularly with regard to such issues as final landform stability (section 4.2.2), rehabilitation of flora (section 4.7.2) and the long-term quality of water in any final voids (section 4.4.2). Implications for the long-term use of the site should also be addressed, particularly with regard to the on-site disposal of waste and the site's inclusion on the Environmental Management Register or Contaminated Land Register.

4. Environmental values and management of impacts

The functions of this section are:

- To describe the existing environmental values of the area which may potentially be affected by the Project. Environmental values are defined in section 9 of the *Environmental Protection Act 1994*, environmental protection policies and other documents such as the ANZECC 2000 guidelines and South East Queensland Regional Water Quality Management Strategy. Environmental values may also be derived following recognised procedures, such as those described in the ANZECC 2000 guidelines. Environmental values should be described by reference to background information and studies, which should be included as appendices to the EIS.
- To describe the potential adverse and beneficial impacts of the Project on the identified environmental values.
- To describe any cumulative impacts on environmental values caused by the Project, either in isolation or by combination with other sources of impact of which the proponent should reasonably be aware and that have been or are being taken or that have been approved.
- To present environmental protection objectives (using quantitative standards and indicators where possible) which can be achieved by reasonable and practicable measures for minimising impacts on and, if possible, protecting and enhancing environmental values which are impacted.
- 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, to control and manage impacts to the nominated objectives should be discussed. This section should detail the environmental protection measures incorporated in the planning, construction, operations, decommissioning, rehabilitation and associated works for the Project. Measures should prevent, or where prevention is not possible, minimise unlawful environmental harm. Preferred measures should be identified and described in more detail than other alternatives.

Environmental protection objectives may be derived from legislative and planning requirements which apply to the Project 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 land care groups. Special attention should be given to those mitigation strategies designed to protect the values of any sensitive areas and any identified ecosystems of high conservation value within the area of possible proposal impact.

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

- **Environmental values affected**: describe the existing environmental values of the area to be affected including values and areas that may be affected by any cumulative

impacts. It should be explained how the environmental values were derived (e.g. by citing published documents or by following a recognised procedure to derive the values).

- **Impact on environmental values:** describe the likely impact of the Project on the identified environmental values of the area. The cumulative impacts of the Project must be considered over time and in combination with other impacts in the dimensions of scale, intensity, duration or frequency of the impacts. In particular, any requirements and recommendations of the relevant State planning policies, environmental protection policies, national environmental protection measures and integrated catchment management plans should be addressed.

  Cumulative impacts on the environmental values of land, air and water and cumulative impacts on public health and the health of terrestrial and aquatic ecosystems must be discussed in the relevant sections. This assessment may include air and water sheds affected by the proposal and other existing and approved proposals competing for use of the local air and water sheds.

  Where impacts from the proposal will not be felt in isolation to other sources of impact, it is recommended that the proponent develop consultative arrangements with other industries in the proposal's area to undertake cooperative monitoring and/or management of environmental parameters. Such arrangements should be described in the EIS.

- **Environmental protection objectives:** describe qualitatively and quantitatively the proposed objectives where practicable. Include proposed indicators to be monitored to demonstrate the extent of achievement of the objective as well as applicable numerical standards that define the achievement of the objective (this standard must be auditable). The measurable indicators and standards can be determined from legislation, support policies and government policies as well as the expected performance of control strategies. Objectives for progressive and final rehabilitation and management of contaminated land should be included.
- **Control strategies to achieve the objectives:** describe the control principles, proposed 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. Include scope, methods and frequency of auditing proposed.
- **Management strategies:** describe the strategies to be used to ensure the environmental protection objectives are achieved and control strategies implemented e.g. continuous improvement framework including details of corrective action options, reporting (including any public reporting), monitoring, staff training, management responsibility pathway, and any environmental management systems and how they are relevant to each element of the environment.
- **Information quality:** information given under each element should also state the sources of the information, how recent the information is, how any background studies were undertaken (e.g. intensity of field work sampling), how the reliability of the information was tested, and what uncertainties (if any) are in the information.

It is recommended that the EIS follow the heading structure shown below. The mitigation measures, monitoring programs, etc., identified in this section of the EIS should be used to develop the environmental monitoring program for the Project (see Section 5).

4.1 Climate

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

The potential impacts due to climatic factors should be addressed in the relevant sections of the EIS. The impacts of rainfall on soil erosion, and storm events on the capacity of waste contamination systems (eg, site bunding, stormwater management and tailings dams) and resultant contamination of waterways, should be addressed within the relevant sections of the EIS. The impacts of winds, rain, humidity and temperature inversions on air quality should be addressed..

4.2 Land

4.2.1 Description of environmental values

This section describes the existing environment values of the land area that may be affected by the Project as required by the introductory part of this section 4 with particular reference to the specific matters mentioned in this section.

