





# **Terms of Reference for an Environmental Impact Statement**

## **Bowen Basin Coal Growth Project**

November 2008

**Under Part 4 of the *State Development and Public  
Works Organisation Act 1971***



# Terms of Reference

## **PREAMBLE**

### **Project Proponent**

The Project proponent is BM Alliance Coal Operations Pty Ltd (BMA) as manager and agent on behalf of the Central Queensland Coal Associates Joint Venture (“C.Q.C.A.”). C.Q.C.A. is an unincorporated joint venture between BHP Billiton (50%) and Mitsubishi Corp. (50%). Joint venture arrangements are regulated in accordance with the C.Q.C.A. Joint Venture Agreement as amended (most recently by Deed dated 28 June 2001) and a Strategic Alliance Agreement dated 28 June 2001 which created BMA. Operations are managed by BM Alliance Coal Operations Pty Ltd on behalf of the C.Q.C.A. Joint Venturers under a Management Agreement dated 28 June 2001.

BMA has equal ownership and management of seven Central Queensland coal mines all located within the Bowen Basin: Goonyella Riverside, Broadmeadow, Peak Downs, Saraji, Norwich Park, Gregory Crinum and Blackwater. BMA also manages the Hay Point coal terminal near Mackay, Queensland.

In addition to the above, BMA manages the operations of BHP Mitsui Coal, which is owned by BHP Billiton (80%) and Mitsui and Co (20%). These operations include the South Walker Creek Mine and Poitrel Mine, which is immediately west of the proposed Daunia Mine.

BMA has three existing coal mines adjacent to the Project sites: Goonyella Riverside open-cut; Broadmeadow underground; and Peak Downs open-cut. BHP Mitsui has one existing coal mine adjacent to the Project sites: Poitrel open-cut.

In total, BMA has the capacity within its current mining leases to produce approximately 58mtpa of coal from the Bowen Basin. A total of 14 different coal products are offered by BMA, ranging from high quality hard coking coals, through to high energy thermal coals.

In addition to the Hay Point Coal Terminal, BMA also utilises capacity at Dalrymple Bay Coal Terminal and Gladstone Port; RG Tanna Coal (Blackwater, Gregory and Crinum Mines) and Barnie Point Coal Terminals.

In 2007, BMA employed 8900 people (full-time, part-time and contractors) and was the largest employer in the Central Queensland region. Currently, over 4000 people are permanently employed by BMA.

### **Project Summary**

The BMA Bowen Basin Coal Growth Project (“the Project”) involves the expansion and development of BMA’s coal mining operations in the northern section of the Bowen Basin, near Moranbah, Queensland.

The Project involves the production of an additional 20 million tonnes per annum (mtpa) of coal products through the proposed development of two new coal mining operations: the Daunia Mine and Caval Ridge Mine; and the expansion of the Goonyella Riverside Mine from 16mtpa to 24mtpa. Development of new coal handling and preparation plants (CHPP) will also provide capacity to process an extra 2.5mtpa from the Peak Downs Mine, adjacent to Caval Ridge Mine.

BMA is also proposing to develop a new, larger capacity airport to replace the existing Moranbah facility, to accommodate the travel requirements of the enlarged workforce.

■ **Table 1 Key Components of the Project**

Project Component	Tonnage Contribution (mtpa)	Construction Commencement	First Coal	Workforce	
				Construction	Operation
Daunia Mine	4	2009	2010	350	200
Caval Ridge Mine	5.5	2009	2011	1200	340
Goonyella Riverside Mine Expansion	8	2010/2011	2013	900	700
Peak Downs contribution <sup>1</sup>	2.5	N/A	N/A	N/A	N/A
Airport	N/A	2009	N/A	TBC	Minimal
Total	20mtpa			2405	1240

A locality map is provided in Figure 1.

Daunia Mine

The Daunia Mine will be located on the eastern side of the existing Poitrel Mine, 40 km east south-east of Moranbah Queensland. The Mine includes the following key elements:


- the development of a new mining operation on the existing Daunia mining lease (ML1781) and Daunia East mining lease (ML70115)
- production up to 4 Mtpa of coal products
- a construction workforce of approximately 350 people, with an estimated operating workforce of 200 people
- mining will be undertaken by truck and excavator
- development of associated infrastructure including a new 5Mtpa coal handling and preparation plant (CHPP) on the existing Red Mountain lease (ML70116), a new connection to the power grid, and a new water pipeline connection and
- additional mine infrastructure such as haulage roads and vehicle parking areas are likely to be located on the existing mining leases, Millennium East ML70312 and Poitrel ML4749.

Caval Ridge Mine

The Caval Ridge Mine will be located north of the existing Peak Downs Mine, 30km south of Moranbah, Queensland. The Mine includes the following proposed key elements:

- it is located in the northern section of the existing ML 1775
- a new mining lease to the west of ML 1775 will be required for site infrastructure, temporary landforms and to maximise resource recovery from ML 1775
- production up to approximately 5.5 Mtpa of coal products

<sup>1</sup> The new CHPP at the Caval Ridge Mine provides the capacity to process this contribution from Peak Downs. This incremental expansion at Peak Downs Mine does not form part of the Project as it is within the currently approved capacity of the Peak Downs Mine.

