The Coordinator-General

TARONG NORTHERN LAND ASH EMPLACEMENT PROJECT – Stage 1

Terms of Reference for an Environmental Impact Statement

UNDER PART (4) OF THE QUEENSLAND *STATE DEVELOPMENT AND PUBLIC WORKS ORGANISATION ACT 1971*

July 2006

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PREFACE

The Tarong Northern Land Ash Emplacement Project (the Project) was declared to be a "significant project" under Section 26 of the Queensland *State Development and Public Works Organisation Act 1971* (*SDPWOA*) by the Coordinator-General (CG) on 29 November 2005. Matters considered by the CG in making this declaration included information in an Initial Advice Statement prepared by the proponent, the level of investment necessary for the Project, employment opportunities provided by the Project, potential impact on the environment, potential effects on relevant infrastructure and the significance of the Project to the region and State. The declaration initiates the statutory environmental impact assessment procedure of Part 4 of this Act, which requires the proponent to prepare an Environmental Impact Statement (EIS) for the Project.

The CG is responsible for managing the environmental impact assessment process. The CG has invited relevant Commonwealth, State and Local Government representatives and authorities to participate in the process as Advisory Agencies.

The first step in the impact assessment procedure is the development of a Terms of Reference (ToR) for the preparation of an EIS. The process involves the formulation of a draft ToR which is made available for public and government agency comment. The CG has regard to all comments received on the draft ToR in finalising the ToR, which will be presented to the proponent. This document represents the draft ToR for public comment.

The statutory impact assessment process under the *SDPWOA* is also the subject of a bilateral agreement between the Queensland and the Commonwealth Governments in relation to environmental assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act).* The proponents referred the proposal to the Commonwealth Minister for the Environment and Heritage in accordance with the provisions of the *EPBC Act*. The Commonwealth Minister decided, on 3 April 2006, that the proposal did not constitute a controlled action under Section 75 of the *EPBC Act.*

The proponent will prepare an EIS to address the ToR. Once the EIS has been prepared to the satisfaction of the CG, a public notice is advertised in relevant newspapers. The notice will state where copies of the EIS are available for inspection and how it can be purchased; that submissions may be made to the CG about the EIS; and the submission period. The proponent may be required to prepare a Supplementary Report to the EIS to address specific matters raised in submissions on the EIS.

At the completion of the EIS phase, the CG will prepare a report evaluating the EIS and other related material, pursuant to Section 35 of *SDPWOA*. The CG report will include an evaluation of the environmental effects of the proposed project and any related matters. The CG report will reach a conclusion about the environmental effects and any associated mitigation measures, taking into account all of the relevant material including the EIS; all properly made submissions and other submissions accepted by the CG; and any other material the CG considers is relevant to the project, such as a Supplementary Report to the EIS, comments and advice from Advisory Agencies, technical reports on specific components of the project and legal advice.

The Project involves development that would require an application for development approval for material change of use and/or impact assessment under the *Integrated Planning Act 1997* (*IPA*). Consequently, the CG report may, under s.39 of *SDPWOA*, state for the assessment manager one or more of the following:

- the conditions that must attach to the development approval;
- that the development approval must be for part only of the development; and
- that the approval must be preliminary approval only.

Alternatively the CG report must state for the assessment manager:

- that there are no conditions or requirements for the project; or
- that the application for development approval be refused.

Further, the CG report must:

- give reasons for the statements (above); and
- be given to the assessment manager by the CG.

Further to the above *IPA* approvals, other approvals under a range of legislation including, but not limited to *Integrated Planning Act 1997* and the *Environmental Protection Act 1994*, are likely to be required.

These ToR provides information in two broad categories:

- Part A – Information and advice on the preparation of the EIS.
- Part B – Content of the EIS.

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

Steve Alcock
Project Manager – Tarong Northern Land Ash Emplacement Project
Major Projects Division
The Coordinator-General
PO Box 15009
BRISBANE CITY EAST QLD 4002
Tel: (07) 3224 2748 Fax: (07) 3225 8282
Email: steve.alcock@coordinatorgeneral.qld.gov.au

**** The term environment refers to:***

a) ecosystems and their constituent parts, including people and communities;

b) all natural and physical resources;

c) the qualities and characteristics of locations, places and areas, regardless of size, that stimulate biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community;

d) the social, economic, aesthetic and cultural conditions which influence, or are affected by, the entities and attributes mentioned in paragraphs (a) to (c); and

e) ***the local, regional, Queensland and Australian populations and labour markets.***

PART A - INFORMATION AND ADVICE ON PREPARATION OF THE EIS

Purpose of the Terms of Reference

These ToR essentially outline the issues that should be considered in preparing the EIS. Furthermore, the ToR provides the framework for the EIS, including information on the purpose and role of the EIS and the factors considered to be most significant for the proposal. It indicates the types of studies and the data that should be provided in the EIS. All potentially significant impacts of the proposed development on the environment are to be investigated, and requirements for the mitigation of any adverse impacts are to be detailed in the EIS. Any prudent and feasible alternatives should be discussed and treated in sufficient detail. The reasons for selection of the preferred option should be clearly identified. The nature and level of investigations should be relative to the likely extent and gravity of impacts. These guidelines should, however, not be interpreted as excluding from consideration any matters which are currently unforeseen, which may arise during ongoing scientific studies or which may arise from any changes in the nature of the proposal during the preparation of the EIS, the community consultation process and associated documentation.

The EIS should address at least the requirements as set out in these ToR.

EIS Guidelines

The objective of the EIS is to identify potential environmental impacts and to ensure that those impacts are avoided where possible. Where unavoidable, impacts must be examined fully and addressed so that the development is based on sound environmental protection and management criteria.

The EIS process followed will be as specified in the *State Development and Public Works Organisation Act 1971.*

An EIS should provide:

- a description of the relevant aspects of the existing social, economic, natural and built environment;
- a description of the development proposal and means of achieving the development objectives;
- definition and analysis of the likely impacts of the development on the environment;
- a framework against which Government decision-makers can consider the environmental aspects of the proposal and set conditions for approval to ensure environmentally sound development;
- a definition of all significant impacts and a consolidated list of measures proposed to mitigate adverse effects; and
- recommendations on the need for and contents of any environmental management plans and/or operational plans to mitigate adverse effects.

EIS Objectives and Key Issues

Objectives

The objectives of the EIS are as follows:

- to provide information on the proposal and development process to the community and decision makers;
- to comprehensively identify and evaluate all relevant issues associated with the proposal;
- to identify all potential environmental, cultural, social, transport and land use planning impacts of the preferred concept, and recommend infrastructure and facilities needs together with other design and operational measures required to minimise or compensate for adverse impacts and enhanced benefits;
- to consult with the community and relevant stakeholders in the process of identifying, assessing and responding to the impacts of the proposal;
- to identify all necessary licences, planning and environmental approvals including approval requirements pursuant to the *Environment Protection and Biodiversity Conservation Act 1999, Integrated Planning Act 1997, Environmental Protection Act 1994, Coastal Protection and Management Act 1995, Fisheries Act 1994, Nature Conservation Act 1992, Vegetation Management*

Act 1999, Electricity Act 1994 and other legislation and the Nanango Shire Council Planning Scheme; and

- to provide an input to the decision-making process, assisting with the determination of whether to accept or modify the proposal, approve it with conditions or carry out further studies.