4.2.1.1 Topography/geomorphology

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

4.2.1.2 Geology

The EIS should provide a description, map and a series of cross-sections of the geology of the Project 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. Geological properties that may influence ground stability (including seismic activity, if relevant), occupational health and safety, rehabilitation programs, or the quality of wastewater leaving any area disturbed by the proposal should be described. In locations where the age and type of geology is such that significant fossil specimens (such as of dinosaurs or their tracks) may be uncovered during construction/operations, the EIS should address the potential for significant finds.

4.1.2.3 Soils

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

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

4.1.2.4 Land use

The EIS should provide a description of current land tenures, land uses and native title issues, for the Project land. The location and owner/custodians of native title in the area and details of registered native title claims should be shown.

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

Describe the land use suitability of the affected area in terms of the physical and economic attributes. The assessment should set out soil and landform subclasses assigned to soil mapping units in order to derive land suitability classes. The limitations and land suitability classification system to use is *Guideline 18: Rehabilitation requirements for Mining Projects.*

Provide a land suitability map of the proposed and adjacent area, and setting out land suitability and current land uses, e.g. for grazing of native and improved pastures and horticulture. Land classified as Good Quality Agricultural Land in the Department of Natural Resources' land classification system is to be shown in accordance with the planning guideline, *The Identification of Good Quality Agricultural Land, which supports State Planning Policy 1/92.*

4.1.2.5 Infrastructure

The location and tenures, reserves, roads and road reserves, railways and rail reserves, stock routes and the like, covering the Project land should be shown on maps of a suitable scale. Indicate locations of gas and water pipelines, power lines and any other easements.

Describe the impacts on environmental values affected by infrastructure requirements for the Project.

4.1.2.6 Landscape character

This section should describe in general terms the existing character of the landscape that will be affected by the proposal. It should comment on any changes that have already been made to the natural landscape since European settlement. It should 'set the scene' for the description of particular scenic values in the following section on visual amenity. The difference being that this section describes the general impression of the landscape that

would be obtained while travelling through and around it, while the visual amenity section addresses particular panoramas and views (e.g. from constructed lookouts, designated scenic routes, etc.) that have amenity value.

4.1.2.7 Visual amenity

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

- 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 (scale, form, materials and colours) and vegetation (natural and cultural vegetation) directional signage and land use
- identification of the project areas that have the capacity to absorb land use changes without detriment to the existing visual quality and landscape character
- the value of existing vegetation as a visual screen.

4.2.2 Potential impacts and mitigation measures

This section defines and describes the objectives and measures as required by the introductory part of this section 4 with particular reference to the specific matters mentioned in this section. It should describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

4.2.2.1 Land use suitability

The potential for the construction and operation of the Project to change existing and potential land uses of the Project site and adjacent areas should be detailed. Post operations land use options should be detailed including suitability of the area to be used for agriculture, industry, or nature conservation. The factors favouring or limiting the establishment of those options should be given in the context of land use suitability prior to the proposal and minimising potential liabilities for long-term management.

The potential environmental harm caused by the proposal on the adjacent areas currently used for agriculture, urban development, recreation, tourism, other business and the implications of the proposal for future developments in the impact area including constraints on surrounding land uses should be described. If the development adjoins or potentially impacts on good quality agricultural land, then an assessment of the potential for land use conflict is required. Investigations should follow the procedures set out in the planning guideline, *The Identification of Good Quality Agricultural Land, which supports State Planning Policy 1/92.*

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

4.2.2.2 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 should be described with particular regard to the impacts in the short, medium and long timeframes.

The methods to be used for the proposal, including backfilling, covering, re-contouring, topsoil handling and revegetation, should be described. However, a description of erosion and sediment control could be deferred to section 4.2.2.4. Any proposals to disturb land that would divert overland flow or creeks, and any subsequent reinstatement, during construction or operations should be first described in this section. However, the potential impacts of interfering with flow on the quantity and quality of water resources should be assessed in section 4.4. Also, the final drainage and seepage control systems and any long-term monitoring plans should be described.

In addition to assessing the operational phase of land disturbance, the EIS should address the ultimate changes following implementation of the decommissioning and rehabilitation plan described in section 3.8. The EIS should detail the proposed long-term changes that will occur to the land after mining ceases compared to the situation before mining commences. Those changes should be illustrated on maps at a suitable scale and with contours at intervals sufficient to assess the likely drainage pattern for ground and surface waters (though the assessment of the impacts on drainage and water quality should be provided in the water resources section of the EIS). The mitigation measures for land disturbance to be used on decommissioning the site should be assessed in sufficient detail to decide their feasibility. In particular, the EIS should address the long-term stability of final voids and spoil dumps, safety of access to the site after surrender of the lease, and the residual risks that will be transferred to the subsequent landholder.

Rehabilitation completion criteria (definition in EPA Guideline 18) should be outlined.

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

4.2.2.3 Land contamination

The EIS should describe the possible contamination of land from aspects of the proposals 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 remediating any contaminated land should be outlined. Intentions should be stated concerning the classification (in terms of the Queensland Contaminated Land Register or Environmental Management Register) of land contamination on the project site.