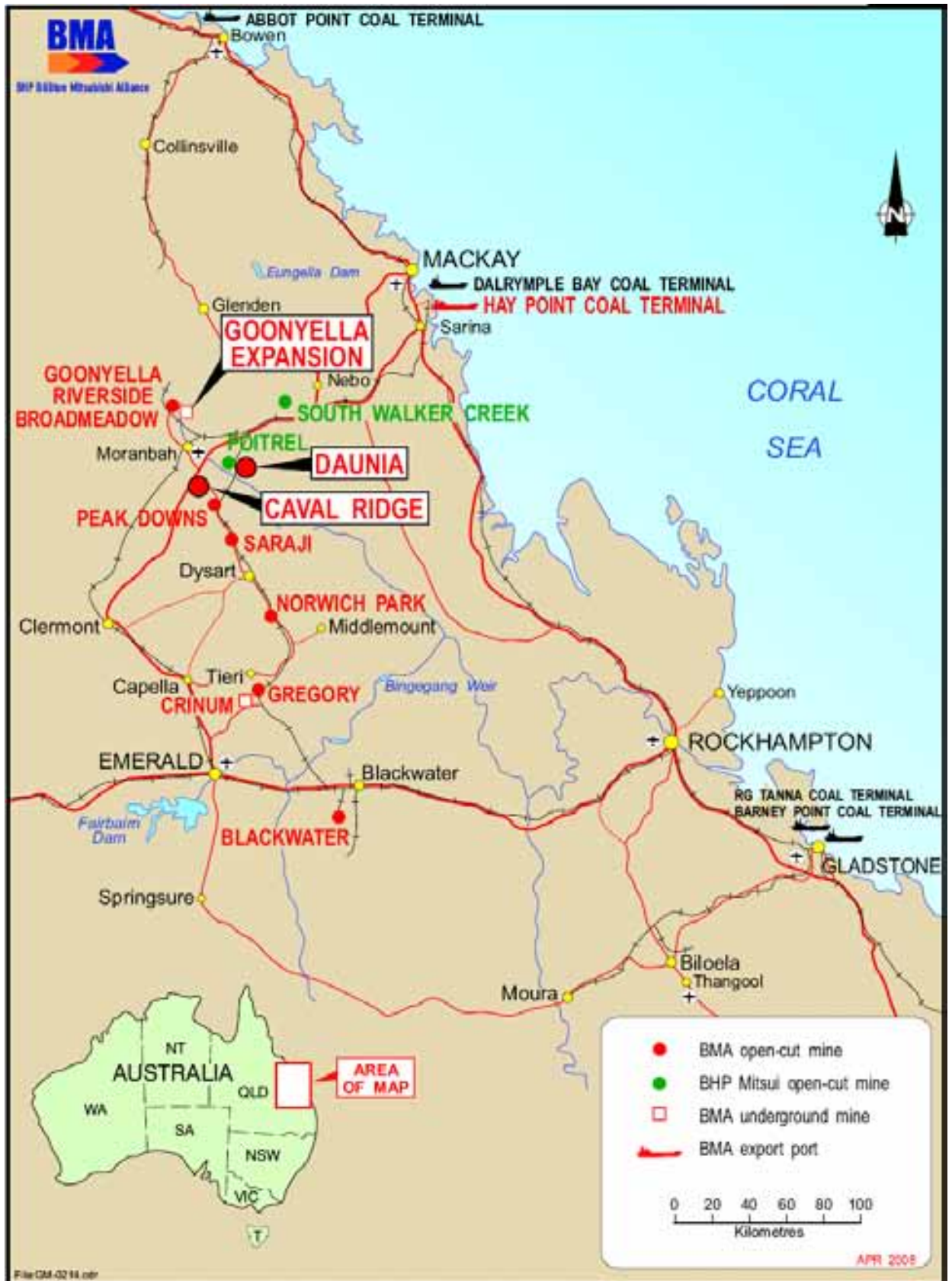
- 
- a construction workforce of approximately 1200 people, with an estimated operating workforce of 340 people;
  - mining will be undertaken by dragline and truck and shovel
  - development of associated infrastructure including a new 8Mtpa CHPP, a new connection to the power grid, and a new water pipeline connection and
  - an incremental 2.5Mtpa from the existing Peak Downs Mine will be processed through the new CHPP. This incremental 2.5 Mtpa does not form part of the Caval Ridge Mine project as it is within the currently approved capacity of the Peak Downs Mine.

#### The Goonyella Riverside Mine Expansion

The Goonyella Riverside Mine Expansion is located within the existing Goonyella open cut and Broadmeadows underground mine, approximately 30kms north of Moranbah, Queensland. The Mine expansion includes the following proposed key components:

- the existing open cut mine will progress eastwards into MDL 307 and to the south-west into EPC953
- a new ML will be required to cover the areas proposed to be mined
- the existing Broadmeadow Mine, which extracts the Goonyella Middle Seam (GMS), will be expanded eastwards into MDL 307 using either the conventional longwall mining practices currently being used for its operations within ML 1763 or see the introduction of Longwall Top Coal Caving (LTCC) technology once its feasibility is proven as a means to improve the levels of resource recovery compared to conventional longwall mining methods
- production to increase from 16Mtpa to 24Mtpa of coal products
- a construction workforce of approximately 900 people, with an estimated operating workforce of 700 people
- open cut and underground mining will be undertaken using mining methods currently practiced at the site and
- development of associated infrastructure including a new CHPP and a capacity upgrade to an existing CHPP to provide an additional 8Mtpa of product, a new connection to the power grid, and a new water pipeline.

Figure 1



## Relocation and Upgrade of Moranbah Airport

The Proponent is proposing a new airport in the Moranbah region which is suitable for larger capacity aircraft. Options relating to the scale, location and timing of a new airport will be addressed as options and alternatives in the EIS.


The current commercial airline servicing Moranbah provides direct flights 5 days per week. These services are categorised as Code B (generally less than 36 seats) aircraft under the current Civil Aviation Safety Authority guidelines.

The existing Moranbah airport is partially located within a mining lease and on land owned by BHP Coal Pty Ltd.

## Associated Infrastructure

The scope of the Environmental Impact Statement (EIS) also includes the following components, which may occur partially or wholly outside of the three mining areas:

- land resources: there is likely to be a loss of agricultural land and an impact on landform and drainage patterns associated with the mine development. There is significant potential for soil erosion and sedimentation associated with mining activities and construction of associated infrastructure
- power: a new connection to power grid will be required, with the possibility of supplementary on-site diesel generation
- water: to be supplied from a range of sources including the Burdekin River (Burdekin to Moranbah Pipeline), Eungella Dam (Eungella Pipeline), Bingegang Weir and Braeside Bore Field, and on-site groundwater and surface water capture. Preliminary investigations show that the Daunia and Caval Ridge Mines are likely to require a total 2400ML/yr, and the Goonyella Riverside expansion will require 4000ML/yr. All water requirements can be met by the abovementioned sources and connections to existing water infrastructure
- road network: general access to the sites for material and workforce transportation will require new connections to the network, in particular the Peak Downs Highway
- rail infrastructure: the coal product will be transported to Hay Point and/or Dalrymple Bay Coal Terminals, with new onsite rail loops needed for connection to the Goonyella Rail System. An opportunity exists to transport some product coal from BMA operations (both current and proposed) to Abbot Point once the construction has been completed for the Northern Missing Link rail project. For the Goonyella Riverside expansion a new rail connection to the Northern Missing Link, which is expected to commence construction during 2008) will be required
- accommodation: a range of options need to be explored for housing the proposed workforce throughout the life of the mines, including construction camps, workers camps, rental of existing dwellings, purchase of new dwellings and construction of new dwellings
- community Services: education, medical, emergency, childcare, recreation and other support services in the area, especially in the town of Moranbah, will be placed under considerable pressure by the changing nature of the additional construction and operational workforces. This may include an increasing proportion of fly-in / fly-out workers in the region. Depending upon the source of the Project's non-resident workforce demand for these services may also be expected to be generated in central and north Queensland coastal centres such as Mackay, and

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- wastewater: sewage from the mine and accommodation facilities will be disposed of at the existing wastewater treatment plants. An assessment as to the condition of, and whether or not expansion to the existing wastewater facilities will be undertaken, will be conducted. An assessment of the proposed pipeline connecting the mine to the wastewater treatment plant will also be undertaken.

