Terms of reference for an Environmental Impact Statement

Boundary Hill Mine Extension Project

Environmental Protection Agency
www.epa.qld.gov.au ABN 87 221 158 786

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Glossary

The following abbreviations have been used in this document:

ACCM	Anglo Coal (Callide Management) Pty Ltd
ACH Act	*Aboriginal Cultural Heritage Act 2003*
AHCA	*Australian Heritage Commission Act 1995*
ANZECC	Australian and New Zealand Environment and Conservation Council
BHME	Boundary Hill Mine Extension project
CAMBA	China and Australia Migratory Bird Agreement
CHMP	Cultural Heritage Management Plan
CHP	Coal Handling Plant
CQSS2	*Central Queensland Strategy for Sustainability – 2004 and beyond*, August 2005, Fitzroy Basin Association
DME	Queensland Department of Mines and Energy
DNRW	Queensland Department of Natural Resources and Water
EIS	Environmental Impact Statement
EM Plan	Environmental Management Plan
EMOS	Environmental Management Overview Strategy
EP Act	*Environmental Protection Act 1994*
EPA	Environmental Protection Agency
EPBC Act	*Environment Protection & Biodiversity Conservation Act (C'wlth) 1999*
EPP Air	*Environmental Protection (Air) Policy 1997*
EPP Noise	*Environmental Protection (Noise) Policy 1997*
EPP Waste	*Environmental Protection (Waste Management) Policy 2000*
EPP Water	*Environmental Protection (Water) Policy 1997*
EPWMR	*Environmental Protection (Waste Management) Regulation 2000*

IDAS Integrated Development Assessment System as defined by the *Integrated Planning Act 1997*

IPA *Integrated Planning Act 1997*

JAMBA Japan and Australia Migratory Bird Agreement

MDL Mineral Development Licence issued pursuant to the *Mineral Resources Act 1989*

Mining Project

A mining project means all mining activities carried out, or proposed to be carried out, under one or more mining tenements, in any combination, as a single integrated operation.

Mining Activities

(1) A mining activity means an activity mentioned in Subsection (2 below), that, under the *Mineral Resources Act 1989*, is authorised to take place on –

(a) land to which a mining tenement relates; or

(b) land authorised under that Act for access to land mentioned in paragraph (a).

(2) For subsection (1) the activities are as follows:

(a) prospecting, exploring or mining under the *Mineral Resources Act 1989* or another Act related to mining;

(b) processing a mineral won or extracted by an activity under paragraph (a);

(c) an activity that –

(i) is directly associated with, or facilitates or supports, an activity mentioned in paragraph (a) or (b); and

(ii) may cause environmental harm;

(d) rehabilitating or remediating environmental harm because of a mining activity under paragraphs (a) to (c);

(e) action taken to prevent environmental harm because of an activity mentioned in paragraphs (a) to (d);

(f) any other activity prescribed for this subsection under a regulation.

ML Mining Lease issued pursuant to the *Mineral Resources Act 1989*

MLA Mining Lease Application issued pursuant to the *Mineral Resources Act 1989*

MRA *Mineral Resources Act 1989*

Mt/a Million Tonnes Per Annum

NCA *Nature Conservation Act 19992*

NES National Environmental Significance as defined by the *Environment Protection & Biodiversity Conservation Act (C'wlth) 1999*

TIA *Transport Infrastructure Act 1994*

ToR Terms of Reference

WAct *Water Act 2000*

VMA *Vegetation Management Act 1999*

PART A PREAMBLE

Project proponent

The Proponent for the Boundary Hill Mine Extension Project ("the Project"), is Anglo Coal (Callide Management) Pty Ltd (ACCM) on behalf of the Joint Venture Partners, Anglo Coal (Callide) Pty Ltd and Anglo Coal (Callide) No.2 Pty Ltd.

Project summary

ACCM proposes to extend the life of its Boundary Hill operation by developing a new open-cut pit to the south of the current operation. The Project will enable the continuation of mining at a rate of approximately 4 million tonnes per annum (Mt/a) of run of mine coal (ROM) to the total Callide Mine output and replace part of the existing Callide Mine operation known as the Boundary Hill operations.

Existing mine

ACCM operates Callide Mine, which is located in the Callide Basin of Central Queensland, approximately 20 kilometres (km) from the rural town of Biloela and 120 km south west of the Port of Gladstone (refer to **Figure 1**). Callide mine consists of two areas known as the Southern Pits and Boundary Hill operations. Coal from the Southern Pits is currently delivered to the adjacent Callide Power Stations at a rate of 5.8 – 6.0 Mt/a. Coal production at Boundary hill is currently at a rate of 3.6 – 4.0 Mt/a, and is transported via train to Gladstone. The coal is sold to the Gladstone Power Station, Queensland Alumina Limited (QAL), Comalco Alumina Refiner (CAR) and some is exported for power generation overseas.

The existing Callide Mine (including Southern Pits and Boundary Hill operations) covers a total area of approximately 4097 hectares (ha). The Mining Leases (MLs) for the Southern Pits cover an area of 2936 ha, comprising 1006 ha in five (5) MLs at Dunn Creek, 402 ha in two MLs at Trap Gully, 1314 ha in a single ML at the Hut, and 214 ha in a single ML at The Bluff. The total area of the current Boundary Hill MLs (MLs 5655, 6994, 80107 and 80115) is 1160.51 ha (refer to **Figure 2**).

As at June 2006, the 4097 ha at the Callide Mine consisted of approximately 1684 ha of undisturbed land and approximately 2413 ha of land disturbed by mining, of which 544 ha have been rehabilitated.

All coal from the Southern Pits is processed through a central Coal Handling Plant (CHP) at Dunn Creek. No tailings or fines are produced in the CHP; hence, no tailings disposal facilities are required. The processed coal is transported either by conveyor to the Callide Power Stations or by train to customers in Gladstone. At Boundary Hill, an hydraulic excavator is used to load coal into rear dump trucks for transport to an in-pit crusher. The coal can either be stockpiled at an in-pit ROM or crushed and screened at the Boundary Hill CHP. The crushed coal is then conveyed to a screening and secondary crusher plant. All coal is sold as an unwashed product, and therefore no tailings disposal dams are needed.

Proposed mine

Tenements and tenure

The Project is situated 3 km southeast of the existing Boundary Hill operations and is located within ML Application (MLA) 80121.

The Project is proposed to be carried out on freehold land parcels Lot 26 on SP163782, Lot 94 on RN1524, and Lot 134 on RN417, as illustrated on **Figure 3**. These parcels are owned by Anglo Coal (Callide) Pty Ltd and Anglo Coal (Callide) No.2 Pty Ltd.

Project justification

The Anglo Coal Callide Mine is a commercially viable operation with infrastructure, plant and skilled personnel that contributes to Gross Domestic Product and benefits to the National, State and regional economies. It provides flow on benefits to community services and through business and employment opportunities. The extension of the mine will ensure a continuity of supply to meet current demand at the Gladstone Power Station, Queensland Alumina Limited, Comalco Alumina Refinery and for Coal export maintaining these benefits for up to 18 years. The continuity of supply of up to 4 Mt/a will enable the continuation of economic development and employment opportunities, demand for local business services, maximise regional education and training opportunities and provide significant revenue to government.

Continuity of revenue also provides ongoing resources for timely, progressive rehabilitation of disturbed land at the Callide Mine.

Project site

A total area of approximately 1500 ha (including out-of-pit dumps, haul roads, access roads) will be disturbed over the life of the Project, which is up to 18 years. All of this land is currently under MLA 80121. The disturbed areas will be progressively rehabilitated with the site fully rehabilitated within 3 years of completion of mining activities in the Project area. Rehabilitation aims to return native habitat to disturbed areas. Water management on site currently aims and will continue to protect the downstream water quality for native ecosystems, grazing and cropping uses.

The Project will be staffed by current Callide Mine employees and utilise existing mine infrastructure located at Boundary Hill and/or Callide Mine operations, where possible. Therefore the disturbance footprint will be minimised and no additional plant, vehicles or staff are expected to be utilised during the construction and operation of the Project. Disturbance involving relocating infrastructure will be minimised, where possible. Mining will nominally be operated on a 24-hour basis 5 days per week. Some activities such as draglines and drills will operate 7 days per week. Truck and shovel operations may vary between 5 and 7 day operations. Shifts are likely to be either 8.5 or 12 hour duration. Boundary Hill and Southern Pit operations currently have a mixture of the above roster crews; therefore the Project will be operated in a similar way.

Coal from the Project will be transported either via a 5 km haul road or via conveyor along a similar route to the Boundary Hill Industrial Area.

Approximately 6 cubic metres of prime overburden will be removed for each tonne of coal mined. This will be carried out by a dragline with a prestrip fleet or an entire truck and shovel operation. The pit will be progressively rehabilitated to a stable post mining landform suitable for native habitat.