A preliminary site investigation (PSI) of the site consistent with the EPA's Draft guidelines for *The assessment and management of contaminated land in Queensland,* should be

undertaken to determine background contamination levels. The results of the PSI should be summarised in the EIS and provided in detail in an appendix.

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

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

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

The EIS should address management of any existing or potentially contaminated land in addition to preventing and managing land contamination resulting from project activities. The *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* should be used.

4.2.2.4 Erosion and stability

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

The report should include an assessment of likely erosion effects for all disturbed areas such as:

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

Methods proposed to prevent or control erosion should be specified and should be developed with regard to (a) the long-term stability of waste dumps and voids; (b) preventing soil loss in order to maintain land capability/suitability, and (c) preventing significant degradation of local waterways by suspended solids. The mitigation measures should address the selective handling of waste rock and capping material to maximise long-term stability of final landforms in regard to slumping and erosion both on and below the surface. Erosion control measures should be developed into an erosion and sediment control plan for inclusion in the EM plan.

4.2.2.5 Landscape character

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

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

4.2.2.6 Visual amenity

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

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

4.2.2.7 Lighting

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

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

4.2.2.8 Transport

The EIS should provide sufficient information to make an independent assessment of how the State-controlled and local government road networks will be affected. The impact on stakeholders along the whole route should be detailed and how any impacts will be managed.

Details should be provided of the impacts on environmental values of any new roads or road realignments required for the Project. The EIS should include detailed analysis of probable impact of identified construction and operational traffic generated by the Project with particular concern to impacts on road infrastructure, road users and road safety.

The EIS needs to identify impacts on the State-controlled and local government road networks and to indicate clearly the corrective measures necessary to address adverse road impacts

and the costs involved. This will require the proponent to compare the traffic situation and road conditions with, and without, the Project.

Provide information on product spill contingency plans and the adequacy of equipment and facilities to deal with possible spills for the transport nodes of the Project. Indicate whether there is a need to update the plans based on increase in frequency of traffic and volumes to be transported.

4.3 Waste

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

4.3.1 Description of environmental values

This section should describe the existing environmental values that may be affected by the generation of wastes from the mine site, as defined in the *EP Act* and *Environmental Protection (Waste Management) Policy 2000, and Environmental Protection (Waste Management) Regulation 2000*. It should also clearly outline any waste minimisation strategies (i.e., avoidance, reuse, recycling, treatment, and disposal) to be adopted to ensure efficient use of resources.

All regulated wastes such as tyres, oils etc should be clearly described in the EIS.

4.3.2 Potential impacts and mitigation measures

The purpose of this section is to describe the preferred methods (and discuss any alternatives) to be used to deal with waste streams and outline their impacts, and highlight opportunities for efficient use or reuse of resources / by products. The full description of the magnitude and nature of impacts on particular environmental values due to the management of waste should be provided in the relevant sections of Part 4 of the EIS.

This section defines and describes the objectives and measures as required by the introductory part of this section 4 with particular reference to the specific matters mentioned in this section. It should 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.

As part of the description, this section should provide details of each waste in terms of:

- operational handling and fate of all wastes including storage
- on-site treatment methods proposed for the wastes
- 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
- the potential impact on environmental values
- proposed discharge/disposal criteria for liquid and solid wastes
- measures to ensure stability of the dumps and impoundments should be described

- slope profiles that are consistent with intended land use and acceptable post-mining land management and maintenance
- alternatives for excavated waste disposal, including in-filling of voids, off-site options and treatment of any contaminated soil
- methods to prevent seepage and contamination of groundwater from stockpiles and/or dumps should be given
- market demand for recyclable waste (where appropriate) should be addressed
- waste minimisation techniques processes proposed
- decommissioning of the site.

Having regard for the *Environmental Protection (Waste Management) Policy*, the EIS should indicate the results of investigation into the feasibility of using waste minimisation and cleaner technology options during all phases of the proposal. The EPA has also released draft guidelines covering aspects of waste management under this *Environmental Protection (Waste Management) Policy*, which should be addressed.

Waste minimisation and treatment, and the application of cleaner production techniques, should also be applied to gaseous wastes, particularly nitrogen oxides, sulfur oxides, particulates and carbon dioxide. Particular attention should be paid to measures, which will maximise energy efficiency and minimise internal energy consumption in the proposal.

Cleaner production waste management planning should be detailed especially as to how these concepts have been applied to preventing or minimising environmental impacts for each phase of the mine. Details on natural resource use efficiency (e.g. energy and water), integrated processing design, co-generation of power and by-product reuse as shown in a material/energy flow analysis are required.

4.4 Water resources

4.4.1 Description of environmental values

This section describes the existing environment for water resources that may be affected by the Project as required by the introductory part of this section 4 with particular reference to the specific matters mentioned in this section.

4.4.1.1 Surface water

A description should be given of the surface watercourses and their quality and quantity in the area affected by the Project 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 streams and wetlands. Also provide details of the likelihood of flooding, history of flooding including extent, levels and frequency, and a description of present and potential water users 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 Project.

The existing water quality should be described, including seasonal variations or variations with flow where applicable. Include a relevant range of physical, chemical and biological parameters in the water quality assessment.