Key Issues

The issues to be addressed as part of the EIS can be divided into the following categories:

- detailed project description;
- project justification and alternatives;
- impacts on the terrestrial environment;
- impacts on water quality;
- impacts on areas of cultural heritage value or Indigenous significance;
- air emissions and impacts;
- impacts of noise and vibration;
- impacts on surrounding land uses and land use planning;
- economic issues, including impacts on local and regional businesses;
- social issues;
- safety and emergency; and
- waste management.

The EIS will be required to consider in detail relevant issues under each of these categories and all other impacts on the physical and social environment. The information required is described in the following sections.

Public Consultation on Terms of Reference

An appropriate public consultation program, developed to the satisfaction of The Coordinator-General's Office is essential to the impact assessment. This section should outline the methodology that will be adopted to identify and mitigate socio-economic impacts of the project. Information about the consultation that has already taken place and the results of such consultation should be provided.

The consultation process will actively involve relevant and interested community members or groups so that solutions to issues and problems can be developed together and potential project obstacles can be avoided. A list of affected persons and interested stakeholders as well as information on consultation with these persons will be provided.

The public consultation program should provide opportunities for community involvement and education. It may include interviews with individuals, public meetings, interest group meetings, production of regular summary information and updates, and other consultation mechanisms to encourage and facilitate active public consultation. The public consultation process should identify broad issues of concern to local community and interest groups and should continue from project planning through commissioning, project operations and final decommissioning. Refer to the EPA guideline Issue Identification and Community Consultation. Whilst this guideline has been developed primarily for the mining industry, the principles are applicable to this proposal.

PART B - CONTENT OF THE EIS

It is strongly recommended that the EIS follows the heading structure of these ToR to facilitate cross-referencing. This structure has been found through long experience to be the best option.

Executive Summary

The function of the executive summary is to convey the most important aspects and options relating to the proposed Tarong Northern Land Ash Emplacement Project to the reader in a concise and readable form. The structure of the executive summary should follow that of the EIS, and focus strongly on the key issues and conclusions for the Tarong Ash Emplacement area.

Glossary of Terms

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

1 INTRODUCTION

The introduction explains why the EIS has been prepared and what it sets out to achieve. In particular, the introduction will address the level of detail of information required to meet the level of approval being sought. The Tarong Northern Land Ash Emplacement project will undertake the assessment process under the *State Development and Public Works Organisation Act 1971*, Part 4 –Environmental co-ordination for the Environmental Impact Assessment. The EIS will be tailored to meet the requirements for this process. It should also define the audience to whom it is directed, and contain an overview of the structure of the document. Throughout the EIS, factual information contained in the document should be referenced.

1.1 Project Proponent

Provide details of the project proponents, including details of any joint venture partners.

1.2 Project Description

A brief description of the key elements of the project should be provided and illustrated. 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

A brief description of the objectives which have led to the development of the proposal and a brief outline of the events leading up to the proposal's formulation, including alternatives, envisaged time scale for implementation and project life, anticipated establishment costs and actions already undertaken within the project area.

Describe the current status of the project and outline the relationship of the project to The Tarong Power Stations, and other developments or actions that may relate whether or not they have been approved. The consequences of not proceeding with the project should also be discussed, incorporating an economic and social assessment.

1.4 The EIS Process

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

1.4.1 Methodology of the EIS

This section should provide a description of the EIS process steps, timing and decisions to be made for relevant stages of the project. This section should also indicate how the consultation process (which will be described in detail in section 1.5) would integrate with the other components of the impact assessment, including the stages, timing and mechanisms for public input and participation. The information in this section is required to ensure:

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

1.4.2 Objectives of the EIS

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

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

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

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

When considering whether an impact is or is not significant, the proponent should take account of both the intensity of the impact and the context in which it would occur.

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

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

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

1.4.3 Submissions

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

1.5 Public Consultation Process

To facilitate the assessment process, the proponent is strongly encouraged to regularly consult with Advisory Agencies and other appropriate stakeholders throughout the EIS process. This should include consultation with relevant Indigenous traditional owner groups and the Indigenous community.

It is the responsibility of the proponent, in consultation with Advisory Agencies, to identify legislation, policies and methodologies relevant to the EIS process, and to determine appropriate parts of the community which should be consulted during the EIS preparation stage. It is recommended that an open community consultation process be carried out in addition to the legislated environmental impact assessment process. Copies of the draft EIS will be provided to all Advisory Agencies and on request to relevant individuals and peak groups with an interest in the project.

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

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

1.6 Project Approvals

1.6.1 Relevant legislation and policy requirements

This section should explain the legislation and policies controlling the approvals process. Reference should be made to the Queensland *Environmental Protection Act 1994, Integrated Planning Act 1997* and other relevant Queensland laws. Any requirements of the Commonwealth EPBC Act should also be included.

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

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

The EIS should demonstrate the projects compliance with the EPA Code of Environmental Compliance for Environmental Authorities for High Hazard Dams containing Hazardous Waste or any other applicable version.

1.6.2 Planning processes and standards

This section should discuss the project's consistency with existing land uses or long-term policy framework for the area (e.g. as reflected in local and regional plans), 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 proposal conforms with State, regional and local plans for the area. Nanango Shire Council planning schemes will be consulted in this section. The section should detail:

- any planning controls, by-laws and policies relating to the study area and adjacent lands;
- details of all licences, planning and environmental approvals required;
- regional strategies or plans that relate to the study area or proposal (existing or in preparation); and
- relationship to other significant developments (existing or proposed) in the study area or surrounding areas.

2 PROJECT NEED AND ALTERNATIVES

2.1 Project Justification

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

2.2 Alternatives to the Project

This section should describe feasible alternatives for ash management and disposal, including conceptual, technological and locality alternatives to the project, and discussion of the consequences of not proceeding with the project. Alternatives should be discussed in sufficient detail to enable an understanding of the reasons for preferring certain options and courses of action and rejecting others. Comparative environmental impacts of each alternative should be summarised. In particular, the option of mine void disposal should be considered and information provided outlining how this option could be pursued in conjunction with the proposed ash placement system. An assessment is to be made of the environmental outcomes that could be achieved by pursuing that option in the longer term in comparison to the ash placement system proposed. The use of voids when they become available should be assessed as an alternative.

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

Reasons for selecting the preferred options should include technical, commercial, social and natural environment aspects, in particular the principals of ESD and sustainable development. The relationship of options chosen for waste management and any emissions produced should be detailed. This information is required to assess why the scope of the proposal is as it is and to ensure that the ESD principles and sustainable development aspects have been considered and incorporated during the scoping and planning of the proposal.

3 DESCRIPTION OF THE PROJECT

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

3.1 Overview of Project

An overview of the project should be provided to put the project into context. The key components of the Tarong Northern Land Ash Emplacement Project should be described. Provide the expected project cost and overall expected project duration and timing.

Summarise the employment benefits from the project from the construction and operations phases. Provide a summary of any environmental design features of the project.

3.2 Location

3.2.1 Regional context

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

3.2.2 Local context

Local descriptions of the project site should include real property descriptions. Maps should show the precise location of the project area, and in particular:

- the location and boundaries of land tenures, in place or proposed, to which the project area is or will be subject;
- the location and boundaries of the project footprint;
- the road network servicing the area including road names;
- the location of any proposed buffer areas or buffer zones surrounding the Tarong Northern Land Ash Emplacement working areas; and
- the location of environmentally sensitive receptors potentially affected by the development such as residences, the State Forest, remnant vegetation on and off the site and water.