All operations are planned within the area covered by MLA 80121. To the south of the Project Area, the property is private freehold land owned by the 'Stewart' Family (Lot 75 on RN1526, Lot 79 on RN1526, Lot 26 on SP102343 and Lot 1 on RP616095. These lots are all located within the Parish of Spier in the County of Raglan. This land is covered by an Exploration Permit for Coal (EPC) 188 but no mining is currently planned for this area.

Establishment of the Project will require the removal of approximately 1-2 ha of the *Acacia harpophylla* and/or *Casuarina cristata* community, known as Brigalow community 11.4.3. This is listed as a threatened community under the EPBC Act. Studies show there are no rare or threatened species, and no migratory species within this area. Previous decisions made by the Commonwealth Department of the Environment and Heritage indicate that this is not a large enough area to warrant a controlled action.

Strategic mine plan

The BHME Project, which replaces the current Boundary Hill operation as it reaches the end of its economic life, forms part of ACCM's long-term resource development strategy. It is proposed as the best option to continue to supply quality coal to its Gladstone and export customers, is consistent with Anglo Coal's business objectives, and exceeds the required financial investment criteria. It is proposed to undertake the BHME project using the existing equipment, similar workforce numbers, and at similar production levels. This strategy will allow Callide to supply specification quality coal to its Gladstone Power Station (GPS), Queensland Alumina (QAL), Comalco (CAR) and export customers beyond 2008.

The strip layout is divided into northern and southern strips orientated in a NW-SE direction (refer to Figure 2), developed from a central box cut and coal ramp. A central box cut was developed due to the absence of a shallow sub-crop and minimum overburden depths of 60 m to 90 m. The initial strips advance to the south, chasing lower ratio coal. The northern strips follow the first dragline strip in the south. Once in steady state, the mining location will alternate north, south, north, south until the reserves are depleted.

Heritage listed property

A registered place on the Queensland Heritage Register referred to as the Kilburnie Homestead is located close to the current Boundary Hill Mine Access Road and south of Argoon Road. The register indicates that the homestead is significant as it "illustrates the pattern of early European exploration and settlement of Queensland where the development of pastoral properties preceded agriculture and the establishment of towns. As an early homestead in the Leichhardt Pastoral District, which has remained in use, it has associations with the

development of the pastoral industry in Queensland. Kilburnie Homestead has a special association with the life and work of four generations of the Campbell family who, as early pastoralists, contributed to the development of the area".

The homestead is located immediately south of the proposed BHME pit. The initial boxcut will be located approximately 1km north of the homestead and will advance to within 400m of the homestead. The proximity of the homestead represents the most significant constraint to the project.

A range of technical assessments are nearing completion as part of the EIS investigations, these include (i) noise and vibration (ii) European heritage assessment of Kilburnie Homestead (iii) dust (iv) groundwater; and (v) surface water. A range of issues have been identified in relation to impacts associated with noise, dust and water management. These issues can be managed by implementing appropriate mitigation measures. While these measures have cost implications they do not represent a critical risk to the project. The vibrations associated with blasting at Kilburnie Homestead are however, a critical issue and represent the major risk to implementation of the project.

Previous groundwater studies

Groundwater investigations have been conducted at the existing Boundary Hill mine and the immediate surroundings dating back to the late 1970s. More recently, groundwater assessment of the area has been undertaken using a combination of field surveys and groundwater modelling. Field assessments have included (i) drilling and installation of groundwater monitoring bores and water supply bores (ii) undertaking pumping tests within water supply bores (iii) groundwater sampling for chemical analysis (iv) surveying of bore locations and groundwater usage on neighbouring properties; and (v) monitoring of groundwater level fluctuations within bores.

Desktop studies have included (i) reviewing the available geological and hydrogeological information and data (ii) interpreting the results of groundwater level and groundwater chemistry monitoring (iii) reviewing the groundwater potential for the area (iv) assessing the potential of groundwater as a source of water supply for the Boundary Hill Mine Extension (v) analytical and numerical modelling of potential pit groundwater inflow rates for the life of mine (vi) assessing the impact of groundwater dewatering within the Project on surrounding aquifers and groundwater users; and (vii) evaluating groundwater monitoring requirements during mine operation.

Further studies will be conducted in the context of the current EIS process to review the quality, quantity and significance of groundwater within the Project area, the potential production of significant volumes of groundwater, together with existing and future opportunities for beneficial groundwater use in neighbouring areas.

Administration details for the terms of reference

The legislative framework

The Project requires an ML under the *Mineral Resources Act 1989* (MRA) to secure tenure for the Project. Accordingly, an application has been made (MLA 80121) to obtain the mining lease under the *Mineral Resources Act 1989*. An amendment of the existing environmental authority (non-standard mining activity permit no. M2602 issued 6 December 2006) under the Queensland *Environmental Protection Act 1994* (EP Act) is also required for the new pit.

An Environmental Impact Statement (EIS) is triggered under the EP Act because the Project involves the following:

- the potential to significantly impact on a registered place of cultural heritage significance under the *Queensland Heritage Act 1992*;
- abstraction of more than 2 million m^3 of water per year from natural surface and/or groundwater sources;
- mining more than 2 Mt/a of ROM coal per year; and
- will result in more than 25 ha remaining post mining in a non-beneficial land capability where an acceptable alternative may be feasible.

Public consultation on the draft terms of reference

Stakeholder consultation is an integral component of the planning and approvals process for the Project. The consultation process requires the early identification and engagement of stakeholders.

The following is a list of stakeholders.

- Commonwealth Department of the Environment and Heritage (DEH)
- Queensland Environmental Protection Agency (EPA)
- Queensland Department of Natural Resources and Water (DNRW)
- Queensland Department of Mines and Energy (DME)
- Queensland Department of Main Roads (DMR)
- Queensland Department of the Premier and Cabinet
- Queensland Department of Emergency Services
- Banana Shire Council
- Directly affected landholders
- Indirectly affected landholder/groundwater users
- Nature conservation and wilderness groups i.e. Capricorn Conservation Council Inc.
- The general community i.e. Rotary Club/Lions Club
- Gangulu Aboriginal Party
- Powerlink Queensland
- Queensland Transport
- Neighbouring coal mines
- Queensland Rail
- Enterprise Biloela Association Inc.
- Dawson Valley Development Association Inc.
- Dawson Catchment Coordinating Association
- Callide Landcare
- Fitzroy Basin Association

PART B CONTENT OF THE EIS

Executive summary

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

Glossary of terms

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

1 Introduction

The function of the introduction is to explain why the EIS has been prepared and what it sets out to achieve. It will also define the audience to whom it is directed, and contain an overview of the structure of the document.

1.1 Project proponent

This section will provide details regarding ACCM, including postal address and key contact details for the ACCM Project staff and Project consultants.

1.2 Project description

A brief description of the key elements of the Project will be provided. Any major associated infrastructure requirements should also be summarised.

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

A description of the proposed annual coal production and total coal production for the life of the mine will be provided.

Detailed descriptions of the project will be provided in **Section 3**.

1.3 Project objectives and scope

A statement of the objectives which have led to the development of the Project and a brief outline of the events leading up to the Project's formulation, including alternatives, envisaged time scale for implementation and project life and anticipated establishment costs will be provided.

This section will describe how the Project relates to any other actions, of which ACCM should reasonably be aware that have been, or are being, taken or that have been approved in the area affected by the Project. The consequences of not proceeding with the Project will also be discussed.

1.4 The Environmental Impact Statement (EIS) process

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

1.4.1 Methodology of the EIS

This section will 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 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:

- the relevant legislation is addressed;
- there is awareness 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

This section will provide a statement of the objectives of the environmental impact assessment (EIA) process. The structure of the EIS can then be outlined as an explanation of how the EIS will meet its objectives. The purpose of the EIS is to:

- provide public information on the need for and likely effects of the Project;
- 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.

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 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 previous unforeseen matters and / or any significant issues not addressed in the terms of reference are found to be relevant to the assessment of impacts of the Project, those matters will be included in the EIS.

In addition, the main text of the EIS will address all relevant matters concerning environmental values, impacts on those values and proposed mitigation measures. No relevant matter will 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 EIS will 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 Project. As such, the main text will be written in plain English avoiding jargon as much as possible. Additional technical detail will be provided in appendices. The main text will 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 Project.

In brief, the EIS objectives will 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 will 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

Interested and affected persons will be made aware of how submissions on the EIS will be addressed and taken into account in the decision-making process. The EIS will inform the reader as to:

- how to make submissions, provide contact details and what form the submissions should take; and
- when submissions must be made to gain standing for any appeal process.