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

- values identified in the *Environmental Protection (Water) Policy*
- sustainability, including both quality and quantity
- physical integrity, fluvial processes and morphology of watercourses, including riparian zone vegetation and form
- any water resource plans, land and water management plans relevant to the affected catchment.

4.4.1.2 Groundwater

The EIS should review the quality, quantity and significance of groundwater in the Project area, together with groundwater use in neighbouring areas.

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

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

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

This section should include reference to:

Nature of the aquifer/s

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

Hydrogeology of the aquifer/s

- depth to water level and seasonal changes in levels
- groundwater flow directions (defined from water level contours)
- interaction with surface water
- interaction with sea/salt water
- possible sources of recharge
- vulnerability to pollution.
- the significance of the resource at a local and regional scale.

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

Describe the environmental values of the underground waters of the affected area in terms of:

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

4.4.2 Potential impacts and mitigation measures

This section is to assess potential impacts on water resource environmental values identified in the previous section. It will also define and describe the objectives and measures as required by the introductory part of this section 4 with particular reference to the specific matters mentioned in this section. It should describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

The EIS should describe the possible environmental harm caused by the proposed proposal to environmental values for water as expressed in the *Environmental Protection (Water) Policy*.

Water management controls should be described, addressing surface and groundwater quality, quantity, drainage patterns and sediment movements. The beneficial (environmental, production and recreational) use of nearby surface and groundwater should be discussed, along with the proposal for the diversion of affected creeks during mining, and the stabilisation of those works. Monitoring programs should be described which will assess the effectiveness of management strategies for protecting water quality during the construction, operation and decommissioning of the proposal.

Key water management strategy objectives include:

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

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

4.4.2.1 Surface water and water courses

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

The hydrological impacts of the proposal should be assessed, particularly with regard to scouring, erosion, and changes to flooding levels and frequencies both upstream and downstream of the project. When flooding levels will be affected, modelling of afflux should be provided and illustrated with maps.

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

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

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

The EIS may need to consider the water consumption from the following activities for Project and the resulting impacts:

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

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

Having regard for the requirements of the *Environmental Protection (Water) Policy*, the EIS should present the methods to avoid stormwater contamination by raw materials, wastes or products and present the means of containing, recycling, reusing, treating and disposing of

stormwater. Where no-release water systems are to be used, the fate of salts and particulates derived from intake water should be discussed.

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

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

4.4.2.2 Groundwater

The EIS should include an assessment of the potential environmental impacts caused by the Project 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 Project to groundwater depletion or recharge, and propose management options available to monitor and mitigate these effects. The response of the groundwater resource to the progression and finally cessation of the Project 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 be discussed.

4.5 Air

4.5.1 Description of environmental values

This section describes the existing air environment that may be directly affected by the Project as required by the introductory part of this section 4 with particular reference to the specific matters mentioned in this section.

A description of the existing air shed should be provided having regard for particulates and gaseous and odorous compounds. The background levels and sources of suspended particulates, sulphur oxides, nitrogen oxides, and any other major constituent of the air environment that may be directly affected by the Project should be discussed.

Sufficient data on local meteorology and ambient levels of pollutants should be gathered to provide a baseline for later studies or for the modelling of air quality environmental impacts within the air shed. Parameters should include air temperature, wind speed and direction, atmospheric stability, mixing depth and other parameters necessary for input to the models.

4.5.2 Potential impacts and mitigation measures

This section defines and describes the objectives and measures as required by the introductory part of this section 4 with particular reference to the specific matters mentioned in this section. It should describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

Information should be submitted on the use of new technologies to reduce air emissions from emission sources.

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

The proposed levels of emissions should be compared with the national environmental protection measures (NEPM) for ambient air quality (1998), the National Health Medical Research Council (NHMRC) national guidelines (1985) for control of emissions from stationary sources, 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 Project's impact on air quality should include at least the following matters:

- Evaluate the contribution of nitrogen oxides, sulfur oxides and volatile hydrocarbon emissions from the Project to impacts within the local airshed. Address both acute and cumulative impacts by considering the Project in conjunction with existing emission sources within the region.
- The human health risk associated with emissions from the facility of all hazardous or toxic pollutants should be assessed whether they are or are not covered by the National *Environmental Protection Council (Ambient Air Quality) Measure* or the *Environmental Protection (Air) Policy 1997*.
- Detail the features of the proposal designed to suppress or minimise emissions, including dusts and odours.
- The assessment of proposed levels of emissions of dust, fumes and odours should include emissions during both normal and upset conditions. Consideration should be given to the range of potential upset condition scenarios and the air emissions that may be generated as a result.
- Where there is no single atmospheric dispersion model that is able to handle the different atmospheric dispersion characteristics exhibited in the proposal area (e.g. sea breezes, strong convection, terrain features, temperature inversions and pollutant re-circulation), a combination of acceptable models will need to be applied.
- The air quality modelling results should be discussed in light of the limitations and accuracy of the applied models.
- 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.
- Air shed management and the contribution of the proposal to air shed capacity in view of existing and future users of the air shed for assimilation and dispersion of emissions.