These features should be overlain on a rectified air photo enlargement to illustrate components of the project in relation to the natural and built features of the area.

3.3 Construction

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

3.4 Operations

The location and nature of the processes defined by the engineering study will be illustrated with maps and diagrams, and described in the text. Operational issues to be addressed should include, but may not be limited to:

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

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

Information should be provided on the workforce numbers to be employed in the facility's operations with a brief description of where those people may be accommodated.

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.

3.4.1 Ongoing Evaluations

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

3.5 Materials Handling

Describe and show, on plans at an appropriate scale, the proposed methods and facilities to be used for product storage and for transferring material from the power stations to the ash emplacement facilities. Include discussion of any environmental design features of these facilities including bunding of containment structures around storage facilities and pipeline maintenance points where there is a risk that ash may be released. Discussion should include consideration of alternatives for ash management in the event that the ash thickening facilities fail.

3.6 Infrastructure Requirements

This section should provide descriptions, with concept and layout plans, of requirements for constructing, upgrading or relocating all infrastructure in the vicinity of the project area. The matters to be considered include such infrastructure as roads, rail, bridges, jetties, ferries, tracks and pathways, dams and weirs, bore fields, power lines and other cables, wireless technology (e.g. microwave telecommunications), conveyors and pipelines for any services (whether underground or above).

3.6.1 Road

Describe arrangements for the transport of equipment, products, wastes and personnel during both the construction phase and operational phases 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 road transportation requirements on public roads for both construction and operations phases, including:

- the volume, composition (types and quantities), origin and destination of goods to be moved including construction materials, plant, raw materials, wastes, and hazardous materials;
- 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; and
- need for increased road maintenance and upgrading.

3.6.2 Energy

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

3.6.3 Water supply and storage

The EIS should provide information on the proposed water usage by the project, including the quality and quantity of all water supplied to the site during the construction and operational phases. In particular, the proposed sources of water supply should be described (eg bores and surface storages) given the implication of the Water Resource Plan (Burnett Basin) 2000 and the Burnett Basin Resource Operations Plan 2005, as well as any approvals required under the *Water Act 2000*.

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

Determination of potable water demand should be made for the project, including the temporary demands during the construction period. Details should be provided of any existing town water supply

to meet such requirements. If water storage and treatment is proposed on site, for use by the site workforce, then this should be described.

3.6.4 Stormwater drainage

A description should be provided of the proposed stormwater drainage system, and the proposed disposal arrangements.

3.6.5 Telecommunications

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

3.6.6 Accommodation and other infrastructure

A description should be provided of any other developments directly related to the project not described in other sections, such as:

- site offices and construction camps;
- new permanent or temporary fuel storage areas (eg diesel, petrol, oil, etc);
- new permanent or temporary chemical storage areas;
- equipment hardstand and maintenance areas; and
- technical workshops or laboratories.

The method of operation of these areas should also be addressed.

3.7 Rehabilitation and Decommissioning

The means of decommissioning the site, both from the construction and operational phases, in terms of the removal of plant, equipment, structures and buildings should be described, and the methods proposed for the rehabilitation of the affected areas should be given. Final rehabilitation of the site should be discussed in terms of ongoing land use suitability, management of any residual contaminated land, structural stability and safety, topsoil medium availability and application rate, erosional stability, selection and establishment of vegetative cover, sustainability of the vegetative cover, long-term maintenance and any other foreseeable land management issues.

3.8 Waste Management

3.8.1 Character and quantities of waste materials

Provide an inventory of all wastes generated by the ash placement facility from construction, operational and decommissioning phases of the project.

The development of waste management measures must have regard for best practice waste management strategies and the *Environmental Protection (Waste) Policy*, the proposals for waste avoidance, reuse, recycling, treatment and disposal should be described in the appropriate sub-section below. Information should also be provided on the continuing investigation into alternative uses for ash.

Cleaner production waste management planning should be detailed especially as to how these concepts have been applied to preventing or minimising environmental impacts. 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 should be presented where applicable.

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 at the site e.g. processess that may extract and reuse deposited ash, disturbance by wind action on stockpiles and conveyors, or by transportation equipment. Monitoring at sensitive receptor would be undertaken and dust suppression and mitigation measures addressed following these results.

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

Management of waste other than ash
Existing waste management practices at the power stations should be reviewed, with particular consideration given to wastes, other than ash, that may currently be directed to the ash dam. The proposed management of these wastes should be detailed with consideration given to the suitability of available waste disposal options.

Ash
Describe in detail the quantity and quality of ash generated by the Project. The description should include a full description of contaminants and potential contaminants, and should be based on the results of previous monitoring. The proposed management of these wastes should be detailed.

Liquid waste
A description should be presented of the origin, quality and quantity of wastewater and any immiscible liquid waste originating from the project. A water balance for the proposal 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 and ash placement areas;
- drainage (i.e. run-off plus any seepage or leakage);
- seepage from other waste storages;
- water usage for:
  - dust suppression, and
  - domestic purposes; and
- evaporation.

3.9 Financial Feasibility

This section shall detail the financial feasibility of the proposal, including details of costs of development and ongoing maintenance, operational and decommissioning costs; the capacity of the proponents to satisfactorily develop the project; the costs of decommissioning the project and rehabilitation of the site, including long term management costs associated with management of the facility after ash placement has ceased; the need for the provision of a financial assurance to the State; fare pricing structures and cash-flow projections; estimated losses in income due to climatic conditions and both natural and human induced hazards; applicable commercial and Government fees; financial assurances and Joint Venture arrangements; and Foreign Investment Review Board issues.

For projects with large energy inputs a sensitivity analysis should be conducted on the possible imposition of a financial cost on such emissions.

An assessment of financial feasibility will be based on industry knowledge and experience to incorporate maintenance and long term costs. This assessment will be tailored to meet design criteria identified in the engineering component of this project.

This part of the EIS may be confidential.

3.10 Rehabilitation and Decommissioning

This section should present the strategies and methods for progressive and final rehabilitation of the environment disturbed by the proposal and of the ash itself. The strategic approach to progressive and

final rehabilitation should be described. A preferred rehabilitation strategy should be developed with a view to minimising the amount of land disturbed at any one time and minimising the exposed area of ash without final cover. The final topography of any excavations, ash disposal areas and dam sites should be shown. The land use suitability of the various land disturbance types should be described.

The strategies and methods presented for progressive and final rehabilitation of the ash placement areas and other disturbed areas should have the following objectives:

- rehabilitation should aim to create a landform which is stable and which has the best possible land use capability and/or suitability given the nature of the ash and cover system;
- rehabilitation should ensure that dust emissions are minimised;
- ash placement areas and other disturbed land should be rehabilitated to a condition that is self-sustaining, or to a condition where the maintenance requirements are consistent with an agreed post-ash disposal land use; and
- surface and ground waters that leave the area should not be degraded. Current and future water quality should be maintained at levels that are acceptable for users downstream of the site.