1.5 Public consultation process

An appropriate public consultation program, developed to the satisfaction of the EPA, is essential to the impact assessment. This section will outline the methodology that will be adopted to identify and mitigate socio-economic impacts of the project. Refer to the EPA guideline Issue Identification and Community Consultation. Information about the consultation that has already taken place and the results of such consultation will be provided.

The submission of a list of affected persons and interested persons as well as a statement of how the proponent proposes to consult with those persons is a statutory requirement of the EIS process in the *Environmental Protection Act 1994* (See section 7).

The public consultation program will provide opportunities for community involvement and education. For directly affected individuals it will involve interviews, 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 will identify broad issues of concern to local community and interest groups and will continue from Project planning through commissioning, Project operations and final decommissioning. This section will 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 will be provided.

1.6 Project approvals

1.6.1 Relevant legislation and policy requirements

This section will explain the legislation and policies controlling the approvals process, including the roles of government agencies. Reference will be made to relevant State legislation including (but not limited to):

- EP Act;
- *Water Act 2000*;
- *Vegetation Management Act 1999;*
- MRA;
- *Integrated Planning Act 1997*;
- *Transport Infrastructure Act 1994*;
- *Transport Planning and Coordination Act 1994*;
- *Transport Operation (Road Use Management) Act 1995*;
- Department of Main Roads (DMR) Guidelines for Assessment of Road Impacts of Development (2006); and
- *Fisheries Act 1994*.

Any requirements of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) will also be included.

Local Government planning controls, local laws and policies applying to the development will 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 Project, which agencies have jurisdiction, and whether the proposed impact assessment process is appropriate.

1.6.2 Planning processes and standards

This section will 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 will refer to all relevant State and regional planning policies. This information is required to demonstrate how the Project conforms to State, regional and local plans for the area.

1.7 Accredited process for controlled actions under Commonwealth legislation

Projects that are undergoing an EIS under a State statutory process may also be controlled actions under the Commonwealth's EPBC Act. In such case, the Commonwealth may accredit the State's EIS process for the purposes of the Commonwealth's assessment under Part 8 of the EPBC Act. An EPBC referral is being lodged for the Project to determine whether an approval is required under the EPBC Act for (i.e. controlled action) the removal of approximately 1-2 ha of Brigalow. If the Project is deemed a controlled action, the bilateral process will apply. Previous decisions by the DEH indicate that this is not a large enough area to warrant a controlled action.

ToR and the EIS will provide separate discussions under sub-headings in the relevant sections that describe the values and address the potential impacts on Matters of National Environmental Significance (NES) protected under the EPBC Act.

2 Project need and alternatives

2.1 Project justification

The justification for the Project will 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 will be discussed in a regional, State and national context.

2.2 Alternatives to the project

This section will describe feasible alternatives, including conceptual, technological and locality alternatives to the Project, and discussion of the consequences of not proceeding with the Project. Alternatives will 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 will be summarised.

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

Reasons for selecting the preferred options will consider technical, commercial, social and natural environment aspects, in particular, the principals of ecologically sustainable development. The relationship of options chosen for waste management and any emissions produced will be detailed.

This information is required to assess why the scope of the Project 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 Project.

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 the Project including all phases of the Project. It also allows further assessment of which approvals may be required and how they may be managed through the life of the Project.

3.1 Location

3.1.1 Regional and local context

The regional and local context of the Project will be described and illustrated on maps at suitable scales with locational maps showing the site and the supporting local and state road network systems, complete with road names for orientation. Real property descriptions of the Project site will be provided.

The current use of the land, both on and surrounding the project area, and the key environmental features of the area will be described.

3.1.2 Resource

This section will summarise the results of studies and surveys undertaken to identify and delineate the mineral resource. On the proposed mining lease, the location, tonnage of mineral resource will be described.

Maps will be provided showing the general location of the Project area, and in particular:

- the location of the area to be explored, developed or mined;
- the location and boundaries of mining tenures, granted or proposed, to which the Project area is or will be subject;
- the location for mine excavation (s); and
- the location of any proposed buffers surrounding the working areas.

Consideration will be given to providing an air photo enlargement to illustrate components of the Project in relation to natural features of the area.

3.2 Construction

The extent and nature of the Project's construction phase will be described. The description will include the type and methods of construction and the construction equipment to be used and any items of plant to be transported onto the construction site. Any staging of the Project will be described and illustrated showing site boundaries, development sequencing and timeframes. The estimated numbers of people to be employed in the Project construction phase will also be provided with a brief description of where those people may be accommodated. All significant environmental and social impacts of the construction phase will be identified and addressed.

3.3 Operations

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

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

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

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

3.3.1 Location and tenure

This section will summarise the results of studies and surveys undertaken to identify the natural resources required to implement the Project. The location, volume, tonnage and quality of natural resources required will be described (e.g. land, water, forests, energy, etc.). Maps at suitable scales will be provided showing the precise location of the Project area, and in particular:

- the location and boundaries of land tenures, in place or proposed, to which the Project area is or will be subject;
- the location and boundaries of the Project footprint showing all key aspects including excavations, stockpiles, areas of fill, watercourses, plant locations, water storages, buildings, bridges, culverts, hardstands, car parks, etc; and
- the location of any proposed buffers surrounding the working areas.

Contour maps will be provided at a suitable scale and interval such that the drainage of water from all catchments contributing to the site may be determined from the maps. All maps will be provided in the latest geodetic datum and in geographic projection.

A rectified air photo enlargement or satellite image will be provided to illustrate components of the project in relation to the land and built mining features of the area.

3.3.2 Mine life and coal resource base

Specific details will be provided of the following:

- the proposed mine life and an outline of the Boundary Hill Extension Project; and
- the quantity of coal to be mined annually including any proposed ramping of production or staging of development.

3.3.3 Mining methods and equipment

Specific details will be provided of the following:

- the mining type and methods to be used, including the major equipment to be used in the various components of the operation;
- the use of different techniques in areas of different topographic or geo-technical character; and
- chemicals to be used.

The description will refer to, and be complemented by, the figures previously mentioned, showing the locations of key aspects of the Project.

3.3.4 Mine sequencing

Specific details will be provided of the following:

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

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

3.3.5 Processing and products

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

3.3.6 Ongoing evaluation and exploration activities

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

3.4 Coal handling

This section will describe and show on plans, the proposed methods and facilities to be used for coal storage at the Project site and for transferring coal to the handling plant and coal loading onto trains. Discussion will be included of any environmental design features of these facilities including bunding of storage facilities and dust suppression methods.

The section will describe and show on plans, the proposed methods and facilities used for rail-loading of coal at the Project site. Discussion will include a description of design features covering wagon overload management systems, load profiling and freeboard control measures, and dust suppression measures to minimise coal spillage and dust dispersion during rail transit.

3.5 Infrastructure requirements

This section will provide descriptions and layout plans of requirements for constructing, upgrading or relocating any public infrastructure in the vicinity of the Project area. The matters to be considered include such infrastructure as roads, rail, bridges, tracks and pathways, dams and weirs, bore fields, power lines and other cables, wireless technology (e.g. microwave telecommunications), and pipelines for any services (whether underground or above). Plans, descriptions and consideration will also be extended to include existing infrastructure relevant to the mine extension. Where landholder's infrastructure is to be impacted, this section will describe suitable measures to be taken to assist Affected Persons with alternatives.

3.5.1 Transport-road/rail/ship

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

Details will be provided of new access and haul roads (including locations where new roads join existing public roads), road realignments or proposed road closures required as a result of the Project.

Details will be provided of the coal supply chain from the mine until loaded on board ship or delivered to any Australian customers at the point of sale.

Information will 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, hazardous materials, finished products;
- the volume of traffic, origins and destinations 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.

3.5.2 Energy

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

3.5.3 Water supply and storage

The EIS will provide information on water usage by the Project, including the quality and quantity of all water supplied to the site. In particular, the proposed and optional sources of water supply should be described (e.g. bores, any surface storages such as dams and weirs, municipal water supply pipelines).

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

A determination of potable water demand will be made for the Project, including the temporary demands during the construction period. Details will 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 will be described.

3.5.4 Stormwater drainage

A brief description will be provided of the proposed stormwater drainage system and the proposed disposal arrangements, including any off-site services. Water management, including stormwater management, should be addressed in detail under **Section 4.3** of this ToR.

3.5.5 Sewerage

This section will describe, in general terms, the sewerage infrastructure required by the Project.

3.5.6 Telecommunications

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

3.5.7 Accommodation and other infrastructure

A description will be provided of other developments directly related to the Project not described in other sections, such as:

- site offices;
- camps, townships or residential developments;
- technical workshops and laboratories
- fuel storage areas; and
- road access arrangements of any temporary accommodation camps.