Further details of the Project are contained in the Proponent's Initial Advice Statement (IAS) dated May 2008, which can be downloaded from the Department of Infrastructure and Planning website [www.dip.qld.gov.au/projects](http://www.dip.qld.gov.au/projects).

### **Administrative Procedures for these Terms of Reference**

On 18 July 2008, the Coordinator-General (CG) declared the Bowen Basin Coal Growth Project ('the Project') a 'significant project', for which an Environmental Impact Statement (EIS) is required pursuant to section 26(1)(a) of the *State Development and Public Works Organisation Act 1971* (SDPWO Act). Matters considered by the CG in making this declaration included information in the Initial Advice Statement (IAS) prepared by BMA; relevant planning schemes and policy frameworks; infrastructure impacts; employment opportunities; environmental effects; complexity of local, State and Commonwealth requirements; level of investment; and the Project's strategic significance.

It should be noted that a significant project declaration is not an indication of approval of, or support for a project. Rather it is a recognition of the significant complexity of a project, the substantial benefits it may bring and the need to carefully assess its impacts and how they could be mitigated if the project is approved to proceed. This will be achieved by way of a comprehensive Environmental Impact Statement process (EIS)

The declaration initiates the statutory environmental impact assessment procedure under Part 4 of the SDPWO Act, which requires the Proponent to prepare an EIS for the Project.


The Project consists of four potential project components:

- Daunia Mine
- Caval Ridge Mine
- Goonyella Riverside Mine Expansion; and
- Moranbah Airport.

An EIS may be submitted in Parts for each of these components of the Project as allowed under s.32 (1) (b) of the SDPWO Act. BMA has indicated that it intends to submit the EIS in multiple parts. Each Part shall be sub-titled to refer to the component it covers (e.g. 'The Daunia Mine EIS', 'The Caval Ridge Mine EIS', 'The Goonyella Riverside Expansion EIS' and 'The Moranbah Airport EIS'). These multiple parts will be known collectively as 'the EIS'.

An EIS Part should describe how the component it covers relates to other components in the Project and assess the cumulative impacts of the whole Project. Where the nature and level of environmental impact of the Project and associated mitigation measures can be sufficiently described and assessed, consideration of approvals for an EIS Part may be undertaken prior to the submission of subsequent EIS Parts, provided that sufficient information is also submitted for those other parts to enable the cumulative project impacts to be considered.

The Proponent referred the Daunia Mine and Caval Ridge Mine components of the Project to the Australian Government Minister for the Environment, Water, Heritage and the Arts for a decision as to whether the Project constitutes a controlled action under the provisions of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Daunia Mine and



Caval Ridge were declared controlled actions on 22 and 23 September respectively. The Department of the Environment, Water, Heritage and the Arts (DEWHA) has also been consulted in the development of these ToR.

The Project requires assessment and approval under the EPBC Act. The Australian Government has accredited the EIS process under the SDPWO Act under a bilateral agreement between the Australian and Queensland Governments, pursuant to section 87(1)(a) of the EPBC Act. This will enable the EIS to meet the impact assessment requirements under both the Australian and Queensland legislation.

The Department of Infrastructure and Planning (DIP) is managing the EIS process on behalf of the CG. DIP has invited relevant Australian, State and local government representatives and other relevant authorities to participate in the process as Advisory Agencies.

The first step in the impact assessment process is the development of Terms of Reference (ToR) for an EIS for the Project to satisfy the requirements of the SDPWO Act. The process involves the formulation of draft ToR that are made available for public and Agency comment. The CG has regard to all properly made submissions received on the draft ToR in finalising the ToR, which will be presented to the Proponent.

The draft ToR were released for public comment from 9 August 2008 to the 5 September 2008. A total of 14 properly-made submissions were received, all from Advisory Agencies. This document represents the final ToR.

BMA will prepare an EIS to address the ToR. Once the EIS has been prepared to the satisfaction of the CG, a public notice will be placed in relevant newspapers. The notice will state: where copies of the EIS are available for inspection and how it can be purchased; that submissions may be made to the CG about the EIS; and the submission period.


BMA may be required to prepare a Supplementary EIS to address specific matters raised in submissions on the EIS. The CG will then prepare a report evaluating the EIS. The CG's Report will be provided to BMA, the Minister for the Environment, Heritage and the Arts (under the EPBC Act) and will be publicly notified by placing it on DIP's website.

To undertake some of the mining components of the Project, BMA will require mining lease(s) under the Mineral Resources Act 1989 (MR Act) issued by the Queensland Governor in Council, specifically for the Caval Ridge Mine and Goonyella Riverside Mine. BMA will also require new and / or amended environmental authorities (mining activities) under the Environmental Protection Act 1994 (EP Act) issued by the Queensland Minister for the Environment for all of the mines. Some parts of the Project outside the mining leases (including the proposed airport relocation and expansion) may require development approvals under the Integrated Planning Act 1997 (IP Act). In this case, the assessment manager for any such development applications would likely be the relevant local government authority.

Consequently, the abbreviation 'EIS' used in these ToR should be interpreted as satisfying the impact assessment requirements of all relevant Queensland and Australian Government statutes for the Project, which include, but are not limited to, the SDPWO Act, EPBC Act, EP Act, MR Act, IP Act and Transport Infrastructure Act 1994.

Under s.45 of SDPWO Act, the CG's Report may state conditions for the proposed mining lease. If CG's conditions are included in the Report:

- the CG must give the MRA Minister a copy of the report and

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- the conditions of the proposed mining lease are, subject to any inconsistency with native title issues conditions that are paramount under s.47 of SDPWO Act, taken to include the CG's conditions.

Similarly, the CG's Report may, under s.49 of SDPWO Act, state conditions for any draft environmental authority under the EP Act for the proposed environmental authority (mining lease). If conditions are included in the Report:

- the CG must give the EP Act Minister a copy of the Report.

Finally, if the Project involves development requiring an application for a development approval under IPA (for example, for the airport), the CG's Report may, under s.39 of SDPWO Act, state for the assessment manager one or more of the following:

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

Alternatively the Report must state for the assessment manager:

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

Further, the Report must:

- give reasons, if the Report states that development approval be refused and
- be given to the assessment manager for the application by the CG.