The means of decommissioning the proposal, in terms of the removal of plant, equipment, structures and buildings should be described, and the methods proposed for the stabilisation of the affected areas should be given. Information should be provided regarding decommissioning and rehabilitation of any plant on the site, rehabilitation of concrete footings and foundations, hardstand areas and storage tanks (including any potential for reuse of these facilities). Where dams are to be constructed, proposals for the management of these structures after the completion of the project should be given. Also, the final drainage and seepage control systems and long-term monitoring plans should be described.

A description of cover material that will be used on the ash should consider the source of the material, transport and storage of material.

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 4.1.2) and rehabilitation of ash placement area (section 4.8.2). Implications for the long-term use and fate of the site should also be addressed, particularly with regard to the on-site disposal of waste and the site's inclusion on the Environmental Management Register or Contaminated Land Register.

4 ENVIRONMENTAL VALUES AND MANAGEMENT OF IMPACTS

The functions of this section are:

- to describe the existing environmental values of the area which may be affected by the proposal. Environmental values are defined in section 9 of the *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 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 proposal on the identified environmental values. Any likely environmental harm on the environmental values should be described;
- to describe any cumulative impacts on environmental values caused by the proposal, either in isolation or by combination with other known existing or planned sources of contamination.
- to present environmental protection objectives and the standards and measurable indicators to be achieved; and
- to examine viable alternative strategies for managing impacts. These alternatives should be presented and compared in view of the stated objectives and standards to be achieved. Available

techniques, including best practice, to control and manage impacts to the nominated objectives should be discussed.

This section should detail the environmental protection measures incorporated in the planning, construction, operations, decommissioning, rehabilitation and associated works for the proposal. Measures should minimise environmental harm and maximise socio-economic and environmental benefits of the proposal. Preferred measures should be identified and described in more detail than other alternatives.

Environmental protection objectives may be derived from legislative and planning requirements which apply to the proposal including Commonwealth strategies, State planning policies, local authority strategic plans, environmental protection policies under the *Environmental Protection Act 1994*, and any catchment management plans prepared by local land care groups. Special attention should be given to those mitigation strategies designed to protect the values of any sensitive areas and any identified ecosystems of high conservation value within the area of possible proposal impact.
This section should address all elements of the environment, (such as land, water, coast, air, waste, noise, nature conservation, cultural heritage, social and community, health and safety, economy, hazards and risk) in a way that is comprehensive and clear. To achieve this, the following issues should be considered for each environmental value relevant to the project:

- environmental values affected: describe the existing environmental values of the area to be affected including values and areas that may be affected by any cumulative impacts (refer to any background studies in Appendices - note such studies may be required over several seasons). It should be explained how the environmental values were derived (e.g. by citing published documents or by following a recognised procedure to derive the values);
- impact on environmental values: describe quantitatively the likely impact of the proposal on the identified environmental values of the area. The cumulative impacts of the proposal must be considered over time or in combination with other (all) impacts in the dimensions of scale, intensity, duration or frequency of the impacts. In particular, any 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 ecosystems, must be discussed in the relevant sections. This assessment must include air and water sheds affected by the proposal and other proposals competing for use of the local air and water sheds;
- where impacts from the proposal will not be felt in isolation to other sources of impact, it is recommended that the proponent develop consultative arrangements with other industries in the proposal's area to undertake cooperative monitoring and/or management of environmental parameters. Such arrangements should be described in the EIS;
- environmental protection objectives: describe qualitatively and quantitatively the proposed objectives for enhancing or protecting each environmental value. Include proposed indicators to be monitored to demonstrate the extent of achievement of the objective as well as the numerical standard that defines the achievement of the objective (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 principals, proposed actions and technologies to be implemented that are likely to achieve the environmental protection objectives; include designs, relevant performance specifications of plant. Details are required to show that the expected performance is achievable and realistic;
- 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 eg. 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; and
- 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 (eg 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 ToR and 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 Land

4.1.1 Description of environmental values

This section describes the existing environmental values of the land area that may be affected by the ash emplacement proposal in the context of environmental values as defined by the *Environmental Protection Act 1994* and Environmental Protection Policies. It should also define and describe the objectives and practical measures for protecting or enhancing land-based environmental values, describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

4.1.1.1 Topography/geomorphology

Maps should be provided locating the project and its environs 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 landscape 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 4.1. Commentary on the maps should be provided highlighting the significant topographical features.

4.1.1.2 Geology

The EIS should provide a description, map and a series of cross-sections of the geology of the proposal area, with particular reference to the physical and chemical properties of surface and sub-surface materials and geological structures within the 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. Field assessments should be undertaken through borehole techniques to confirm geological units and soil type within the proposed ash emplacement area.

4.1.1.3 Mineral Resources

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

The location, tonnage and quality of the mineral resources within the project area should be described in detail as indicated below and, for coal projects, where possible it should be presented on a ‘seam by

seam' basis and include the modifying factors and assumptions made in arriving at the estimates. The mineral resources should be estimated and reported in accordance with the Australasian code for reporting of mineral resources and ore reserves (the JORC Code - available at www.jorc.org/main.php) and the principles outlined in the Australian guidelines for the estimating and reporting of inventory coal, coal resources and coal reserves (available at www.jorc.org/pdf/coalguidelines.pdf) as appropriate.

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

- the location and areal extent of the mineral resources underlying the ash disposal area;
- the location and boundaries of mining tenures, granted or proposed, to which the project area is, or will be subject;
- the location and boundaries of any project sites; and
- 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.

4.1.1.4 Soils

A soil survey of the sites affected by the proposal 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, rehabilitation and agricultural productivity of the land. Information should also be provided on soil stability and suitability for construction of the proposed 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*.

4.1.1.5 Land use

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

Maps at suitable scales showing existing land uses and tenures, and the proposal location, should be provided for the entire proposal area and surrounding land that could be affected by the development. The maps should identify areas of conservation value and marine areas in any locality that may be impacted by the proposal. 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 that in Attachment 2 of *Land Suitability Assessment Techniques in the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland* (1995). While these guidelines have been developed for the mining industry, the principles are applicable to this proposal.

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 DNRM&W 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*.

Existing data will be reviewed in conjunction with the Nanango Shire Council Town planning Scheme and Tarong site land use plan 2003-2004. Identification of mitigation and compensatory strategies will be detailed.

4.1.1.6 Infrastructure

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

4.1.1.7 Sensitive environmental areas

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

In particular, the EIS should indicate if the land affected by the proposal is, or is likely, to become part of the protected area estate, or is subject to any treaty. Consideration should be given to national parks, conservation parks, declared fish habitat areas, wilderness areas, aquatic reserves, heritage/historic areas or items, national estates, world heritage listings and sites covered by international treaties or agreements (e.g. Ramsar, JAMBA, CAMBA), areas of cultural significance and scientific reserves (see section 4.7 for further guidance on sensitive areas).

To obtain copies of plans of declared fish habitat areas contact Queensland Fisheries Service of the QDPI at the call centre 13 25 23.

In addition, the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* should be addressed and a determination should be made whether there are national environmentally significant matters that should be described.

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

4.1.1.8 Scenic values

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;
- 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 areas of the proposal that have the capacity to absorb land use changes without detriment to the existing visual quality and landscape character; and
- the value of existing vegetation as a visual screen.

<u>Lighting</u>

An assessment of all potential impacts of lighting of the project, during all stages, is to be provided.

<u>Landscape character</u>

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.

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 when addressing the following issues:

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

4.1.1.8 Native title

The location and owner/custodians of native title in the area and details of native title claims should be provided. Discuss the tenure history of the site, whether there have been any native title extinguishing events and if native title may continue to exist.