4.6 Greenhouse gas emissions

4.6.1 Description of environmental values

This section should contain an assessment of greenhouse gas emissions from the Project including:

- an estimate of proposed future annual emissions of each greenhouse gas and total emissions expressed in "CO_2 equivalent" terms for each component of the Project and for the combined total Project
- methodologies by which estimates were made.

Greenhouse gas emission assessments should be based on existing national and State protocols, agreements and strategies.

4.6.2 Potential impacts and mitigation strategies

This section should address abatement of greenhouse emissions from the Project by strategies such as:

- identifying reasonable and practicable measures which could be taken to minimise emissions
- consideration of alternatives which minimise the release of greenhouse gases
- consideration of opportunities for offsetting greenhouse gas emissions by voluntary actions, such as through forestry plantations or support for relevant research
- 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.

The environmental management plan in section 5 of the EIS should include a specific module to address greenhouse gas abatement including:

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

Climate change adaptation

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

- a risk assessment of how changing patterns of rainfall and hydrology, temperature, extreme weather and sea level (where appropriate) may affect the viability and environmental management of the project
- the preferred and alternative adaptation strategies to be implemented
- commitments to undertaking, where practicable, a cooperative approach with government, other industry and other sectors to address adaptation to climate change.

The EPA recognises that predictions of climate change and its effects have inherent uncertainties, and that a balance must be found between the costs of preparing for climate change and the uncertainty of outcomes. However, proponents should use their best efforts to incorporate adaptation to climate change in their EIS and project design.

4.7 Noise and vibration

4.7.1 Description of environmental values

This section describes the existing environmental values that may be affected by noise and vibration from the Project as required by the introductory part of this section 4 with particular reference to the specific matters mentioned in this section.

If the Project could adversely impact on the noise environment, baseline monitoring should be undertaken at a selection of sensitive sites affected by the Project. Noise sensitive places are defined in the *Environmental Protection (Noise) Policy 1997*. Long-term measured background noise levels that take into account seasonal variations are required. The locations of sensitive sites should be identified on a map at a suitable scale. The results of any baseline monitoring of noise and vibration in the proposed vicinity of the proposal should be described.

Sufficient data should be gathered to provide a baseline for later studies. The daily variation of background noise levels at nearby sensitive sites should be monitored and reported in the EIS, with particular regard given to detailing variations at different periods of the night. Monitoring methods should adhere to accepted best practice methodologies, relevant Environmental Protection Agency guidelines and 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 that may cause a background level of ground vibration (for example: major roads, quarrying activities, etc.).

4.7.2 Potential impacts and mitigation measures

This section defines and describes the objectives and measures as required by the introductory part of this section 4 with particular reference to the specific matters mentioned in this section. It should 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. The assessment of noise impacts should include matters raised in the document *The health effects of environmental noise – other than hearing loss* published by the enHealth Council, 2004 (or later editions), ISBN 0 642 82304 9.

Information, including mapped noise contours from a suitable acoustic model, should be submitted based on the proposed generation of noise. The potential environmental harm of noise and vibration at all potentially sensitive places, in particular, any place of work or residence should be quantified in terms of objectives, standards and indicators to be achieved. Particular consideration should be given to emissions of low-frequency noise; that is, noise with components below 200Hz. Details of the proposed measures should be provided, including details and illustrations of any screening, lining, enclosing or bunding. A discussion should be provided of timing schedules for construction and operations with respect to minimising environmental nuisance and harm 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, residence, recreation, worship and general amenity. The magnitude, duration and recurrence frequency of any blasting associated vibration should be discussed. A discussion should be provided of reasonable and practicable measures to prevent or minimise environmental nuisance and harm. Blasting noise and vibration limits are provided in section 6I of the *Environmental Protection Regulation 1998*. Reference should also be made to the *EPA Guideline: Noise and vibration from blasting*.

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

4.8 Nature conservation

4.8.1 Description of environmental values

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

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

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

The flora and fauna communities which are rare or threatened, environmentally sensitive localities including waterways, riparian zone, rainforest remnants, old growth indigenous forests, wilderness and habitat corridors should be described. The description should include a plant species list, a vegetation map at appropriate scale and an assessment of the significance

of native vegetation, from a local and regional and state perspective. The description should indicate any areas of state or regional significance identified in an approved biodiversity planning assessment (BPA) produced by the EPA.

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

The Queensland *Vegetation Management Act 1999* and any regional ecosystem maps should also be referenced.

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

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

Terrestrial flora

For terrestrial vegetation a map at a suitable scale should be provided, with descriptions of the units mapped. Sensitive or important vegetation types should be highlighted, including riparian vegetation, and their value as habitat for fauna and conservation of specific rare floral and faunal assemblages or community types. The existence of rare or threatened species should be specifically addressed. The surveys should include species structure, assemblage, diversity and abundance. The description should contain a review of published information regarding the assessment of the significance of the vegetation to conservation, recreation, scientific, educational and historical interests.