The ToR provides information in two broad categories:

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

The Coordinator-General's contact details for any further enquiries are:

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# Abbreviations

ASA	Airservices Australia
ANZECC	Australia and New Zealand Environment Conservation Council
BMA	BM Alliance Coal Operations Pty Ltd
CASA	Civil Aviation Safety Authority
CHMP	Cultural Heritage Management Plan
CG	Coordinator General
DES	Queensland Department of Emergency Services
DEIR	Queensland Department of Employment and Industrial Relations
DEWHA	Commonwealth Department of the Environment, Water, Heritage and the Arts
DoH	Queensland Department of Housing
DoTARS	Commonwealth Department of Transport and Regional Services
DIP	Queensland Department of Infrastructure and Planning
DLGPSR	Queensland Department of Local Government, Sport and Recreation
DME	Queensland Department Mines and Energy
DMR	Queensland Department of Main Roads
DNRW	Queensland Department of Natural Resources and Water
DPIF	Queensland Department of Primary Industries and Fisheries
DSD	(former) Queensland Department of State Development
DTRDI	Queensland Department of Tourism, Regional Development and Industry
EIS	Environmental Impact Statement
EM Plan	Environmental Management Plan
EP Act	<i>Environmental Protection Act 1994</i>
EPA	Queensland Environmental Protection Agency
EPBC Act	<i>Environment Protection &amp; Biodiversity Conservation Act 1999</i> (Commonwealth)
EPP	Environmental Protection Policy
ESD	Ecologically Sustainable Development
IAS	Initial Advice Statement
IP Act	<i>Integrated Planning Act 1997</i>
JORC	Australasian Joint Ore Reserves Committee
ML	Mining Lease issued pursuant to the Mineral Resources Act 1989



MLA	Mining Lease Application issued pursuant to the Mineral Resources Act 1989
MR Act	<i>Mineral Resources Act 1989</i>
QH	Queensland Health
QT	Queensland Transport
QR	Queensland Rail
SDPWO Act	<i>Queensland State Development and Public Works Organisation Act 1971</i>
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# PART A — INFORMATION AND ADVICE ON THE PREPARATION OF THE EIS

## 1. Introduction

These Terms of Reference (ToR) were developed in accordance with s.29 and s.30 of the Queensland *State Development and Public Works Organisation Act 1971* (SDPWO Act) and assist the Project's Proponent to develop a comprehensive Environmental Impact Statement (EIS) that satisfies the requirements of the SDPWO Act. In addition, the EIS is to satisfy the requirements of the *Environmental Protection Act 1994* (EP Act), the *Integrated Planning Act 1997* (IP Act), and the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), which can require the submission of an EIS. The abbreviation 'EIS' is used to satisfy the terms used by all relevant statutes.


All potentially significant impacts of the proposed Project on environmental, social and economic matters are to be investigated. Control strategies for the mitigation of any adverse impacts are to be detailed in the EIS. The focus of the EIS will be on the relevant features of the Project and the impacts associated with them. It is the responsibility of the Proponent to address any issues that arise during the preparation of the EIS that are not covered in these ToR. In addition to this, the Coordinator-General (CG) may request additional information on any matter not adequately dealt with in the EIS Report. In order to clarify the nature and level of investigations that are requested by the ToR, the Proponent may contact relevant Government agencies (known as Advisory Agencies), peak community interest organisations and relevant individuals and groups as necessary. However, the CG reserves the final decision on interpretation of the requirements of the ToR.

The impacts of the project are to be addressed to the degree necessary to enable all relevant decision makers and the general public to be adequately informed. The nature and level of investigations should be relative to the likely extent and gravity of impacts.

The Project consists of four potential project components:

- Daunia Mine
- Caval Ridge Mine
- Goonyella Riverside Mine Expansion and
- Moranbah Airport.

An EIS may be submitted in Parts for each of these components of the Project as allowed under s.32 (1) (b) of the SDPWO Act. BMA has indicated that it intends to submit the EIS in multiple parts. Each Part shall be sub-titled to refer to the component it covers (e.g. 'The Daunia Mine EIS', 'The Caval Ridge Mine EIS', 'The Goonyella



Riverside Expansion EIS' and 'The Moranbah Airport EIS'). These multiple parts will be known collectively as 'the EIS'.

An EIS Part should describe how the component it covers relates to other components in the Project and assess the cumulative impacts of the whole Project. Where the nature and level of environmental impact of the Project and associated mitigation measures can be sufficiently described and assessed, consideration of approvals for, an EIS Part may be undertaken prior to the submission of subsequent EIS Parts, provided that sufficient information is also submitted for those other parts to enable the cumulative project impacts to be considered.

The EIS should consist of three major parts:

- the executive summary
- the main text of the document, which should be written in a clear and concise manner so as to be readily understood by general readers and
- a volume of appendices containing detailed technical information.

The following sections of this ToR detail the required content of the EIS. This information has been set out in a manner that may be adopted as the format for the main text of the EIS. However, this format need not be followed where the required information can be more effectively presented in an alternative format.


The EIS report should be written so that any conclusions reached can be independently assessed. This means that all sources must be appropriately referenced.

Reference to any culturally sensitive information should be indicative only and disclosure of any such information must be negotiated with traditional custodians. Confidential information supplied by or to the Proponent must be clearly identified and placed in discrete attachments to the main report.

Relevant maps, diagrams and other illustrative materials at easily understood scales which allow proper identification of features, such as contour lines, should be included in the EIS where appropriate.

## 2. EIS Objectives

The objective of the EIS is to ensure that all potential environmental, social and economic impacts of the Project are identified and assessed and, where possible, how adverse impacts would be avoided or mitigated. Direct, indirect and cumulative impacts must be fully examined and addressed. The Project, including selection of the site, should be based on sound environmental protection and management criteria.



The EIS should be a self-contained and comprehensive document that provides sufficient information for an informed decision on the potential impacts of the Project and the management measures employed to mitigate residual impacts. The EIS documentation should provide:

- for interested persons and bodies: a basis for understanding the Project, prudent and feasible alternatives, affected environmental values, potential impacts that may occur and measures to be taken to mitigate potential adverse impacts
- for groups or persons with rights or interests in the land: an outline of the potential effects of the Project on that land including access arrangements
- for government agencies: a framework for decision-makers to assess the environmental aspects of the Project with respect to legislative and policy provisions and based on that information to make an informed decision on whether the Project should proceed or not and if so, on what conditions, if any
- for the Federal Minister for the Environment, Heritage and the Arts: information to determine the extent of potential impacts of the Project on matters of national environmental significance, in particular the controlling provisions under the EPBC Act: listed threatened species and communities (sections 18 and 18A) and
- for the Proponent: a mechanism by which the potential environmental impacts of the Project are identified and understood. Information to support the development of management measures including an Environmental Management Plan (EM Plan), to mitigate the adverse effects of residual environmental impacts of the development.