4.1.2 Potential impacts and mitigation measures

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

4.1.2.1 Land use suitability

The potential for the construction and operation of the proposal to change existing and potential land uses of the proposal 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.

4.1.2.2 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. The methods to be used for the proposal, including backfilling, covering, re-contouring, topsoil handling and revegetation, should be described. Consideration should be given to the use of threatened plant species during any landscaping and revegetation.

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

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

A description of topsoil management should consider transport, storage and replacement of topsoil to disturbed areas. Preparation of the ash emplacement area working footprint will detail progressive top soil stripping and storage for rehabilitation. The minimisation of topsoil storage times (to reduce fertility degradation) should also be addressed. Erosion and sediment control should be described.

Information should be provided regarding decommissioning of any plant site, removal of processing plant, rehabilitation of concrete footings and foundations, hard stand areas, storage tanks and wharfage (including any potential for reuse of these facilities).

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.

4.1.2.3 Land contamination

The EIS should describe the possible contamination of land from aspects of the proposals including waste, reject product, acid generation from exposed sulfidic material and spills at chemical and fuel storage areas. Information will be gathered to identify potential contaminants for the project, their nature, quantity and mode of transport and storage.

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. Incorporation of a monitoring program during the duration of the ash emplacement area will be investigated including monitoring at the nearest sensitive receptor both up and down stream. Intentions should be stated concerning the classification (in terms of the Queensland Contaminated Land Register) of land contamination on the land, processing plant site and product storage areas after proposal completion.

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; and
- a description of the nature and extent of contamination at each site 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* can be downloaded from the EPA website at: www.epa.qld.gov.au/environment/business/contaminated. Proponents should refer study proposals to the EPA for review prior to commencement (Consult with the Contaminated Land Section in the Queensland EPA).

4.1.2.4 Soil erosion

For all permanent and temporary landforms, possible erosion rates and management techniques should be described. For each 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, especially those resulting from the removal of vegetation, both on-site and off-site for all disturbed areas such as:

- access roads and other rail/transport corridors; and
- dams, banks and creek crossings.

Methods proposed to prevent or control erosion should be specified and should be developed with regard to (a) preventing soil loss in order to maintain land capability/suitability following rehabilitation of the site, including maintenance of capping and vegetation cover; and (b) preventing significant degradation of local waterways by suspended solids.

Identify and assess the impact of exposure of sodic soils and the subsequent potential for gully erosion.

Identify remediation measures to limit the impact of gully erosion on surrounding landscapes.

4.1.2.5 Visual Amenity and Landscape Character

This section should analyse and discuss the visual impact of the proposal on particular panoramas and outlooks. This is to be placed into context of the existing views of the power stations and supporting infrastructure. It should be written in terms of the extent and significance of the changed landform as viewed from places of residence, work, and recreation, from road, 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 and associated infrastructure. Sketches, diagrams, computer imaging and photos are to be used where possible to portray the near views and far views of the completed landform 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 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. Identification of road closure and any potential road upgrades will be incorporated. 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. The EIS should include detailed analysis of the 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 and ash transport routes across 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.

Information about the impacts and proposed measures for dealing with those impacts should be prepared by the proponent in close consultation with the local District Office of the Department of Main Roads.

The EIS should provide details of the impact on any current or proposed rail infrastructure.

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 proposal. Indicate whether there is a need to update the plans based on increase in frequency of traffic and volumes to be transported.

4.3 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 (eg temperature inversions) that may affect air quality within the environs of the proposal. Extremes of climate (droughts, floods, cyclones, etc) should also be discussed with particular reference to water management at the proposal site. The vulnerability of the area to natural or induced hazards, such as floods and bushfires, should also be addressed. The relative frequency, magnitude and risk of these events should be considered.

The potential impacts due to climatic factors should be addressed in the relevant sections of the EIS. The impacts of rainfall on soil erosion should be addressed in Section 4.1. The impacts of storm events on the capacity of waste containment systems (e.g. site bunding/stormwater management and tailings dams) should be addressed in Section 4.3 with regard to contamination of waterways and in Section 4.6 with regard to the design of waste containment systems. The impacts of winds, rain, humidity and temperature inversions on air quality should be addressed in Section 4.5.

Climate change projections have been completed for Queensland by the CSIRO (see www.longpaddock.qld.gov.au/ClimateChanges). The EIS should consider how the proposed design and rehabilitation would be affected by the projected changes in climate. Strategies for addressing any impacts due to climate change should be discussed in the EIS.

4.4 Water Resources

4.4.1 Description of Environmental Values

A description should be given of the surface watercourses, lakes, springs and bioregional, regional and other significant wetlands and their quality and quantity in the area potentially affected by the proposal, with an outline of the significance of these waters to the estuarine system in which they occur. Details provided should include a description of existing surface drainage patterns and flows in streams and wetlands. Also, details should be provided on the likelihood and history of flooding including extent,

levels and frequency. Present and potential water uses downstream of the areas affected by the proposal should be described.

An assessment is required of existing water quality in surface waters and wetlands likely to be affected by the proposal including seasonal variations. Existing monitoring data collected within the area should be presented.

Describe the environmental values of the surface waterways of the affected area in terms of:
- values identified in the *Environmental Protection (Water) Policy 1997*;
- sustainability, including both quality and quantity;
- physical integrity, fluvial processes and morphology of watercourses, including riparian zone;
- vegetation and form; and
- any water resource plans or land and water management plans relevant to the affected water body.

The location and quality of any groundwater aquifers potentially impacted should be discussed. The extent of the area within which groundwater resources are likely should be defined. The assessment should include the sites for the existing and proposed sources of water for the expanded project during both construction and operational phases.

The review should include a survey of the existing groundwater supply facilities to the extent of any environmental harm likely to be associated with increased demands from this resource. The information to be gathered for analysis should include:
- location;
- pumping parameters;
- draw down and recharge at normal pumping rates; and
- seasonal variations (if records exist) of ground water levels.

This section should include reference to:
- nature of the aquifer/s;
- geology/stratigraphy - such as alluvium, volcanic, metamorphic;
- aquifer type - such as confined, unconfined; and depth to and thickness of the aquifers;
- hydrology of the aquifer/s;
- depth to water level and seasonal changes in levels;
- ground water flow directions (defined from water level contours);
- interaction with surface water;
- interaction with sea/salt water;
- possible sources of recharge; and
- vulnerability to pollution.

Details should be provided on any requirements under the Water Act 2000 for a Riverine Protection Permit. A Riverine Protection Permit may be required if it is proposed to destroy vegetation, excavate or place fill in a watercourse, lake or spring.

4.4.2 Potential Impacts and Mitigation Measures

The EIS should describe the possible environmental impacts of the proposal to environmental values for water as expressed in the *Environmental Protection (Water) Policy 1997* including:
- identify bioregional; regional and other significant wetlands as described in the dictionary of the Regional Vegetation Management Codes;
- identify lakes as described in the dictionary of the Regional Vegetation Management Codes;
- identify springs as described in the dictionary of the Regional Vegetation Management Codes; and
- maintenance of ecological processes associated with the identified Wetlands, Lakes and Springs.