3.6 Waste management

3.6.1 Character and quantities of waste materials

An inventory of all wastes to be generated by the Project during the construction, operational and decommissioning phases of the Project will be provided in the EIS. In addition to the expected total volumes of each waste produced, included will be an inventory of the following per unit volume of product produced:

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

Schematic diagrams, which for the operational phase may be simplified versions of those provided in **Section 3.3**, will be provided for each distinct stage of the Project (e.g. construction/site preparation, commissioning, operation and decommissioning) indicating the processes to be used and highlighting their associated waste streams (i.e. all waste outputs: solid, liquid and gaseous), including recycling efforts, such as stockpiling and reusing topsoil. The schematic diagrams, or an associated table, will
cross-reference the relevant sections of the EIS where the potential impacts and mitigation measures associated with each waste stream are described. The physical and chemical characteristics of waste material from the process plant will be provided.

Having regard for best practice waste management strategies and the Environmental Protection (Waste) Policy, the proposals for waste avoidance, reuse, recycling, treatment and disposal will be described in the appropriate sub-section below. Information will also be provided on the variability, composition and generation rates of all waste produced at the site.

Cleaner production waste management planning will be detailed especially as to how these concepts have been applied to preventing or minimising environmental impacts at each stage of the Project. 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 will be presented.

3.6.1.1 Air emissions

This section will 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, including coal loading within the mine lease, or disturbed by wind action on stockpiles and conveyors, or by transportation equipment within the mine lease (e.g. trucks, either by entrainment from the load or by passage on unsealed roads).

The methods to be employed in the mitigation of impacts from air emissions will be described in **Section 4.4.**

3.6.1.2 Solid waste disposal

The proposed location, site suitability, dimensions and volume of any solid waste disposal facility, including its method of construction, will be shown on maps in the EIS.

Spoil waste dumps will be identified and spoil will be characterised. Potential impacts and appropriate management measures associated with waste spoil material will be identified in the appropriate sections of **Section 4.**

3.6.1.3 Liquid waste

A description will be presented of the origin, quality and quantity of wastewater and any immiscible liquid waste originating from the Project. Particular attention will be given to the capacity of wastes to generate acid, and saline or sodic wastewater. A water balance for the Project and processing plant is required to account for the estimated usage of water.

The EIS will consider, where relevant, the following effects:

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

3.7 Rehabilitation and decommissioning

This section will describe the options, strategies and methods for progressive and final rehabilitation of the environment disturbed by the Project. The strategic approach to progressive and final rehabilitation will be described, with reference to the *EPA Guideline 18: Rehabilitation requirements for mining projects*. A preferred rehabilitation strategy will be developed with a view to minimising the amount of land disturbed at any one time. The final topography of any excavations, waste areas and dam sites will be shown on maps at a suitable scale.

The strategies and methods presented for progressive and final rehabilitation of disturbed areas will demonstrate compliance with the objectives of the *Environmental Management Policy for Mining in Queensland*, 1991, or with updated versions of that policy[1] as they become available. Land suitability assessment should follow the *Technical guidelines for the environmental management of exploration and mining in Queensland,* 1995. In particular, the strategies and methods will have the following objectives:

- the landform will be rehabilitated to a condition that is safe to humans and wildlife, non-polluting and stable;
- mining and rehabilitation will aim to create a landform with land use capability and/or suitability similar to that prior to disturbance unless other beneficial land uses are pre-determined and agreed;
- mine wastes and disturbed land will be rehabilitated to a condition that is self-sustaining, or to a condition where the maintenance requirements are consistent with an agreed post-mining land use; and

[1] Refer to website http://www.nrw.qld.gov.au/mines/environment/regulation.html

- surface and ground waters that leave the lease will not be degraded to a significant extent. Current and future water quality will be maintained at levels that are acceptable for users downstream of the site and will be discussed with landowners. Any post-mining impacts on the quality and/or levels of groundwater within the surrounding area will be addressed. Impacts will be discussed and if significant impacts on groundwater or surface water are identified, mitigation measures will be discussed with affected downstream users.

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

Proposals to divert creeks during operations and the reinstatement of the creeks after operations have ceased, will be provided if applicable. Where dams are to be constructed, proposals for the management of these structures after the completion of the Project will be given. Also, the final drainage and seepage control systems and long-term monitoring plans will be described.

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

Detail of the impacts of the preferred rehabilitation strategy will 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, rehabilitation of flora, disposal of waste and the long-term quality of water in any final voids. Implications for the long-term use and fate of the site will also be addressed, particularly with regard to the on-site disposal of waste and the site's potential inclusion on the Environmental Management Register or Contaminated Land Register.

The EIS will address the regional aspirations, targets and on-ground actions for land in CQSS2 section 3.4.9 Mining.

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 Project. Environmental values are defined in section 9 of the Environmental Protection Act 1994, environmental protection policies and other documents such as the ANZECC 2000 guidelines and South East Queensland Regional Water Quality Management Strategy. Environmental values may also be derived following recognised procedures, such as described in the ANZECC 2000 guidelines. Environmental values will be described by reference to background information and studies, which will be included as appendices to the EIS;
- to describe the potential adverse and beneficial impacts of the Project on the identified environmental values. Any likely environmental harm on the environmental values will be described;
- to describe any cumulative impacts on environmental values caused by the Project, 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 will be discussed. This section will detail the environmental protection measures incorporated in the planning, construction, operations, decommissioning, rehabilitation and associated works for the Project. Measures should prevent, or where prevention is not possible, minimise environmental harm and maximise socio-economic and environmental benefits of the Project. Preferred measures should be identified and described in more detail than other alternatives.

Environmental protection objectives may be derived from legislative and planning requirements which apply to the Project including Commonwealth strategies, State planning policies, local authority strategic plans, environmental protection policies under the Environmental Protection Act 1994, and any catchment management plans prepared by local water boards or land care groups. Special attention should be given to those mitigation strategies designed to protect the values of any sensitive areas and any identified ecosystems of high conservation value within the area of possible proposal impact.

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

- Environmental values affected: describe the existing environmental values of the area to be affected including values and areas that may be affected by any cumulative impacts. It should be explained how the environmental values were derived (e.g. by citing published documents or by following a recognised procedure to derive the values).
- Impact on environmental values: describe quantitatively the likely impact of the Project on the identified environmental values of the area. The cumulative impacts of the Project must be considered over time 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 will be addressed.
- Cumulative impacts on the environmental values of land, air and water and cumulative impacts on public health and the health of terrestrial, aquatic and marine ecosystems must be discussed in the relevant sections. This assessment may include air and water sheds affected by the proposal and other proposals competing for use of the local air and water sheds.

- 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). 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 showing that the expected performance is achievable and realistic will be provided.
- 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. Included will be the scope, methods and frequency of auditing proposed.
- Management strategies: describe the strategies to be used to ensure the environmental protection objectives are achieved and control strategies implemented e.g. continuous improvement framework including details of corrective action options, reporting (including any public reporting), monitoring, staff training, management responsibility pathway, and any environmental management systems and how they are relevant to each element of the environment.
- Information quality: information given under each element should also state the sources of the information, how recent the information is, how any background studies were undertaken (e.g. intensity of field work sampling), how the reliability of the information was tested, and what uncertainties (if any) are in the information.

The mitigation measures and monitoring programs identified in this section of the EIS will be used to develop the environmental monitoring programs that will be included in the Environmental Management Plan (EM Plan) for the Project.

4.1 Climate

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

The potential impacts due to climatic factors will be addressed in the relevant sections of the EIS. The impacts of rainfall on soil erosion will be addressed. The impacts of storm events on the capacity of waste containment systems (e.g. site bunding/stormwater management and tailings dams) will be addressed with regard to contamination of waterways and with regard to the design of the waste containment systems. The impacts of winds, rain, humidity and temperature inversions on air quality, and the potential for dust generation from spoil as a result of low humidity and prevailing winds, will be addressed in **Section 4.4**.

4.2 Land

4.2.1 Description of environmental values

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

4.2.1.1 Topography/geomorphology

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

4.2.1.2 Geology

The EIS will provide a description, map and a series of cross-sections of the geology of the Project area, with particular reference to the physical and chemical properties of surface and sub-surface materials and geological structures within the proposed areas of disturbance. Geological properties that may influence ground stability (including seismic activity, if relevant), occupational health and safety, rehabilitation programs, or the quality of wastewater leaving any area disturbed by the Project will 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 will address the potential for significant finds.

4.2.1.3 Mineral resources

The EIS will 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 will be described. The mineral resources will 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) will be provided showing the general location of the Project area, and in particular:

- the location and area extent of the mineral resources to be developed or mined;

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

4.2.1.4 Resource utilisation

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

4.2.1.5 Soils

A soil survey of the sites affected by the Project will 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 will also be provided on soil stability and suitability for construction of Project facilities.

Soil profiles will 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*.

4.2.1.6 Land use

The EIS will provide a description of current land tenures and land uses, including native title issues, in the Project 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 will be shown.