The Proponent is required to address the ToR to the satisfaction of the CG before the EIS is made publicly available. It should be noted that the CG does not evaluate the EIS until public notification is completed and the CG has obtained any other material that the CG considers relevant to the Project, including additional information or comment about the EIS and the Project from the Proponent.

Completion of the EIS to the final ToR does not mean that the Project will necessarily be approved.

### 3. General EIS Guidelines

The EIS is to provide stakeholders with sufficient information to understand the type and nature of the Project, the potential environmental, social and economic impacts and the measures proposed by the proponent to mitigate all adverse residual impacts on the natural, built and social environment. It should be recognised that Australian, Queensland and local Governments, special interest groups and the general public will have an interest in the EIS.

All phases of the Project should be described in the EIS including pre-construction, construction, commissioning and operation, rehabilitation of disturbed lands and decommissioning. Direct, indirect and cumulative impacts should be identified and



assessed with respect to the environmental values of the Project area and its potential area of impact. Cumulative impacts include impacts accumulating over time and impacts exacerbated by intensity or scale or frequency or duration of impacts both at the site and remote to the site.

Specifically, the EIS should provide:


- an executive summary of the potential environmental impacts of the Project
- an overview of the Proponent and its operations
- a description of the Project's objectives and rationale, as well as its relationship to strategic policies and plans
- a description of the entire Project, including associated infrastructure requirements
- a description of feasible alternatives capable of substantially meeting the Project's objectives
- an outline of the approvals required for the Project to proceed
- descriptions of the existing environment, particularly where this is relevant to the assessment of impacts
- measures for avoiding, minimising, managing and monitoring residual impacts, including a statement of commitment to implement the measures
- rigorous assessment of the residual risks of environmental impacts arising from the Project and relevant alternatives on environmental, social and economic values, relative to the 'no project' scenario. The extent of baseline and predictive studies should be commensurate to risks. Assessments should address direct and indirect, combined, short- and long-term, beneficial and adverse impacts, as well as cumulative impacts in combination with other known activities. An estimation of the reliability of predictions should also be provided
- a description of stakeholder consultation undertaken and
- responses to issues raised during public and stakeholder consultation.

Consideration should be given to undertaking baseline and predictive studies to address all controlling provisions triggered by the Project.

The main report needs to be supported by appendices containing relevant data, technical reports and other sources of the EIS analysis. The EIS will therefore consist of the main report together with appendices.

In preparing the EIS, the approach to be adopted requires that:

- predictions of environmental impacts are based on scientifically supported studies

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- the EIS is to reference all technical data, sources of authority and other information used to assess impacts
  - the methods used to undertake the specialist studies are outlined, together with the relevant assumptions and professional or scientific judgments
  - the scientific reliability of investigations and predictions is indicated, including the estimated degree of certainty or if possible, statistical confidence wherever appropriate
  - proposed measures to mitigate and manage identified issues are described and
  - residual impacts that are not quantifiable are described qualitatively, in as much detail as reasonably practicable.

The assessment of all environmental impacts needs to encompass both potential impacts on, and uncertain risks to, the environment. The level of investigation of potential impacts or particular risks needs to be proportionate to both the severity of the potential consequences of possible events and the likelihood of those events occurring.


Specific types of relevant impacts requiring investigation are set out in Part B. However, the EIS will need to address other issues or aspects that may emerge during the investigations and preparation of the EIS. Ultimately, it is the Proponent's responsibility to ensure that adequate studies are undertaken and reported.

The EIS should state the criteria adopted in assessing the proposed Project and its impacts, such as compliance with relevant legislation, policies, standards, community acceptance and maximisation of environmental benefits and minimisation of risks.

The level of analysis and detail in the EIS should reflect the level of significance of the expected impacts on the environment. Any prudent and feasible alternatives should be discussed and treated in sufficient detail, and reasons for selection of the preferred option should be clearly identified.

Where possible, information provided in the EIS should be clear, logical, objective and concise, so that non-technical persons may easily understand it. Where appropriate, text should be supported by maps and diagrams. Factual information contained in the document should be referenced wherever possible. Where applicable, aerial photography and/or digital information (e.g. of Project site, infrastructure corridors, etc) should be presented.

The term "detail" and "discuss" should be taken to include both quantitative and qualitative matters as practicable and meaningful. Similarly, adverse and beneficial effects should be presented in quantitative and/or qualitative terms as appropriate. Should BMA require any information in the EIS to remain confidential, this should be clearly indicated, and separate information should be prepared on these matters.



The term “Project” includes all activities undertaken on lands covered by the granted and proposed mining leases, materials transport corridors and supporting project infrastructure (e.g. any new or expanded coal loading facilities, electricity transmission easements etc.). Where existing facilities are to be used to support the Project (e.g. existing coal loading, rail and port facilities), the potential for a significant increase in environmental impact arising from Project activities is to be discussed. Where there is a likelihood of a significant increase in environmental impact, the impact should be described along with proposed management of unavoidable impacts.

## 4. Stakeholder Consultation

The Proponent should undertake a comprehensive program of consultation with government agencies, key stakeholders and interested parties. The consultation program should provide stakeholders with the opportunity to obtain information about the Project being examined by this EIS, to raise issues and express their concerns and to receive feedback on how the Proponent intends to address the issues and mitigate all adverse impacts of the Project. Consultation with the Advisory Agencies should be the principal forum for identifying legislation, policies, regulations and guidelines relevant to the Project and EIS process.

Appropriate communication processes, possibly including information bulletins and discussion papers, should be used to disseminate information about the Project to a wider audience and to inform stakeholders of the proponent's progress in the EIS process, in particular on specific issues.


The Proponent is required to provide opportunities for the general public to obtain information about, and comment on, the Project through such forums as public information sessions.

As part of this EIS process, consultation will also be undertaken to better understand the social impacts of the proposed Project and opportunities for mitigation of those impacts. The responsibility for this consultation is shared between the Queensland Government (in meeting its statutory notification and referral requirements) and the Proponent (who undertakes a separate public consultation process).

## 5. General EIS Format

The EIS should explain how the EIS responds to the ToR. The EIS documentation is to include appendices containing:

- a copy of the final ToR
- a list of persons, interest groups and agencies consulted during the EIS
- a list of Advisory Agencies consulted with an appropriate contact and

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- the names of, and work done by, all personnel involved in the preparation of the EIS.

Maps, diagrams and other illustrative material should be included in the EIS to assist in the interpretation of the information.