4.4.2.1 Water Management Controls and Monitoring

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 surface and groundwater should be discussed. Monitoring programs should be described which will assess the effectiveness of management strategies for protecting water quality during the construction, operation and decommissioning of the proposal. Quality characteristics discussed should be those appropriate to the downstream and upstream water uses and environmental values that may be affected. Chemical and physical properties of any wastewater (including concentrations of constituents) at the point of entering natural surface waters should be discussed along with adverse effects to flora and fauna.

4.4.2.2 Water Supply Usage, Storage and Discharge

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

The EIS should investigate;

- the effects of predictable climatic extremes (droughts, floods) upon the structural integrity of the ash emplacement facility;
- flows and quality of water discharged; and
- the need or otherwise for licensing of any storage under the *Water Act 2000* should be discussed.

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.

4.4.2.3 Ground Water

The EIS should include an assessment of the potential environmental harm caused by the proposal to local groundwater resources, including supply sources. The impact assessment should;

- define the extent of the area within which groundwater resources are likely to be affected by any increased water demands;
- address the significance of the proposal to groundwater depletion or recharge; and
- propose management options available to monitor and mitigate these effects.

An assessment should be undertaken of the impact of the proposal on the local groundwater regime. An assessment of the potential to contaminate groundwater resources and measures to prevent, mitigate and remediate such contamination should be discussed. Discussion should include potential impacts on others outside the project area using the same aquifer(s).

4.4.2.4 Surface Water

The potential environmental harm to the quality of surface waters from all phases of the project should be discussed, with particular reference to their suitability for the current and potential downstream uses, including the requirements of any affected riparian area.

Discuss changes to drainage patterns during the life of the project.

The impacts of surface water flow on adjoining sites and on existing and proposed infrastructure should be considered. Reference should be made to the Environmental Protection (Water) Policy, *Water Act 2000* and the Australian and New Zealand Environment and Conservation Council (ANZECC) 2000 guidelines.

4.5 Air

4.5.1 Description of environmental values

A general description of the local air quality should be provided. This should include the existing airshed and local influences on air quality such as emissions from existing industry or climatic factors.

A review of the existing levels of ash dust from the current operations and any history of ash dust complaints should be provided including a description of past nuisance dust impacts. Management strategies currently employed for minimisation of dust levels, and their effectiveness, should be included.

There should be a discussion of the results of air quality monitoring to date including particular references to:

- total suspended particulates;
- ash content;
- ash dust characteristics including respirable fraction where available;
- nuisance levels;
- odour;
- visual effects;
- wind speed and direction; and
- existing air environment of nearby areas.

4.5.2 Potential impacts and mitigation measures

Proposed dust control methods are to be benchmarked against best practice environmental management. Any deviation from best practice environmental management would need to be justified.

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.

Describe the nuisance dust impacts and mitigation measures in relation to the stripping and stockpiling of topsoil, and the filling of Stage 1 ash emplacement area.

Describe the nuisance dust impacts and mitigation measures in relation to the placement of the ash itself.

Provide information regarding the likely content of mercury and other heavy metals in the ash, including a chemical analysis of ash from the current operations.

Provide an analysis of the likely associated impacts, as a result of heavy metal contamination (via fallout), on health, soils, water quality and surrounding land-uses from the operational and decommissioning phases of the Project.

Provide, for each surrounding land use, a description of the likely impacts as a result of fallout (dust and associated contaminants), including impacts to soils, vegetation, and native ecosystems, and describe mitigation measures proposed to minimise these impacts.

Provide information and commitments regarding ongoing monitoring in relation to air quality issues, including details of monitoring locations, parameters to be measured, and frequency of monitoring.

4.6 Waste

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

4.6.1 Description of environmental values

This section describes the existing environment values that may be affected by the project's wastes in the context of environmental values as defined by the *Environmental Protection Act 1994* and

applicable Environmental Protection Policies. Refer to each of the waste streams described in section 3.8 and provide references to environmental values described in other sections of part 4 of the EIS.

4.6.2 Potential impacts and mitigation measures

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

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

- operational handling and fate 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 level of 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;
- 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; and
- decommissioning of the site.

Having regard for the *Environmental Protection (Waste) 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 EPP, 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, sulphur 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 at each stage of the proposal. Details on natural resource use efficiency (eg energy and water), integrated processing design, co-generation of power and by-product reuse as shown in a material/energy flow analysis are required.

4.7 Noise and Vibration

4.7.1 Description of environmental values

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

If the proposed activity could adversely impact on the noise environment, baseline monitoring should be undertaken at a selection of nearby sensitive sites affected by the proposal. 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 (EPA) 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 practical measures for protecting or enhancing environmental values from impacts by noise and vibration, describes how nominated quantitative standards and indicators may be achieved for noise and vibration management, and how the achievement of the objectives will be monitored, audited and managed. The assessment of noise impacts should include matters raised in the document *The Health Effects of Environmental Noise – Other than Hearing Loss* published by the enHealth Council, 2004 (or later editions), ISBN 0 642 82304 9.

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. The assessment should also include environmental impacts on terrestrial and marine animals and avifauna, particularly migratory species. Proposed measures for the minimisation or elimination of impacts should be provided, including details and illustrations of any screening, lining, enclosing or bunding. A discussion should be provided of timing schedules for construction and operations with respect to minimising environmental nuisance and harm from noise.

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

4.8 Nature Conservation

4.8.1 Description of environmental values

This section describes the existing environment values for nature conservation that may be affected by the proposal in the context of environmental values as defined by the *Environmental Protection Act 1994* and *Environmental Protection Policies*, and the *Nature Conservation Act 1992*.

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

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

A discussion should be presented on the nature conservation values of the areas likely to be affected by the proposal. The flora and fauna communities which are rare or threatened, environmentally sensitive localities including the marine environment, waterways, riparian zone, and littoral 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 riparian environments, 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. Proposal proximity to any environmentally sensitive areas should be described. Areas regarded as sensitive with respect to flora and fauna have one or more of the following features (and which should be identified, mapped, avoided or effects minimised):

- important habitats of species listed under the *Nature Conservation Act 1992* and/or Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* as presumed extinct, endangered, vulnerable or rare;
- regional ecosystems listed as 'endangered' or 'of concern' under State legislation, and/or ecosystems listed as presumed extinct, endangered or vulnerable under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999*;
- good representative examples of remnant regional ecosystems or regional ecosystems which are poorly represented in protected areas;
- sites listed under international treaties such as Ramsar wetlands and World Heritage areas;
- sites containing near threatened or bio-regionally significant species or essential, viable habitat for near threatened or bio-regionally significant species;
- sites in, or adjacent to, areas containing important resting, feeding or breeding sites for migratory species of conservation concern listed under the Convention of Migratory Species of Wild Animals, and/or bilateral agreements between Australia and Japan (JAMBA) and between Australia and China (CAMBA);
- sites containing common species which represent a distributional limit and are of scientific value or which contains feeding, breeding, resting areas for populations of echidna, koala, platypus and other species of special cultural significance; and
- sites containing high biodiversity that are of a suitable size or with connectivity to corridors/ protected areas to ensure survival in the longer term; such land may contain:
    - natural vegetation in good condition or other habitat in good condition (e.g. wetlands); and/or
    - degraded vegetation or other habitats that still supports high levels of biodiversity or acts as an important corridor for maintaining high levels of biodiversity in the area;
    - a site containing other special ecological values, for example, high habitat diversity and areas of high endemism;
    - ecosystems which provide important ecological functions such as: wetlands of national, state and regional significance; coral reefs; riparian vegetation; important buffer to a protected area or important habitat corridor between areas;
    - sites of palaeontologic significance such as fossil sites;
    - sites of geomorphological significance, such as lava tubes or karst;
    - protected areas which have been proclaimed under the *Nature Conservation Act 1992* and *Marine Parks Act 1982* or are under consideration for proclamation; and/or
    - areas of major interest, or critical habitat declared under the *Nature Conservation Act 1992* or high nature conservation value areas or areas vulnerable to land degradation under the *Vegetation Management Act 1999*.