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

This section will describe the land use suitabilities of the affected area in terms of the physical and economic attributes. The potential environmental harm caused by the Project on the adjacent areas currently used for agriculture, recreation, tourism, other business and the implications of the Project for future developments in the impact area including constraints on surrounding land uses will be described. The assessment will 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)*.

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

4.2.1.7 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 will be shown on maps of a suitable scale. The locations of gas and water pipelines, power lines and any other easements will be indicated on maps and descriptions of the environmental values affected by this infrastructure will be provided.

4.2.1.8 Sensitive environmental areas

This section of the EIS will identify whether areas that are environmentally sensitive areas could be affected, directly and indirectly, by the Project.

In particular, the EIS will indicate if the land affected by the Project is, or is likely, to become part of the protected area estate, or is subject to any treaty. Consideration will be given to national parks, conservation parks, 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.

In addition, the Commonwealth's EPBC Act will be addressed concerning Matters of National Environmental Significance.

The proximity of the Project elements to any of these areas will be identified.

4.2.1.9 Landscape character

A description in general terms of the existing character of the landscape that will be affected by the Project will be provided. It will comment on any changes that have already been made to the natural landscape since European settlement. It will 'set the scene' for the description of particular scenic values in the following section on visual amenity.

4.2.2 Potential impacts and mitigation measures

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

4.2.2.1 Land use suitability

The potential for the construction and operation of the Project to change existing and potential land uses of the Project site and adjacent areas will be detailed. Post operations land use options will 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 will be given in the context of land use suitability prior to the Project and minimising potential liabilities for long-term management.

The potential environmental harm caused by the Project on the adjacent areas currently used for agriculture and the implications of the Project for future developments in the impact area including constraints on surrounding land uses will be described.

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

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

4.2.2.2 Land disturbance

A strategy will be developed where appropriate, with a view to minimising the amount of land disturbed at any one time. The strategic approach to progressive and final decommissioning will be described.

The methods to be used for the Project, including backfilling, covering, re-contouring, topsoil handling and revegetation, should be described. The EIS should evaluate options for moving spoil from the first cut to the final

void should be included. Consideration will be given to the use of threatened plant species during any landscaping and revegetation.

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

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

The description of topsoil management in the EIS will consider transport, storage and replacement of topsoil to disturbed areas. The minimisation of topsoil storage times (to reduce fertility degradation) will also be addressed. Erosion and sediment control will be described in **Section 4.2.2.4**).

Information will be provided regarding decommissioning of any concrete footings and foundations, hard stand areas and storage tanks (including any potential for reuse of these facilities).

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

4.2.2.3 Land contamination

The EIS will 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.

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

The EIS will address management of any existing or potentially contaminated land in addition to preventing and managing land contamination resulting from Project activities. To the knowledge of the current landowner there is no existing land contamination on the Project site.

4.2.2.4 Soil erosion

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

The report will 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:

- buildings;
- access roads or other transport corridors;
- spoil dumps; and
- dams, banks and creek crossings.

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

Consideration will be given to off-site impacts to adjacent land.

4.2.2.5 Landscape character

The potential impacts of the Project landscape character of the site and the surrounding area will be described. Particular mention will be made of any changes to the broad-scale topography and vegetation character of the

area, such as due to spoil dumps, excavated voids and broad-scale clearing. Maps showing the topography of the area subsequent to mining and the indicative restoration of watercourses and habitat will be included.

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

4.2.2.6 Lighting

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

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

4.2.2.7 Transport

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

Details will be provided of the impacts on environmental values of any new roads or road realignments.

The EIS will provide details of the provisions and arrangements for the safe transport of dangerous goods.

The EIS will include detailed analysis of probable impact of identified construction and operational traffic generated by the project with particular concern to impacts on road infrastructure, road users and road safety.

The EIS needs to identify impacts on the State-controlled and local government road networks and to indicate clearly the corrective measures necessary to address adverse road impacts and the costs involved. This will require the EIS 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 will be prepared in close consultation with the local District Office of the Department of Main Roads.

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

Product spill contingency plans and the adequacy of equipment and facilities to deal with possible spills for the transport nodes of the Project will be provided. It will be Indicated whether there is a need to update the plans based on increase in frequency of traffic and volumes to be transported.

This section will also address the potential impacts on privately owned or port authority operated ports and State-controlled, Commonwealth-controlled or privately owned airports.

Additional water transport issues that will be considered include the potential of the Project to impact on recreational crafts in rivers and dams.

4.3 Water resources

4.3.1 Description of environmental values

This section describes the existing environment for water resources that may be affected by the Project in the context of environmental values as defined in such documents as the EP Act and the Environmental Protection Policies (EPPs), the National Water Quality Management Strategy (NWQMS), ANZECC 2000 Guidelines, the EPA guideline '*Establishing draft environmental values and water quality objectives'*, and the South East Queensland Water Quality Management Strategy.

Where a licence or permit is required under the Water Act 2000 to take or interfere with the flow of water, this section will provide sufficient information for a decision to be made on the application. Similarly, waterway barrier works may need approval under the *Fisheries Act 1994*, and if so it will be addressed.

4.3.1.1 Surface waterways

A description will be given of the surface watercourses and their quality and quantity in the area affected by the Project with an outline of the significance of these waters to the river catchment system in which they occur. Details provided will include a description of existing surface drainage patterns, and flows in major streams and wetlands. Details will be provided of flooding and stream flows, including extent, levels and frequency, and a description of present and potential water uses downstream of the areas affected by the Project. Flood studies will include a range of annual exceedance probabilities for affected waterways, where data permits. A summary of the available data for use in flood studies will be provided.

The EIS will provide a description of overland flow and drainage on all areas affected by the extension.

Contour maps will be provided at a suitable scale and interval such that the drainage of water from all catchments contributing to the site may be determined from the maps. All maps will be provided in the latest geodetic datum and in geographic projection.

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

An assessment is required of existing water quality in surface waters and wetlands likely to be affected by the Project. The basis for this assessment should be a monitoring program, with sampling stations located upstream and downstream of the proposal. Complementary stream-flow data should also be obtained from historical records (if available) to aid in interpretation.

The water quality will be described, including seasonal variations or variations with flow where applicable. Relevant physical, chemical and biological parameters will be discussed to gauge the environmental harm on any affected creek or wetland system.

The environmental values of the surface waterways of the affected area will be described in terms of:

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

4.3.1.2 Groundwater

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

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

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

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

This section will 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;
- groundwater flow directions (defined from water level contours);
- interaction with surface water;
- possible sources of recharge;
- vulnerability to pollution; and
- predicted hydrogeological function of the post-mining void.

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

The environmental values of the surface waterways of the affected area will be described in terms of:

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

The significance of the groundwater in the Callide Basin will be discussed in the context of the current and future pressures on water supply with reference to the resource condition and management action targets in CQSS2 section 3.6.2, particularly from the perspective of the importance of the Precipice Sandstone, which is the main aquifer in the BHME project area.

4.3.2 Potential impacts and mitigation measures

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

It will describe the possible environmental harm caused by the proposed Project to environmental values for water as expressed in the Environmental Protection (Water) Policy.

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

Key water management strategy objectives include:

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

A risk assessment for uncontrolled emissions to water due to system or catastrophic failure, implications of such emissions for human health and natural ecosystems will be conducted. A list of the strategies to prevent, minimise and contain impacts will also be presented.

The proponent will provide information relating to how activities will affect objectives of the Central Queensland Regional Water Supply Strategy.

4.3.2.1 Surface water and water courses

The potential environmental changes to the flow and the quality of surface waters from all phases of the Project will be discussed, with particular reference to their suitability for the current and potential downstream uses, including the requirements of any affected riparian area, wetland, and in-stream biological uses. The impacts of surface water flow on existing infrastructure should be considered with reference to the Environmental Protection (Water) Policy 1997 and *Water Act 2000*.

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

Quality characteristics discussed will be those appropriate to the downstream and upstream water uses that may be affected. Chemical and physical properties of any waste water (including concentrations of constituents) at the point of entering natural surface waters will be discussed along with toxicity of effluent constituents to flora and fauna. Consideration will be given to impacts on stream flows and fish passages where appropriate.

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

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

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

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

The Australian and New Zealand Environment and Conservation Council (ANZECC, 2000) *National Water Quality Management Strategy, Australian Water Quality Guidelines for Fresh and Marine Waters,* the *Queensland Water Quality Guidelines 2006*, and the Environmental Protection (Water) Policy 1997 should be used as a reference for evaluating the effects of various levels of contamination.

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

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

4.3.2.2 Wastewater

A description will be presented of the origin, quality and quantify of wastewater originating from the Project. Particular attention will be given to the capacity of wastes to generate acid, and saline or sodic waste water. A water balance for the Project is required.