The Proponent should consider including a separate chapter/section in the EIS in which the controlling provisions of the EPBC Act are addressed in one place. This could be achieved by copying relevant information from the body of the EIS and with it constructing a stand-alone section addressing matters of relevance under the EPBC Act.

The EIS should be produced on A4 size paper capable of being photocopied, with maps and diagrams on A4 or A3 size. Text should be a minimum of 10pt size. The EIS document should not contain watermarks across the body of the text. The EIS should also be produced on CDROM/DVD.

Two separate CDROM/DVD copies should be provided:

1. CDROM/DVD copies resolution equivalent to the printed document for distribution to stakeholders
2. CDROM/DVD copies for placement on the internet. Copies should be in Adobe® PDF format for placement on the internet. All compression must be down-sampled to 72 dpi. PDF documents should be no larger than 1 MB in file size. The executive summary should be supplied in HTML 3.2 format with \*.jpg graphics files. Text size and graphics files included in the PDF document should be of sufficient resolution to facilitate reading and enable legible printing, but should be such as to keep within the 1 MB file size.

The final nature and number of EIS copies required to be submitted and made available, should be discussed and agreed with the CG in the early stages of the EIS process.

## PART B — CONTENT OF THE EIS

The EIS should include the following sections but need not be limited to these sections or inferred structure.

### EXECUTIVE SUMMARY

The Executive Summary should be written as a stand alone document, able to be reproduced on request and distributed to interested parties who may not wish to read or purchase the EIS as a whole. It should convey, in plain English, the most important aspects and options relating to the Project, focusing on the key issues, mitigation measures and conclusions in a concise and readable form in the structure set by the EIS.

The Executive Summary should include:

- the title of the Project
- a brief description of the Project (pre-construction, construction and operational activities) and the existing environment, utilising visual aids where appropriate
- name and contact details of the Proponent, and a discussion of previous projects undertaken by the Proponent, if applicable, and their commitment to effective environmental management
- a concise statement of the aims and objectives of the Project
- the legal framework, decision-making authorities and advisory agencies
- an outline of the background to and need for the Project, including the consequences of not proceeding with the Project
- an outline of the alternative options considered and reasons for the selection of the proposed development option
- an outline of the principal environmental impacts predicted and the proposed environmental management strategies (including waste minimisation and management) and commitments to minimise the significance of these impacts and
- a map of the project location.

### Glossary of terms

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



# 1. Introduction

The function of the introduction is to explain why the EIS has been prepared and what it sets out to achieve. In particular, the introduction should address the level of detail of information required to meet the level of approval being sought (for example, whether the proponent is seeking only a preliminary approval through the Integrated Development Assessment System (IDAS) or a full approval with all permits). It should also define the audience to whom it is directed, and contain an overview of the structure of the document. Throughout the EIS, factual information contained in the document should be referenced.

## 1.1 Project Proponent

This section should provide details regarding BMA as the Project Proponent (and its Joint Venture partners). It should describe the experience of BMA, including nature and extent of business activities, experience and qualifications, and environmental record including BMA's environmental policy.

## 1.2 Project Description

A brief description of the key components of the Project should be provided and illustrated.

The inter-relationship (if any) between the components of the Project (Daunia Mine, Caval Ridge Mine, the Goonyella Riverside Mine expansion and the airport relocation and expansion) should be explained.

Any major associated infrastructure requirements should also be summarised. Detailed descriptions of the Project should follow in Section 2.

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

## 1.3 Project Rationale

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

### 1.3.1 Project Need, Costs and Benefits



The EIS should describe the justification for the Project including:

- the status of the Project in a regional, state and national context
- strategic, economic, environmental and social implications of the Project
- the Project's technical feasibility and commercial viability and
- compatibility with relevant policy and regulatory frameworks.

This section should also summarise:

- the economic and social costs and benefits of the Project to industry and the wider community, including employment and spin-off business development
- increased demands on natural resources
- increased demands on local and regional community services and facilities and
- regional socio-economic issues including cultural impacts, community disruption, related land use changes, employment, skills development and any workforce accommodation issues.

### **1.3.2 Relationship to Other Projects**

This section should also describe how the Project relates to any other actions, of which the Proponent should reasonably be aware, that have been, or are being, taken or that have been approved in the area affected by the Project.


## **1.4 Alternatives to the Project**

This section should describe feasible alternatives, including conceptual, technological and locality alternatives to the Project, and discussion of the consequences of not proceeding with the project. Alternatives should be discussed in sufficient detail to enable an understanding of the reasons for preferring certain options and courses of action and rejecting others. Comparative environmental and social impacts of each alternative should be summarised. In particular, the discussion of reasonably practicable alternatives to the Project should include:

- the alternative of taking no action
- a comparative description of the impacts of each alternative for the Project on matters of national environmental significance and
- sufficient detail to clarify why any alternative is preferred to another.

The interdependencies of the Project elements should be explained, particularly with regard to how each of any elements, or various combinations of the elements, and any infrastructure requirements relate to the viability of the Project. This section should include a description of and rationale for the need for the water supply, power, community/social and transport infrastructure proposed for the Project.

Reasons for selecting the preferred options should include technical, commercial, social, cultural and natural environment aspects. In particular, the principles of



Ecologically Sustainable Development (ESD) and sustainable development should be considered. The relationship of options chosen for waste management and any emissions produced should also be detailed.

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

## 1.5 Co-location opportunities

Where linear infrastructure is proposed (i.e. water pipeline, electricity transmission and distribution lines, etc) opportunities may exist for efficiency gains and the mitigation of environmental and property impacts through the location of other proposed linear infrastructure in, near or parallel to the proposed infrastructure).

The Project Proponent should identify any proposals to develop infrastructure within the vicinity of the proposed linear infrastructure investigation corridor. Such proposals would be limited to those projects which are in the public arena during the period of preparation of this EIS and for which a proponent entity can be readily identified.

## 1.6 The Environmental Impact Assessment Process

This section should make clear the methodology and objectives of the EIS process under the SDPWO Act, the environmental authority approval process under the EP Act and mining lease approval under the MRA. This section should include a description of the impact assessment process, timing and decisions to be made for relevant stages of the Project and an outline of the various approvals required for the Project to proceed. In particular, this section should outline mechanisms in the process for public input and the public release of an EIS which will specify all responses to stakeholder submissions.

### 1.6.1 Methodology of the EIS

This section should provide a description of the EIS process steps, timing and decisions to be made for relevant stages of the Project. This section should also indicate how the consultation process (which will be described in detail in Part A Section 4.0) 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:

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

## 1.6.2 Objectives of the EIS

This section should provide a statement of the objectives of the environmental impact assessment 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
- demonstrate how environmental impacts can be managed through the protection and enhancement of the environmental values and
- discuss options and alternatives associated with the Project.