Potential impacts on adjacent land, in particular Yarraman State Forest to the south of the project site, should be described. Discussions should include an assessment of potential off-site impacts and any remedial action in relation to high value adjacent land parcels.

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

The Queensland *Vegetation Management Act 2000* and the findings of any regional vegetation management plan should also be referenced.

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

Key flora and fauna indicators should be identified for future ongoing monitoring. 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's *Guidelines for Fauna and Flora Assessment in EIA* provide further details. The EPA should be consulted on the scope of any biological studies before they are undertaken.

4.8.1.1 Terrestrial flora

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

The existence of local and regional weed species, particularly noxious and declared weeds under the *Land Protection (Pest and Stock Route Management) Act 2002* should also be discussed.

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

- location and extent of vegetation types using the EPA's regional ecosystem type descriptions in accordance with *The Conservation Status of Queensland's Bioregional Ecosystems*. (Sattler P.S. & Williams R.D. 1997 2nd edition) and the current version of the EPA's listing of the conservation status of regional ecosystems (Regional Ecosystem Description Database [REDD]);
- 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 1994* 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; and
- location and abundance of any exotic or weed species.

A list of species present at each site and their abundance should be recorded. Methodology used for flora surveys and species lists should be specified in the appendices to the report.

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

- site data should be recorded in a form compatible with the Queensland Herbarium CORVEG database.
- the minimum site size should be 10 by 50 metres;
- a complete list of species present at each site should be recorded;
- the relative abundance of plant species present should be recorded;

- any plant species of conservation, cultural, commercial or recreational significance should be identified; and
- specimens of species listed as protected plants under the *Nature Conservation (Wildlife) Regulation 1994*, other than common species, are to be submitted to the Queensland Herbarium for identification and entry into the HERBRECS database.

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.

4.8.1.2 Terrestrial fauna

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

- species diversity (i.e. a species list) and abundance of animals, including amphibians, birds, reptiles, mammals and bats;
- any species which are poorly known but suspected of being rare or threatened;
- habitat requirements and sensitivity to changes; including movement corridors and barriers to movement;
- the existence of feral or exotic animals;
- existence of any rare, threatened or otherwise noteworthy species/communities in the study area, including discussion of range, habitat, breeding, recruitment, feeding and movement requirements, and current level of protection (eg any requirements of Protected Area Management Plans);
- use of the area by migratory birds, nomadic birds, fish and terrestrial fauna;
- noise impacts on terrestrial and avifauna particularly migratory species;
- changed habitat conditions for nocturnal fauna and associated impacts of lighting; and
- night operations/maintenance and effects of lighting on fauna and residents.

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

4.8.1.3 Aquatic biology

If no biota surveys/studies have previously been conducted in and downstream of the project area, 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/or associated lacustrine and marine 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 lacustrine and marine environment;
- aquatic plants;
- aquatic and benthic substrate; and
- habitat downstream of the project or potentially impacted due to currents in associated lacustrine and marine environments.

4.8.2 Potential impacts and mitigation measures

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

The EIS should address any actions of the project or likely impacts that require an authority under the *Nature Conservation Act 1992*, and/or would be assessable development for the purposes of the *Vegetation Management Act 1999*.

The discussion should cover all likely direct and indirect environmental harm on flora and fauna particularly sensitive areas as listed below. Terrestrial environments should also be covered. Also include human impacts and the control of any domestic animals introduced to the area. Strategies for protecting World Heritage Property, and any rare or threatened species should be described, and any obligations imposed by State or Commonwealth legislation or policy or international treaty obligations (i.e. JAMBA, CAMBA) should be discussed.

Strategies for collecting and preserving any significant fossils should be described.

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

The potential environmental harm on flora and fauna of any alterations to the local surface and ground water environment should be discussed with specific reference to environmental harms 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 harm on migratory, nomadic and aquatic animals should be discussed.

Weed control strategies aimed at containing existing weed species (eg. parthenium and other noxious weeds) and ensuring no new invasive weeds are introduced to the area are required, and feral animal management strategies should 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 authorities' pest management plan when determining control strategies.

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

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

A cultural heritage study is required that will describe Indigenous and non-Indigenous cultural heritage sites and places, and their values.

4.9.1.1 Indigenous Cultural Heritage

An Indigenous cultural heritage study is a specific process under the *Aboriginal Cultural Heritage Act 2003* (ACHA) the sole purpose of which is to have an area/object recognised and recorded on the Aboriginal Cultural Heritage Register. A requirement of the Act is that a Cultural Heritage Management Plan (CHMP) is an essential element of any EIS. All work must be conducted by a suitably qualified expert that is agreed upon between the parties and must include the following:

- notification, as required by the ACHA, to the Chief Executive of NRM&W, Nanango Shire Council (only if owner or occupier of the subject land), and the registered Native Title Claimants, who are the Aboriginal Parties under the ACHA;
- endorsement of those Aboriginal Parties who respond to the notification;
- consultation with the Aboriginal Parties about their involvement in the development of the CHMP, and about outcomes;
- compliance with the Duty of Care Guidelines and the CHMP Guidelines as gazetted;
- seeking approval of the CHMP from the Chief Executive, NRM&W, through the EIS process;
- liaison with the Aboriginal Parties concerning:
  - places of significance to that community (including archaeological sites, natural sites, story sites etc;
  - appropriate community involvement in field surveys;
- any requirements by communities and /or informants relating to confidentiality of site data must be highlighted. Non-Indigenous communities may also have relevant information;
- a search of both the Cultural Heritage register and the Cultural Heritage database;
- a systematic survey of the proposed development area to locate and record Indigenous cultural heritage places;
- significant assessment of any cultural heritage sites/places located;
- the impact of the proposed development on cultural heritage values; and
- a report of work done which includes background research, relevant environmental data and methodology, as well as results of field surveys, significance assessment and recommendations.

4.9.1.2 Non-Indigenous Cultural Heritage

The cultural heritage study must be conducted by a suitably qualified expert and will require:

- a permit to conduct the research and survey will be required under the provisions of the *Queensland Heritage Act 1992.* The EPA regional manager should be consulted for the provision of general advice including the appropriate conduct of cultural heritage surveys and the necessary permit;
- a systematic survey of the proposed development area to locate and record non-Indigenous cultural heritage places;
- significant assessment of any cultural heritage sites/places located;
- the impact of the proposed development on cultural heritage values; and
- a report of work done which includes background research, relevant environmental data and methodology, as well as results of field surveys, significance assessment and recommendations.

4.9.2 Potential impacts and mitigation measures

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

The environmental harm to cultural heritage values in the vicinity of the project should be managed under a 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; and
- a conflict resolution process.

The development of the CHMP should be negotiated between the relevant parties i.e. the project proponent and the relevant Aboriginal party.