The EIS will consider the following effects where appropriate:

- groundwater from excavations;
- rainfall directly onto disturbed surface areas;
- run-off from roads, plant and industrial areas, chemical storage areas;

- seepage from waste storages;
- seepage from ROM storage and the prevention of groundwater contamination;
- water usage for:
    - process use
    - dust suppression, and
    - domestic purposes.
- evaporation;
- domestic sewage treatment – disposal of liquid effluent and sludge; and
- water supply treatment plant – disposal of wastes.

4.3.2.3 Groundwater

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

The impact assessment will define the extent of the area within which groundwater resources are likely to be affected by the proposed operations and the significance of the Project to groundwater depletion or recharge, and propose management options available to monitor and mitigate these effects. The response of the groundwater resource to the progression and finally cessation of the Project will be described. Issues of making good impacted groundwater supplies will be commented on in the context of the current legislation.

An assessment will be undertaken of the impact of the Project on the local ground water regime caused by the altered porosity and permeability of any land disturbance.

An assessment of the potential to contaminate groundwater resources and measures to prevent, mitigate and remediate such contamination will be discussed.

Should an excess of water be produced during mining, consideration would be given to potential beneficial uses for it.

4.4 Air

4.4.1 Description of environmental values

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

4.4.1.1 Dust and other emissions

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

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

The propensity of any overburden material (e.g. friable sandstones) to generate dust during handling and storage (wind erosion) will be discussed.

4.4.1.2 Greenhouse gas emissions

This section of the EIS will:

- provide an inventory of projected annual emissions for each relevant greenhouse gas, with total emissions expressed in 'CO2 equivalent' terms;

- estimate emissions from upstream activities associated with the proposed Project, including fossil fuel based electricity consumed; and
- briefly describe method(s) by which estimates were made.

The Australian Greenhouse Office Factors and Methods Workbook (available via the internet) will be used as a reference source for emission estimates and supplemented by other sources where practicable and appropriate. The EIS will include estimates of coal seam methane to be released as well as emissions resulting from such activities as transportation of products and consumables, and energy use by the Project.

4.4.2 Potential impacts and mitigation measures

This section defines and describes the objectives and practical measures for protecting or enhancing environmental values for air, to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed. Information will be submitted on the use of new technologies to reduce air emissions from the stack(s) or other emission sources. Information will be provided on procedures to minimise coal dust emissions from unwashed coal during rail transport, including use of environmentally-friendly water-based dust suppressants.

The objectives for air emissions will be stated in respect of relevant standards (ambient and ground level concentrations), relevant emission guidelines, and any relevant legislation. The emissions will be modelled using a recognised atmospheric dispersion model, having due regard for the scope and scale of any expected impacts from the Project.

The proposed levels of emissions should be compared with the National Environmental Protection Measures (NEPM) for ambient air quality (1998), the National Health Medical Research Council (NHMRC) national guidelines (1985) for control of emissions from stationary sources, and the Environmental Protection (Air) Policy (1998).

Where appropriate, the predicted average ground level concentrations in nearby areas will be provided. These predictions will be made for both normal and expected maximum emission conditions and the worst case meteorological conditions should be identified and modelled where necessary. Ground level predictions will be made at any residential, industrial and agricultural developments believed to be sensitive to the effects of predicted emissions. The techniques used to obtain the predictions will be referenced, and key assumptions and data sets explained. The assessment of the Project's impact on air quality will consider the following matters:

- the human health risk associated with emissions from the facility of all hazardous or toxic pollutants should be assessed whether they are or are not covered by the National Environmental Protection Council (Ambient Air Quality) Measure or the Environmental Protection (Air) Policy 1998;
- The National Health and Medical Research Council 'National guidelines for control of emissions of air pollutants from new stationary sources' covers a fairly limited list of generic industry sources. Therefore in order to assess the extent to which the Project complies with best practice environmental management, the emissions from the facility should be compared to best practice emissions from a conventional petroleum refining operation (or other equivalent process);
- features of the Project designed to suppress or minimise dust emissions will be detailed;
- potential impacts on neighbours and appropriate mitigation measures;
- the proposed levels of emissions of dust, fumes and odour will include emissions during normal and upset conditions. Consideration will be given to the range of potential upset condition scenarios and the air emissions that may be generated as a result;
- the limitations and accuracy of the applied modelling methods will be discussed. The air quality modelling results will be discussed in light of the limitations and the accuracy of the applied models;
- air quality predictions will be compared to the relevant goals in the National Environmental Protection Council (Ambient Air Quality) Measure and the Environmental Protection (Air) Policy 1998 goals; and
- air shed management and the contribution of the Project to air shed capacity in view of existing and future users of the air shed for assimilation and dispersion of emissions.

4.4.2.1 Greenhouse gas abatement

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

- a description of the proposed measures (alternatives and preferred) to avoid and/or minimise greenhouse gas emissions directly resulting from activities of the Project, including such activities as transportation of products and consumables, and energy use by the Project;
- an assessment of how the preferred measures minimise emissions and achieve energy efficiency;
- an indication of how the preferred measures for emission controls and energy consumption compare with practice in the relevant sector of industry with a view to achieving best practice environmental management; and
- a description of any opportunities for further offsetting greenhouse gas emissions through indirect means.

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

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

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

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

The EM Plan in the EIS will include a specific module to address greenhouse abatement. That module will include:

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

4.4.2.2 Climate change adaptation

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

assessment of the Project's vulnerabilities to climate change and describe possible adaptation strategies for the activity including:

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

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

4.5 Noise and vibration

4.5.1 Description of environmental values

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

If the proposed activity could adversely impact on the noise environment, baseline monitoring will be undertaken at a selection of sensitive sites affected by the Project. Noise sensitive places are defined in the Environmental Protection (Noise) Policy 1997. 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 Project will be described.

Sufficient data will be gathered to provide a baseline for later studies. The daily variation of background noise levels at nearby sensitive sites will be monitored and reported in the EIS, with particular regard given to detailing variations at different periods of the night. Monitoring methods will adhere to accepted best practice methodologies, relevant Environmental Protection Agency guidelines and Australian Standards, and any relevant requirements of the Environmental Protection (Noise) Policy 1997.

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

4.5.2 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 (including air blast overpressure and ground vibration impacts from blasting operations on the historic values associated with the Kilburnie Homestead), 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.

Information, including noise predictions at nearby sensitive receptors, will be submitted 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 will be quantified in terms of objectives, standards and indicators to be achieved. Particular consideration will be given to emissions of low-frequency noise; that is, noise with components below 200Hz.

This will also include environmental impacts on terrestrial and avifauna, particularly migratory species. Proposals for buffers to minimise or eliminate these effects including details of any screening, lining, enclosing or bunding will be provided, if appropriate. Timing schedules for construction and operations with respect to minimising environmental impacts from noise will be discussed.

Information will be supplied on blasting which might cause ground vibration or fly rock on, or adjacent to, the site with particular attention given to places of work, residence (e.g. Kilburnie Homestead), recreation, worship and general amenity. The magnitude, duration and frequency of any vibration will be discussed. A discussion will be provided of measures to prevent or minimise environmental nuisance and harm. Reference will be made to the EPA Guideline: Noise and vibration from blasting. Mitigation of blasting and vibration impacts, agreed in consultation with relevant stakeholders and specifically for the Kilburnie Homestead, will be detailed.

Off-site transport noise and vibration factors due to road or rail will be addressed.

4.6 Waste

4.6.1 Description of environmental values

This section will describe the existing environmental values that may be affected by the Project's wastes in the context of environmental values as defined by the EP Act and EPPs.

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.

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

- operational handling and fate of all wastes including storage;
- likely content and concentrations of wastes and the potential for waste to be recycled / reused on site;
- 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 will be described;
- methods to prevent, seepage and contamination of groundwater from stockpiles and/or dumps will be given;
- market demand for recyclable waste (where appropriate) will be addressed;
- waste minimisation techniques processes proposed; and
- decommissioning of the site.

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

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

Cleaner production waste management planning will be detailed especially as to how these concepts have been applied to preventing or minimising environmental impacts at each stage of the Project. 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 will be provided.

4.7 Nature conservation

4.7.1 Description of environmental values

This section will describe the existing environment values for nature conservation that may be affected by the Project in the context of environmental values as defined by the EP Act and EPPs and the *Nature Conservation Act 1992* (NCA).

The EIS will 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.

The flora and fauna communities which are rare or threatened, environmentally sensitive localities including the waterways, riparian zone, and habitat corridors will be described. The description will include a plant species list, a vegetation map at an appropriate scale and an assessment of the significance of native vegetation, from a local and regional and State perspective. The description will indicate any areas of State or regional significance.

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

Reference will be made to both State and Commonwealth Endangered species.

The Queensland *Vegetation Management Act 1999* and the findings of any regional vegetation management plan will be referenced.