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

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

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

The role of the EIS in providing information for the formulation of the Environmental Management Plan (EMP) for the Project should be discussed. Discussion of options and alternatives is a key aspect of the EIS.


## 1.6.3 Phased EIS Process

The EIS should clearly articulate that the Project consists of four project components:

- Daunia Mine
- Caval Ridge Mine
- Goonyella Riverside Mine Expansion and
- Moranbah Airport.

This section of should describe the timing for planning, design, construction and operation of the project components.

An EIS may be submitted in Parts for each of these components of the Project as allowed under s.32 (1) (b) of the SDPWO Act. BMA has indicated that it intends to submit the EIS in multiple parts. Each Part shall be sub-titled to refer to the component it covers (e.g. 'The Daunia Mine EIS', 'The Caval Ridge Mine EIS', 'The



Goonyella Riverside Expansion EIS' and 'The Moranbah Airport EIS'). These multiple parts will be known collectively as 'the EIS'.

An EIS Part should describe how the component it covers relates to other components in the Project and assess the cumulative impacts of the whole Project. Where the nature and level of environmental impact of the Project, and associated mitigation measures can be sufficiently described and assessed, consideration of approvals for an EIS Part may be undertaken prior to the submission of subsequent EIS Parts, provided that sufficient information is also submitted for those other parts to enable the cumulative project impacts to be considered.

### **1.6.4 Submissions**

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

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

## **1.7 Public consultation process**


This section should outline the methodology that will be adopted to identify and mitigate environmental and social impacts that may arise from the Project. An appropriate public consultation program is essential to the full conduct of the impact assessment.

This section should outline the methodology that will be adopted to:

- identify the Stakeholders and how their involvement will be facilitated
- identify the public consultation process conducted to date and future consultation strategies and programs which should continue from project planning through commissioning, project operations and final decommissioning, and
- indicate how consultation involvement and outcomes will be integrated into the EIS process and future site activities, including opportunities for engagement and provision for feedback and action if necessary.

A list of the Stakeholders, including 'interested' and 'affected' persons as defined under the EP Act consulted during the program should be provided, as well as any meetings held, presentations made and any other consultation undertaken for the EIS process.

The public consultation program should identify broad issues of concern to local community and interest groups and provide ongoing opportunities for community involvement and education. It may include public meetings, interest group meetings,



production of regular summary information and updates, and other consultation mechanisms as required to encourage and facilitate active public participation.

The types of activities to be undertaken:

- timing
- target the Stakeholder/ community representatives
- integration with other EIS activities and the Project development process
- consultation responsibilities
- communication protocols
- reporting and feedback arrangements and
- Information about the consultation process that has taken place and the results should be provided.

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


The State Government should be consulted about all aspects of the impact assessment. The CG can advise on the lead agency roles of the various State Departments.

## 1.8 Project Approvals

### 1.8.1 Relevant legislation and policy requirements

The aim of this section is to provide the reader with an explanation of the legislation and policies controlling the approvals process for the Project. Reference should be made to the SDPWO Act, EP Act, MR Act, IP Act, *Transport Infrastructure Act 1994*, *Land Act 1994*, *Water Act 2000*, *Vegetation Management Act 1999*, *Fisheries Act 1994* and other relevant Queensland laws. All requirements of the EPBC Act, *Native Title Act 1993*, *Australian Heritage Commission Act 1975*, *Aboriginal Cultural Heritage Act 2003* and other relevant Commonwealth laws should also be included.

The EIS should describe the approval process resulting from the gazettal of this Project as a significant project pursuant to the SDPWO Act and outline the linkage to other relevant State and Australian legislation. This outline should describe the public notification processes and appeal rights that will be available in the anticipated approval processes. The EIS should indicate the level of approvals anticipated for each Project element in order that approval agencies are able to determine the completeness of the information presented and the scope to generate the anticipated approvals.



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

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

### **1.8.2 Planning processes and standards**

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

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

Daunia Mine and Caval Ridge Mine were determined to be controlled actions under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and a significant project under the SDPWO Act. The EIS will be developed pursuant to the Bilateral agreement between the Australian and Queensland Governments for the purposes of the Australian Government's assessment under the EPBC Act.

Therefore, it is likely that the EIS will need to address potential impacts on the matters of national environmental significance (NES) that were identified in the 'controlling provisions' when the Project is determined to be a controlled action. As a minimum requirement, the EIS should provide separate discussions under sub-headings in the relevant sections that describe the values and address the potential impacts on NES matters (see Section 3.5) that exclusively address those issues relevant to the controlling provisions. The impacts should also be assessed in the context of how well the ecological values are represented and protected in the region.

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

1. Introduction
2. Description of proposed action (as it would impact on NES matters)



3. Description of the affected environment relevant to the controlling provisions (i.e. describe the features of the environment that are NES matters protected under the EPBC Act)
4. Assessment of impacts on NES matters and mitigation measures
5. Conclusions
6. References.

## 2. Description of the project

The objective of this section is to describe the components of the Project through their lifetime of design, construction, operation, decommissioning and post-closure monitoring. This information is required to allow assessment of all aspects of a proposal including all phases of each Project component from planning, construction and operation through to decommissioning and closure. It also allows further assessment of which approvals may be required and how they may be managed through the life of the Project.

Each EIS Part submitted for an individual project component should describe how the component it covers relates to other components in the Project and assess the cumulative impacts of the whole Project.

### 2.1 Overview of Project

The EIS should provide an overview of the Project to put it into context. This section should include:

- a description of the key components of the Project, including the inter-relationships between the elements of the Project (if any) and between the components of this project and other projects in the area operated by the Proponent (e.g. Peak Downs Mine, Poitrel and Millennium Coal Project) and by other Proponents (e.g. Isaac Plains, Grosvenor Downs, Moranbah North and Eagle Downs Mines)
- the expected cost and overall duration and timing of the Project and
- the employment benefits from the construction and operational phases of the Project.

Text and design plans should be used where applicable. A summary of any environmental design features of the Project should be presented.

#### 2.1.1 Mine

This section should provide details on aspects of each of the mine components of the Project, including:

- the location of the proposed mines, illustrated on maps
- probable pit boundaries and mine paths
- mine development sequence or timeframes
- proposed stream diversions, stream subsidence and water storages
- any road diversions and

- the final landform and any final void(s) to be left at the cessation of mining.

The rationale for the preferred operational program should be explained. The identification of all site access points to, from and within the Project should also be identified on maps, to assist in the assessment of emergency planning.