Any collection of artefact material as part of a mitigation strategy will need to be done by a suitably qualified expert as agreed between the relevant parties.

Some aspects of the above matters can be referred to the Land and Resources Tribunal. The Land and Resources Tribunal can provide mediation assistance in the course of developing a CHMP or make a recommendation of the suitability of the CHMP if the parties cannot reach agreement.

4.10 Social

4.10.1 Description of environmental values

This section describes the existing social values that may be affected by the proposal.

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. Include a description of traditional and contemporary uses of land and waters by Aboriginal and Torres Strait Islander peoples over the project site and surrounding areas. Consideration should be given to:

- community infrastructure and services, access and mobility;
- population and demographics of the affected community (include a specific category for Aboriginal and Torres Strait Islander peoples when detailing population and demographics in the region);
- local community values, vitality and lifestyles;
- recreational, cultural, leisure and sporting facilities and activities in relation to the affected area;
- recreational and commercial fishers;
- health and educational facilities;
- on farm activities near the proposed activities;
- current property values;
- number of properties directly affected by the project; and
- number of families directly affected by the project, this should include not only property owners but 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.; and
- public health and safety (refer to section 4.11).

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 4.09 Cultural Heritage and Section 4.12 Economy.

4.10.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for protecting or enhancing social values, describes 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 eduction, 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.

Attention should be paid to:

- impacts on demographic, social, cultural and economic profiles;
- impacts on local residents, current land uses and existing lifestyles and enterprises;
- impacts on local and state labour markets, with regard to the source of the workforce. This information is to be presented according to occupational groupings of the workforce. The impacts of both construction and operational workforces and associated contractors on housing demand, community services and community cohesion is to be addressed. The capability of the existing housing stock, including rental accommodation, to meet any additional demands created by the project is to be discussed. This should include discussion on the cumulative impacts from this and other major projects that are likely to be constructed concurrently with this project;
- comment should be made 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;
- impacts on local residents' values and aspirations; and
- 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; and
  - the new project workforce and their families.

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 should be described for the construction and operations phases of the development.

The potential environmental harm on the amenity of adjacent areas used for commercial and recreational fishing, cropping, grazing, forestry, recreation, industry, education, aesthetics, or scientific or residential

purposes should be discussed. The implications of the proposal for future developments in the local area including constraints on surrounding land uses should be described.

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

4.11 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 proposal. 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 practical measures for protecting or enhancing health and safety community values, describes 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 limited to, kindergartens, schools, hospitals, aged care facilities, residential areas, and centres of work (e.g. office buildings, factories and workshops). The EIS, illustrated by the maps, should discuss how planned discharges from the project could impact on public health in the short and long term, and should include an assessment of the cumulative impacts on public health values caused by the proposal, either in isolation or by combination with other known existing or planned sources of contamination.

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

Practical monitoring regimes should also be recommended in this section.

4.12 Economy

4.12.1 Description of environmental values

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

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

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

4.12.2 Potential impacts and mitigation measures

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

An economic analysis, including a cost-benefit analysis, should be presented from national, state, regional and local perspectives as appropriate to the scale of the project. The general economic benefits from the project should be described. At a level of detail appropriate to the scale of the project, the analysis is to consider:

- the significance of this proposal on the local and regional economic context;
- the long and short-term beneficial (eg. job creation) and adverse (eg. competition with local small business) impacts that are likely to result from the development;
- the potential, if any, for direct equity investment in the project by local businesses or communities;
- the cost to all levels of government of any additional infrastructure provision;
- implications for future development in the locality (including constraints on surrounding land uses and existing industry);
- the potential economic impact of any major hazard identified in section 4.13;
- the distributional effects of the proposal including proposals to mitigate any negative impact on disadvantaged groups;
- the value of lost opportunities or gained opportunities for other economic activities anticipated in the future;
- impacts on local property values; and
- the sterilisation of any possible underlying and adjacent mineral resources, actions to be taken to minimise interference with the resources and the economic impact of that sterilisation. Close consultation with DNRM&W is required in this regard.

Consideration of the impacts of the project in relation to energy self-sufficiency, security of supply and balance of payments benefits may be discussed. Attention should be directed to the long and short-term effects of the project on the land-use of the surrounding area and existing industries, regional income and employment and the state economy. 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 proposal. 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.

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 practical measures for protecting people and places from hazards and risk, describes 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; and
- maximum inventory of each substance ;

Details should be provided of:

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

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

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

The plan should include the following components:

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

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

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

This section of the EIS should present environmental management plans (EMPs) developed for the Project. It is expected that all EMPs will be prepared in accordance with the EPA Guideline "*Preparing Environmental Management Plans*". While this guideline has been developed primarily for the mining industry, the principles are in general applicable to this proposal. Separate EMPs should individually address discrete Project elements. The EMPs should be developed from the preceding information in the EIS.

An EMP should provide life-of-proposal control strategies in accordance with agreed performance criteria for specified acceptable levels of environmental harm. In addition, EMPs should identify:

- potential impacts on environmental values;
- mitigation strategies;
- relevant monitoring;
- appropriate indicators and performance criteria;
- reporting requirements; and
- appropriate corrective actions, should an undesirable impact or unforeseen level of impact occur.

The aims of an EMP are to provide:

- commitments by the Proponents to practical and achievable strategies and design standards (performance specifications) for the management of the Project to ensure that environmental requirements are specified and complied with;
- an integrated plan for comprehensive monitoring and control of impacts;
- Local and State authorities, stakeholders and the Proponents with a common focus for approvals conditions and compliance with policies and conditions; and
- the community with evidence that the environmental management of the Project is acceptable.

The recommended structure of each element of the EMP is:

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

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

An EMP should commit to manage, enhance or protect identified environmental values. The commitments should contain the following components for performance criteria and implementation strategies:

- environmental protection objectives for enhancing or protecting each relevant value;
- indicators to be measured to demonstrate the extent to which the environmental protection objective is achieved;
- environmental protection standards (a numerical target or value for the indicator), which defines the achievement of the objective; and
- an action program to ensure the environmental protection commitments are achieved and implemented. This will include strategies in relation to:
    a. continuous improvement;
    b. environmental auditing;
    c. monitoring;
    d. reporting;
    e. staff training; and
    f. a decommissioning program for land proposed to be disturbed under each relevant aspect of the proposal.

6 CONCLUSIONS AND RECOMMENDATIONS

The EIS should make conclusions and recommendations with respect to the proposal, based on the studies presented, the Environmental Management Plans and conformity of the proposal with legislative and policy requirements.

7 REFERENCES

All references consulted should be presented in the EIS in a recognised format such as the Harvard standard (refer to the Style Guide, Australian Government Publishing service). This standard lists references by presenting in the following order: author (date of publication) title, publisher, and place of publication.

8 RECOMMENDED 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 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. Research

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

A6. 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. Include a summary report on consultation to date with registered native title claimants, Native Title Representative Bodies and relevant Indigenous corporations and Indigenous community representatives within the proposed site.

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.

A7. Specialist studies

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

- flora and fauna studies;
- waterway hydrology;
- groundwater;
- geology and soil studies;
- air pollution noise and vibration;
- economic studies;
- hazard and risk studies; and
- land use and land capability studies.

A8. List of Proponent Commitments

A list of all commitments made by the Proponents in the EIS should be provided, together with a reference to the relevant section in the EIS.