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

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

4.7.1.1 Terrestrial flora

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

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

Vegetation mapping will be provided for the Project site. Adjacent areas will be mapped where applicable.

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

- location and extent of vegetation types using the EPA's regional ecosystem type descriptions in accordance with The Conservation Status of Queensland's Bioregional Ecosystems. (Sattler P.S. & Williams R.D. 1997 2nd edition) and the Regional Ecosystem Description Database [REDD] available at the EPA's website;
- location of vegetation types of conservation significance based on EPA's regional ecosystem types and occurrence of species listed as protected plants under the Nature Conservation (Wildlife) Regulation 1994 (NC Regulation) and subsequent amendments, as well as areas subject to the VMA;
- 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 will be identified; and
- description of any exotic or weed species.

Within each defined (standard system) vegetation community, suitable sites will be surveyed for plant species 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 NC Regulation, 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 will be used instead of new survey work where applicable. Methodology used for flora surveys should be specified in the appendices to the report.

4.7.1.2 Terrestrial fauna

The terrestrial and riparian fauna occurring in the areas affected by the Project will 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 will include:

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

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

4.7.1.3 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 Project will be described, noting the patterns and distribution in the waterways. The description of the fauna and flora present or likely to be present in the area will include:

- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways within the affected area and downstream;
- any rare or threatened marine species;
- aquatic plants;
- aquatic and benthic substrate; and
- potentially impacted habitat downstream of the Project.

4.7.2 Potential impacts and mitigation measures

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

The EIS will 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 will cover all likely direct and indirect environmental harm due to the Project on flora and fauna particularly sensitive areas as listed below. Terrestrial and aquatic environments will also be covered. Human impacts and the control of any domestic animals introduced to the area will be discussed.

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

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 will be described, and the indirect effects on remaining vegetation will be discussed. Short-term and long-term effects will be considered with comment on whether the impacts are reversible or irreversible. Mitigation measures and/or offsets will be proposed for adverse impacts. Any departure from no net loss of ecological values will be described.

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

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

Weed management strategies aimed at containing existing weed species (e.g. *Parthenium* and other declared plants) and ensuring no new invasive weeds are introduced to the area are required and feral animal management strategies and practices will also be addressed. The study will develop strategies to ensure that the Project does not contribute to increased encroachment of a feral animal species. Reference will be made to the Banana Shire Pest Management Plan when determining control strategies. The strategies for both flora and fauna will be discussed in the main body of the EIS and provided in a working form in a Pest Management Plan as part of the overall EM plan for the project. Rehabilitation of disturbed areas should incorporate, where appropriate, provision of nest hollows and ground litter.

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

- important habitats of species listed under the NCA and/or Commonwealth EPBC Act as presumed extinct, endangered, vulnerable or rare;
- regional ecosystems recognised by the EPA as ‘endangered’ or ‘of concern’ and/or ecosystems listed as presumed extinct, endangered, vulnerable or rare;
- 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 adjacent to feeding or resting areas of species of special interest;
- 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 cultural significance;
- sites containing high biodiversity that are of a suitable size or with connectivity to corridors/protected areas to ensure survival in the longer term; such land may contain:

- natural vegetation in good condition or other habitat in good condition (e.g. wetlands); and/or
- degraded vegetation or other habitats that still supports high levels of biodiversity or acts as an important corridor for maintaining high levels of biodiversity in the area;
- a site containing other special ecological values, for example, high habitat diversity and areas of high endemism;
- ecosystems which provide important ecological functions such as: wetlands of national, state and regional significance; riparian vegetation; important buffer to a protected area or important habitat corridor between areas;
- sites of palaeontologic significance such as fossil sites;
- protected areas which have been proclaimed under the NCA or are under consideration for proclamation; and/or
- areas of major interest, or critical habitat declared under the NCA or high nature conservation value areas or areas vulnerable to land degradation under the VMA.

4.7.3 Matters of national environmental significance

A small section of the Project surface area, approximately 1-2 ha, contains the Brigalow endangered regional ecosystem (ERE) known as 11.4.3. This ERE is governed by the VMA and EPBC Act. Under the EPBC Act Part 3, the ERE is listed as a threatened ecological community. The ERE is within the proposed mining path and located over economic coal reserves.

Consideration will be given to mitigating the impacts on the Brigalow community by any or all of the following:

- a Compensatory Land Agreement to provide more area of similar, or potentially superior ERE than affected by the Project;
- maximising retention of the ecological communities through detailed mine planning;
- re-establishment and confirmation of biodiversity values in the rehabilitated areas of the mined ecological communities;
- additional site specific studies; and
- the development of management strategies for target species.

The EIS will identify the need, if any, for clearing permits for plants that have conservation status.

Consideration will be given to mitigating the impacts on fauna due to vegetation clearing. Mitigation measures may include, for instance, clearing sequentially from impacted areas towards intact areas to allow wildlife to move from the development site to another location.

4.8 Scenic values

This section of the EIS will describe the scenic values of the Project area as viewed from places of residence, from roads and other known vantage points day and night. Sketches, photographs and computer imaging may be used where appropriate to portray the near views and far views of the mining and infrastructure areas, and their surroundings, from visually sensitive locations. This section will describe the general impression of the landscape that would be obtained while travelling through and around it, while the visual amenity section below will address particular panoramas and views (e.g. from constructed lookouts, designated scenic routes, etc.) that have amenity value.

4.8.1 Visual amenity

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

- identification of elements within the Project area and the 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 Project 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.

4.8.2 Potential impacts and mitigation measures

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

The significance of any clearing of vegetation, from a local amenity, landscape and visual perspective will be discussed.

Information will be provided of measures to be undertaken to mitigate or avoid the identified impacts.

Major illumination or reflection impacts on adjacent properties or roads will be addressed. Details of management of lighting for all stages of the Project will be provided, with particular reference to the objectives and proposed management regime to mitigate or avoid:

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

Monitoring of lighting impacts will be considered.

4.9 Cultural heritage

4.9.1 Description of environmental values

This section will describe the existing cultural heritage values that may be affected by the Project. The environmental values of the cultural landscapes of the affected area will be described in terms of the physical and cultural integrity of the landforms.

The Project is located within reasonable proximity of the Kilburnie Homestead although no mining operations will take place within the regulated distance of 100 m. The homestead will be described with appropriate references to the *Queensland Heritage Act 1992*. The homestead is not listed as a heritage place under the EPBC Act.

A cultural heritage study will be required to describe indigenous and non-indigenous cultural heritage sites and places, and their values. Any such study will be conducted by an appropriately qualified cultural heritage practitioner and will include the following:

- liaison with relevant indigenous community/communities concerning;

  - places of significance to that community (including heritage sites, archaeological sites, natural sites, story sites etc); and
  - appropriate community involvement in field surveys;
- any requirements by communities and /or informants relating to confidentiality of site data must be highlighted. Non-indigenous communities may also have relevant information;
- a systematic survey of the proposed development area to locate and record indigenous and non-indigenous cultural heritage places;
- significant assessment of any cultural heritage sites/places located;
- the impact of the proposed development on cultural heritage values;
- report of work done which includes background research, relevant environmental data and methodology, as well as results of field surveys, significance assessment and recommendations; and
- a permit to conduct the research and survey will be required under the provisions of the *Aboriginal Cultural Heritage Act 2003* and/or *the Queensland Heritage Act 1992*.

4.9.2 Potential impacts and mitigation measures

This section will define and describe 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 (e.g. Kilburnie Homestead) will be managed under a Heritage Agreement (HA) and/or a Cultural Heritage Management Plan (CHMP) developed specifically for the Project. Indigenous and non-indigenous cultural heritage should be addressed under separate CHMPs. The HA and CHMP will provide a process for the management of cultural heritage places both identified and sub-surface within the Project site. It is usual practice for the HA and CHMP to be based on information contained in archaeological and/or anthropological reports on the survey area and cultural heritage reports and/or information from affiliated traditional owners. The CHMP will address and include the following:

- a process for including people associated with the development areas in protection and management of indigenous and non-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/graves;
- the monitoring of foundation excavations and other associated earthwork activities for possible sub-surface cultural material;
- a conflict resolution process; and
- cultural awareness training or programs for Project staff.

The development of the CHMP should be negotiated with the lead agency, the DNRW, and all stakeholder representatives, and where there is a role or responsibility identified for the EPA, such as managing the EIS process under the EP Act, it should be party to the discussions.

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

The EPA regional manager will be consulted for the provision of general advice including the appropriate conduct of non-indigenous cultural heritage surveys and the necessary permits. A study/survey of cultural heritage values requires a permit under section 55 of the *Queensland Heritage Act 1992*.