The location of any horticultural crops in the vicinity of the site should be shown. The existence of important local and regional weed species should also be discussed.

Vegetation mapping should cover all relevant Project sites including new transport infrastructure. Adjacent areas may also require mapping.

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

- Location and extent of vegetation types using the EPA's regional ecosystem type descriptions in accordance with the Regional Ecosystem Description Database [REDD] available at the EPA's website.
- Location of vegetation types of conservation significance based on EPA's regional ecosystem types and occurrence of species listed as protected plants under the Nature Conservation (Wildlife) Regulation 2006 and subsequent amendments, as well as areas subject to the Vegetation Management Act 1999.

- The current extent (bioregional and catchment) of protected vegetation types of conservation significance within the protected area estate (national parks, conservation parks, resource reserves, nature refuges).
- Any plant communities of cultural, commercial or recreational significance should be identified.
- Location and abundance of any exotic or weed species.

Each defined vegetation community, which includes those recorded as a polygon in the EPA RE mapping plus other non-mapped communities, should be surveyed for plant species with surveys spanning two seasons, one of which encompasses the flowering period, as follows:

- site data should be recorded in a form compatible with the Queensland Herbarium CORVEG database
- 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
- specimens of species listed as protected plants under the Nature Conservation (Wildlife) Regulation 2006, other than common species, are to be submitted to the Queensland Herbarium for identification and entry into the HERBRECS database.

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

Terrestrial fauna

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

- species diversity (i.e. a species list) and abundance of animals, including amphibians, birds, reptiles, mammals and bats
- any species that are poorly known but suspected of being rare or threatened
- habitat requirements and sensitivity to changes; including movement corridors and barriers to movement
- the existence of feral or exotic animals
- existence of any rare, threatened or otherwise noteworthy species/communities in the study area, including discussion of range, habitat, breeding, recruitment, feeding and movement requirements, and current level of protection (e.g. any requirements of protected area management plans)
- 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 province where the site of the proposal occurs.

Adequate survey effort should be carried out to account for the ephemeral nature of watercourses traversing the proposal area, and seasonal variation in fauna populations.

Description of fauna species should consider behaviour over a range of seasons, particularly during and following a wet season.

A comprehensive vertebrate fauna survey should be undertaken of the project area at a sampling intensity that supports the scale of vegetation mapping (i.e. 1:10 000 or better). The EPA's local District Office should be consulted when developing the fauna survey methodology. The occurrence of fauna of conservation significance should be geocoded to mapped vegetation units or habitats, which can then be used in section 4.8.2 to propose areas to be protected.

Aquatic biology

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

- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways within the affected area, and/or those in any associated wetland or lacustrine environment
- aquatic plants
- aquatic and benthic substrate.

4.8.2 Potential impacts and mitigation measures

This section defines and describes the objectives and measures as required by the introductory part of this section 4 with particular reference to the specific matters mentioned in this section. It should 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 EIS should address any actions of the Project or likely impacts that require an authority under the *Nature Conservation Act 1992*, and/or would require approval for clearing of native vegetation

The discussion should cover all likely where practicable environmental harm due to the Project on flora and fauna particularly sensitive areas.

Strategies for protecting any rare or threatened species should be described, and any obligations imposed by State or Commonwealth legislation or policy or international treaty obligations (i.e. JAMBA, CAMBA) should be discussed. Strategies for collecting and preserving any significant fossils should be described.

The potential environmental impacts to the ecological values of the area arising from the construction, operation and decommissioning of the Project including clearing, salvaging or removal of vegetation should be described, and the indirect effects on remaining vegetation should be discussed. Short-term and long-term effects should be considered with comment on whether the impacts are reversible or irreversible. Mitigation measures and/or offsets (where applicable under relevant legislation) should be proposed for adverse impacts. Any departure from no net loss of ecological values should be described.

The potential environmental impacts on flora and fauna due to any alterations to the local surface and ground water environment should be discussed with specific reference to

environmental impacts on riparian vegetation or other sensitive vegetation communities. 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 and movement corridors, and strategies to minimise environmental impacts on migratory, nomadic and aquatic animals should be discussed.

Weed management strategies are required for containing existing weed species (e.g. parthenium and other declared plants) and ensuring no new declared plants are introduced to the area. Feral animal management strategies and practices should also be addressed. The study should develop strategies to ensure that the Project does not contribute to increased encroachment of a feral animal species. Reference should be made to the local government authority's pest management plan when determining control strategies. The strategies for both flora and fauna should be discussed in the main body of the EIS and provided in a working form in a Pest Management Plan as part of the overall EM plan for the Project.

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

4.9 Cultural heritage

4.9.1 Description of environmental values

Cultural heritage surveys may be required that describe non-indigenous cultural heritage sites and places, and their values and Aboriginal cultural heritage (as defined in the *Aboriginal Cultural Heritage Act 2003* ("**ACHA**"). Any such surveys for Aboriginal cultural heritage must be conducted by appropriately qualified persons and must include the following:

- liaison with, in the case of Aboriginal cultural heritage, relevant Aboriginal parties (as defined in ACHA) concerning:
  - significant Aboriginal objects and significant Aboriginal areas (as defined in ACHA)
  - the involvement of Aboriginal parties
- any requirements by Aboriginal parties relating to confidentiality of the Aboriginal cultural heritage must be highlighted. Non-indigenous communities may also have relevant information
- a survey of the proposed development area to locate and record non-indigenous cultural heritage places and significant Aboriginal areas and objects
- an analysis of the impact of the proposed development on Aboriginal and non indigenous cultural heritage
- a report of work done which includes background research, relevant methodology, as well as results of field surveys and recommendations.

4.9.2 Potential impacts and mitigation measures

This section defines and describes the objectives and measures as required by the introductory part of this Section 4 with particular reference to the specific matters mentioned

in this section. It should describe how nominated objectives may be achieved for cultural heritage management, and how this achievement 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 will provide a process for the management of cultural heritage places both identified and sub-surface at the project sites. It is usual practice for the CHMP to be based on information contained in archaeological and/or 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 Aboriginal/Torres Strait islander 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
- a conflict resolution process.

The development of the CHMP should be negotiated with the lead agencies (the Department of Natural Resources and Water for indigenous cultural heritage and EPA for non-indigenous cultural heritage) and all stakeholder representatives and where there is a role or responsibility for the relevant authority administering Indigenous cultural heritage legislation, it may be party to the discussions.

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's and DNRW's regional managers should be consulted for the provision of general advice including the appropriate conduct of cultural heritage surveys and the necessary permits.

Aspects of the above matters may be referred to the Land and Resources Tribunal and some may also involve native title considerations.

4.10 Social

4.10.1 Description of environmental values

This section describes the existing social values that may be affected by the Project as required by the introductory part of this Section 4 with particular reference to the specific matters mentioned in this section.

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

- 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
- on farm activities near the proposed activities
- current property values
- number of properties directly affected by the Project
- number of families directly affected by the Project, this should include not only property owners but also families of workers either living on the property or workers where the property is their primary employment.

Describe the social values 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.

Social, economic and cultural values are not as easily separated as physical and ecological values. Therefore it may be necessary for some material in this section to be cross-referenced with in Section 4.8 Cultural Heritage and Section 4.11 Economy.

4.10.2 Potential impacts and mitigation measures

This section defines and describes the objectives and measures as required by the introductory part of this Section 4 with particular reference to the specific matters mentioned in this section. It should 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 information gathered in the community consultation program and the analysis of the existing socio-economic environment, and describe the Project's impact, both beneficial and adverse, on the local community. 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 are to be described and a summary of the results incorporated in the EIS.

The social impact assessment should include sufficient data to enable State authorities, such as Queensland Health and Education Queensland, to plan for the continuing provision of public services in the region of the Project. Proponents of projects that are likely to result in a significant increase in population of an area should consult the relevant management units of the State authorities, and summarise the results of the consultations in the EIS. The summary should discuss how the impacts of population increase on public services, particularly health and education, would be mitigated.

The social impact assessment of the Project is to be carried out in consultation with the Department of Communities. The assessment of impacts should describe the likely response of affected communities and identify possible beneficial and adverse impacts (both

immediate and cumulative). These impacts should be considered both at the regional and local level.

The EIS should address the following matters:

- Include an assessment of impacts on local residents, current land uses and existing lifestyles and enterprises.
- Include an assessment of impacts on local and state labour markets, with regard to the source of the workforce. This information is to be presented according to occupational groupings of the workforce. In relation to the source of the workforce, information is required as to whether the proponent, and/or contractors, is likely to employ locally or through other means and whether there are initiatives for local employment opportunities.
- The EIS should address impacts of both construction and operational workforces and associated contractors on housing demand, community services and community cohesion. The capability of the existing housing stock, including rental accommodation, to meet any additional demands created by the Project is to be discussed.
- The assessment of impacts should take account of relevant demographic, social, cultural and economic profiles.
- Identify any new skills and training to be introduced in relation to the Project. Adequate provision should be made for apprenticeship and worker training schemes. If possible, the occupational skill groups required and potential skill shortages anticipated should be indicated.
- Provide comment on how much service revenue and work from the Project (e.g. provisioning, catering and site maintenance) would be likely to flow to existing communities in the area of the Project, particularly if a fly-in, fly-out workforce is proposed.
- Include an assessment of impacts on existing local residents' values and aspirations.
- In regard to affected indigenous and non-indigenous communities respectively, particular attention should be paid to the effects on:
    - the ability of both indigenous and non-indigenous people, to live in accordance with their own values and priorities
    - the use of and access to culturally important areas and landscapes
    - the access to existing human and commercial services and housing
    - the ability to participate in regional and local employment and training opportunities
    - the new Project workforce and their families.

For the construction and operational phases of the development, describe the effects of the proposal on local and regional residents, including land acquisition and relocation issues and property valuation and marketability, community services and recreational activities.