Potential impacts to Kilburnie Homestead Complex will be considered including but not limited to: dust (with particular attention to the unique paint schemes and significant furnishings and effects); blast effects; vibration; geological movement; and visual amenity. A review of the results and effectiveness of the extant vibration monitoring system is recommended. Mitigation measures should include monitoring of the physical elements of the various significant structures that make up the complex (i.e. monitoring of actual building movement).

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

4.10 Transport and infrastructure

Arrangements for the transport of plant, equipment, products, wastes and personnel during both the construction phase and operation phases of the Project will be described in the EIS. The description will address the use of existing facilities and all the requirements for the construction, upgrading or relocation of any transport related infrastructure.

Details will be provided on the proposed use of rail for transport of materials, products or wastes to or from the Project site. In relation to shipping of products, details of the number of ships will be documented.

Details will be provided of the coal supply chain from the mine until loaded on board ship or delivered to any Australian customers at the point of sale.

Details will be provided of the impacts on environmental values of any new roads or road realignments. The EIS will provide sufficient information to make an independent assessment of how the State-controlled and local government road networks will be affected. Sufficient information will be provided to enable an independent assessment of how the rail network (including infrastructure) will be affected.

The EIS will provide information on product spill contingency plans and the adequacy of equipment and facilities to deal with possible spills for the transport nodes of the Project.

The EIS will also address the potential impacts on privately owned or port authority operated ports and State-controlled, Commonwealth-controlled or privately owned airports.

4.11 Social

4.11.1 Description of environmental values

This section will describe the existing social values that may be affected by the Project. The term ‘affected community’ or ‘local community’ will be defined (i.e. the towns of Biloela and Thangool).

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

- community infrastructure and services, access and mobility;
- population and demographics of the affected community;
- local community values, vitality and lifestyles;
- recreational, cultural, leisure and sporting facilities and activities in relation to the affected area;
- health and educational facilities;
- on farm activities near the proposed activities;
- current property values;
- number of properties directly affected by the Project; 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

A description of 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 will be provided.

Participatory interaction with the community will be demonstrated with reference to CQSS2 section 3.9 Social – target and indicators for viable towns and communities.

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 4.9** Cultural heritage and **Section 4.13** Economy.

4.11.2 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 will 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 will be described and a summary of the results incorporated in the EIS.

The social impact assessment of the project is to be carried out in consultation with the Department of Communities. The assessment of impacts will describe the likely response of affected communities and identify possible beneficial and adverse impacts (both immediate and cumulative). These impacts will be considered both at the regional and local level.

The EIS will address the following matters:

- include an assessment of impacts on local residents, current land uses and existing lifestyles and enterprises;
- include an assessment of impacts on local and state labour markets, with regard to the source of the workforce. This information is to be presented according to occupational groupings of the workforce. In relation to the source of the workforce, information is required as to whether the proponent, and/or contractors, are likely to employ locally or through other means and whether there are initiatives for local employment opportunities;
- the EIS will address impacts of both construction and operational workforces and associated contractors on housing demand, community services and community cohesion. The capability of the existing housing stock, including rental accommodation, to meet any additional demands created by the Project is to be discussed;
- the assessment of impacts will take account of relevant demographic, social, cultural and economic profiles;
- identify any new skills and training to be introduced in relation to the Project. Adequate provision should be made for apprenticeship and worker training schemes. The occupational skill groups required and potential skill shortages anticipated will be indicated;
- provide comment on how much service revenue and work from the Project (e.g. provisioning, catering and site maintenance) would be likely to flow to existing communities in the area of the project, particularly if a fly-in, fly-out workforce is proposed;
- include an assessment of impacts on existing local residents' values and aspirations; 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.

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

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

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

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

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

4.12 Health and safety

4.12.1 Description of environmental values

This section describes the existing community values for public health and safety that may be affected by the Project. Nearby and other potentially affected populations will be identified and described in the EIS. Particular attention will be paid to those sections of the population, such as children and the elderly, who are especially sensitive to environmental health factors.

4.12.2 Potential impacts and mitigation measures

The EIS will specify the existing systems used at Callide Mine to be adopted at Boundary Hill extension to manage the occupation health and safety risks and the impacts on the community in terms of health, safety, and quality of life from the Project operations and emissions.

This section will describe the existing community values for health and safety that may be affected by the Project. Any impacts on the health and safety of the community, workforce, suppliers and other stakeholders will be detailed in terms of health, safety and quality of life.

The EIS will 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 will be detailed in terms of health, safety, quality of life from factors such as air emissions, odour, dust and noise. Mitigations will be planned in accordance with CQSS2 section 3.4.6 Air Quality Action AA8, where practicable.

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

The EIS will address the project's potential for providing disease vectors. Measures to control mosquito and biting midge breeding will be described. Any use of recycled water will 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 will 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 will also be recommended in this section.

4.13 Economy

4.13.1 Description of environmental values

This section will describe the existing economic environment that may be affected by the Project. The character and basis of the local and regional economies will 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) of the Project and its contribution to the ongoing viability of Callide Mine; and
- historical descriptions of large-scale resource developments and their effects in the region.

The economic impact statement will 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. The EIS should address the cost required to fill all final voids and relate this cost to the profitability of the total project.

Economic impacts of the project will be discussed in the context of the CQSS2 section 3.8 Economy Aspirational targets and on-ground actions explaining predicted cumulative and intergenerational impacts and proposing measures to be used for monitoring impacts.

4.13.2 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 the Project on the local and regional economic context;
- the long and short-term beneficial (e.g. job creation) and adverse (e.g. competition with local small business) impacts that are likely to result from the development;
- the 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 4.14**;
- the distributional effects of the Project including proposals to mitigate any negative impact on disadvantaged groups;
- the value of lost opportunities or gained opportunities for other economic activities anticipated in the future; and
- impacts on local property values.

Consideration of the impacts of the Project in relation to energy self-sufficiency, security of supply and balance of payments benefits will be discussed. Attention will 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 will be referred to the government for input before undertaking the studies.

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

4.14 Hazard and risk

4.14.1 Description of environmental values

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

The environmental values likely to be affected by any hazardous materials and actions incorporated in the Project will be detailed. The degree and sensitivity of risk will also 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 Project on sensitive areas and resources such as forests, water reserves, State and local Government controlled roads, places of residence and work, and recreational areas.

4.14.2 Potential impacts and mitigation measures

This section will define and describe the objectives and practical measures for protecting people and places from hazards and risk, describe how nominated quantitative standards and indicators may be achieved for hazard and risk management, and how the achievement of the objectives will be monitored, audited and managed.

The EIS will provide an inventory for each class of substances listed in the Australian Dangerous Goods Codes to be held on-site. This information will be presented by classes and will 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 will 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 will develop an integrated risk management plan for the whole of the life of the Project including construction, operation and decommissioning phases. The plan will include a preliminary hazard analysis (PHA), conducted in accordance with appropriate guidelines for hazard analysis (e.g. HAZOP Guidelines, NSW Department of Urban Affairs and Planning (DUAP)). The assessment should outline the implications for and the impact on the surrounding land uses, and should involve consultation with Department of Emergency Services, Queensland Fire and Rescue Authority, and Queensland Ambulance Service. The preliminary hazard analysis will incorporate:

- all relevant major hazards both technological and natural;
- the possible frequency of potential hazards, accidents, spillages and abnormal events occurring;
- indication of cumulative risk levels to surrounding land uses;
- life of any identified hazards;
- a list of all hazardous substances to be used, stored, processed, produced or transported, ;
- the rate of usage; and

- description of processes, type of the machinery and equipment used;
- potential wildlife hazards such as snakes and disease vectors; and
- public liability of the State for private infrastructure and visitors on public land.

The plan will 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).

4.15 Cross-reference with the terms of reference

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

5 Environmental management plan

The Environmental Management Plan (EM plan) for a proposed mining project is an integral part of the EIS. Its purpose is to set out the Proponents' commitments to environmental management. That is, how environmental values will be protected and enhanced.

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

- the proponents' commitments to acceptable levels of environmental performance, including environmental objectives, i.e. levels of expected environmental harm, performance standards and associated measurable indicators, performance monitoring and reporting;
- impact prevention or mitigation actions to implement the commitments; and
- corrective actions to rectify any deviation from performance standards.

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

The existing EM Plan for Boundary Hill will be amended, where necessary for the extension project.

6 References

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

7 Recommended appendices

A1. Final terms of reference for this EIS

A copy of the final ToR will be included in the EIS.

A2. Development approvals

A3. Study team

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

A4. The standard criteria

A brief summary of the Project's compatibility with the standard criteria as defined by the EP Act will be presented. Each principle should be discussed and conclusions drawn as to how the Project conforms. A life-of-project perspective should be shown.

A5. Consultation report

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

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

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

A6. Specialist studies

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

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

A7. Research

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

Approved By

	20 July 2007
Signature	Date

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