Discuss the potential environmental impacts on the amenity of adjacent areas used for cropping, grazing, forestry, recreation, industry, education, aesthetics, or scientific or residential purposes. Describe the implications of the proposal for future developments in the local area including constraints on surrounding land uses.

The educational impacts of the proposed development are to be analysed and described, particularly in regard to:

- primary, secondary and tertiary educational sectors
- improved appreciation of conservation areas
- environmental education for the general public.

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.

4.11 Health and safety

4.11.1 Description of environmental values

This section describes the existing community values for public health and safety that may be affected by the Project as required by the introductory part of this section 4 with particular reference to the specific matters mentioned in this section. For projects proposing air emissions, and/or those with the potential to emit odours, nearby and other potentially affected populations should be identified and described. Particular attention should be paid to those sections of the population, such as children and the elderly, which are especially sensitive to environmental health factors.

4.11.2 Potential impacts and mitigation measures

This section defines and describes the objectives and measures as required by the introductory part of this section 4 with particular reference to the specific matters mentioned in this section. It should 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 the Project workforce of occupational health and safety risks and the impacts on the community in terms of health, safety, and quality of life from Project operations and emissions. Any impacts on the health and safety of the community, workforce, suppliers and other stakeholders should be detailed in terms of health, safety, quality of life from factors such as air emissions, odour, dust and noise.

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

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

4.12 Economy

4.12.1 Description of environmental values

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

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

4.12.2 Potential impacts and mitigation measures

The function of this section is to define and describe the objectives and measures as required by the introductory part of this Section 4 with particular reference to the specific matters mentioned in this section. It should describe how nominated quantitative standards and indicators may be achieved for economic management, and how the achievement of the objectives will be monitored, audited and managed.

An economic analysis 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.

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

- the significance of the Project on the local and regional economic context
- the long and short-term beneficial (e.g. job creation) and adverse (e.g. competition with local small business) impacts that are likely to result from the development
- the impact to all levels of government of any additional infrastructure provision
- implications for future development in the locality (including constraints on surrounding land uses and existing industry)
- the distributional effects of the proposal including proposals to mitigate any negative impact on disadvantaged groups
- the value of lost opportunities or gained opportunities for other economic activities anticipated in the future
- impacts on local property values.
- the potential economic impact of any major hazard identified in section 4.13.

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. The scope of any studies should be referred to the government for input before undertaking the studies.

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

4.13 Hazard and risk

4.13.1 Description of environmental values

This section describes the potential hazards and risk that may be associated with the Project.

Detail the environmental values likely to be affected by any hazardous materials and actions incorporated in the proposal. The degree and sensitivity of risk should be detailed. Any risk assessment process undertaken should be in accordance with *AS4360 Risk Management.*

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.

4.13.2 Potential impacts and mitigation measures

This section defines and describes the objectives and measures as required by the introductory part of this section 4 with particular reference to the specific matters mentioned in this section. It should 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.

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

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

Details should be provided of:

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

The proponent should develop an integrated risk management plan for the whole of the life of the Project including construction, operation and decommissioning phases. The plan should include a preliminary hazard analysis (PHA), conducted in accordance with appropriate guidelines for hazard analysis (e.g. HAZOP Guidelines, NSW Department of Urban Affairs and

Planning (DUAP)). The assessment should outline the implications for and the impact on the surrounding land uses, and should involve consultation with 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
- description of processes, type of the machinery and equipment used
- 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
- construction safety.

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

4.14 Cross-reference with the terms of reference

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

5. Environmental management plan

The environmental management plan (EM plan) should be developed from the mitigation measures detailed in part 4 of the EIS. Its purpose is to set out the Proponent's commitments to environmental management. That is, how environmental values will be protected and enhanced.

The EM plan is an integral part of the EIS, but should be capable of being read as a stand-alone document without reference to other parts of the EIS. The general contents of the EM plan should comprise:

- the Proponent's commitments under their Environmental Management System (EMS) ISO14000 requirements
- 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, performance monitoring and reporting
- impact prevention or mitigation actions to implement the commitments
- corrective actions to rectify any deviation from performance standards.

Through the EM plan, the EIS commitments to environmental performance can be used as regulatory controls through conditions to comply with those commitments. Therefore, the EM plan is a relevant document for Kunioon Project approvals, environmental authorities and permits, operational controls under the EMS, and may be referenced by them.

6. References

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

7. Appendices

The EIS should include, but not be limited to, the following appendices.

A1. Final terms of reference for this EIS

A copy of the final TOR should be included in the EIS. Where it is intended to bind appendices in a separate volume from the main body of the EIS, the TOR at least should be bound with the main body of the EIS for ease of cross-referencing. A summary, cross-referencing specific items of the TOR to the relevant section of the EIS, should also be provided in Section 4.14 of the EIS. For this purpose the TOR should be line numbered.

A2. Development approvals

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

A3. Study team

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

A4. The standard criteria

A brief summary 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 (Qld) 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.

A5. Consultation report

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

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

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

A6. Specialist studies

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

- geology

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

A7. Research

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