### **2.1.2 Associated Mine Infrastructure**

This section should provide details on the following aspects of the mine's associated infrastructure (e.g. coal handling facilities and tailings management and storage facilities), including any infrastructure associated with delivery of coal and secondary coal distribution infrastructure:

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

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


### **2.1.3 Airport**

This section should provide details on aspects of the airport element of the Project, including:

- the location and scale of the airport (using maps and plans)
- the airport facilities (runway, terminal, refuelling capability) and its design features (including lighting, carparking, landscaping) and methods for construction
- access routes and the nature of access roads including details of pavement design, turnoff controls and lighting
- proposed ownership and operational management arrangements
- airspace restrictions and intended flight paths
- types and sizes of aircraft to use the facility and
- discussion on the need for the airport, including estimated travel demands associated with BMA's growth program and the need for larger capacity aircraft to fly in and out of the Moranbah region.

### **2.1.4 Ecologically Sustainable Development**

The EIS should provide a comparative analysis of how the Project conforms to the objectives for "ecological sustainable development" (see the *"National Strategy for Ecologically Sustainable Development (1992)"*, available from the Australian Government Publishing Service).



This analysis should consider the cumulative impacts (both beneficial and adverse) of the Project from a life-of-project perspective, taking into consideration the scale, intensity, duration or frequency of the impacts to demonstrate a balance between environmental integrity, social development and economic development.

This information is required to demonstrate that sustainable development aspects have been considered and incorporated during the scoping and planning of the Project.

## 2.2 Location

The regional and local context of the Project should be described and illustrated on maps at suitable scales and reference points. Real property descriptions of the Project site(s) should be provided. Maps should show the precise location of the Project area(s), and in particular:

- the location of the resource(s) to be explored, developed or mined
- the location and boundaries of land tenures, in place or proposed, to which the Project area(s) are, or will be subject
- the location and boundaries of mining tenures, granted or proposed, to which the Project area(s) are, or will be subject
- describe and illustrate any existing mining tenements and petroleum tenures overlying and adjacent to the project site, and any to be applied for this Project
- the location and boundaries of the Project footprint(s) showing all key aspects, including mine excavation(s), subsidence areas, stockpiles, areas of fill, watercourses, plant locations, water storages, buildings, bridges, culverts, hardstands, car parks and any final void(s) to be left at the cessation of mining etc
- any part of the resource(s) not intended to be mined and any part of the resource(s) that may be sterilised by the proposed mining operations
- the location of all proposed Project transport and coal loading infrastructure for both new works and upgrades of existing infrastructure, including the various coal transport options considered with an explanation for the rationale for the preferred transport option(s) for the Project
- the location of any proposed buffers surrounding the working areas
- the location of any proposed accommodation sites
- the identification of all site access points to, from and within the Project on maps, to assist in the assessment of emergency planning and
- the location, or alternative locations, or the proposed airport and associated infrastructure.

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

## 2.3 Construction

The extent and nature of the Project's construction phase should be described (as well as any works required off-site enabling construction to commence, e.g. road upgrades), including a map at reasonable scale that shows the footprint of the mine and construction works, and similarly of the airport. The description should include the type and methods of construction, the construction equipment to be used and the items to be transported onto the construction site including the quarry sites from which any gravel/rock is extracted.

Any staging of the Project should be described and illustrated showing site boundaries, development sequencing and timeframes. The estimated numbers of people to be employed in the construction phase must also be provided with a brief description of where those people may be accommodated and/or how they will be transported to the site.

### 2.3.1 Mine and Airport

This section should provide a description of construction activities relating to the mine and airport elements including:

#### 2.3.1.1 Pre-Construction Activities

- Site access:
  - a map to a suitable scale and description showing the upgrading of roads, railways and other infrastructure
  - a map to a suitable scale identifying areas requiring clearing for pre-construction activities and
  - establishment requirements for construction facilities.

#### 2.3.1.2 Construction

- the extent and nature of the Project's construction phase should be described. The description should include the type and methods of construction, the construction equipment to be used and the items of plant to be transported onto the construction site
- construction requirements, including source and extraction of construction materials:
  - Details of the volumes of material required and
  - Any staging of construction activities should be described and illustrated showing site boundaries, development sequencing and timeframes;
- type, source, quantity and method of transport of construction materials
- general construction standards and site management, including environmental and safety management

- an assessment of expected physical and chemical properties and quantities of soil/rock to be excavated
- details of any potential disruption to flows of waterways during construction and any diversion works required
- relocation of existing infrastructure
- timetable for construction, particularly noting seasonal rainfall or flows
- the hours of operation
- emergency aid/medical facilities to be provided on site, including fire-fighting facilities
- the construction methods and containment/disposal of construction spoil and
- solid and liquid waste handling.


### **2.3.2 Associated Infrastructure**

This section should provide a description of construction activities relating to the Project's associated infrastructure, including for transport of coal and water:

- a detailed plan to an appropriate scale and description showing the location of any works
- on-site plans, layouts, boundaries and elevations
- detailed concept and staging (if any proposed) for additional transport facilities and locations
- plant and machinery likely to be involved
- supply and storage of materials – volume, composition, handling and storage during construction
- extent that service corridors will be used during construction and maintenance
- extent of vegetation clearing required. This information must indicate where vegetation to be cleared has significant conservation value (such as sensitive environmental areas and creek crossings), and must also reference where in the EIS the impacts on such vegetation have been addressed
- location(s) of any road/rail crossings along proposed conveyor/water pipeline routes for the Project
- typical crossing techniques including restoration works that would be used at creek crossings, and road, rail, and other service corridor crossings
- disposal of plant-matter left after clearing vegetation
- cleanup and restoration (rehabilitation) of areas used during construction including any camp sites and storage areas and
- disposal/reuse of surplus excavated material and if this material can be coordinated with concurrent construction activities in the vicinity.

## **2.4 Operations**

### **2.4.1 Mines**



The mine operation section should detail the notifiable activities and/or ERAs and the management of such activities (or refer the environmental management impacts and mitigation strategies to the relevant sections of the EIS) such as:

- sewage treatment
- chemical storage
- petroleum product storage
- motor vehicle workshop
- abrasive blasting
- landfill and waste storage
- explosive storage and
- mine wastes.

#### **2.4.1.1 Mine life and coal resource base**

Summarise the results of studies and surveys undertaken to identify the mineral and natural resources required to implement the proposal (further detail should be provided in s.3.2.2 Geology). The location, volume, tonnage and quality of natural resources required should be described (e.g. land, water, timber, energy, etc.). Specific details should be provided of the following:

- the proposed mines' life and an outline of the coal resource base including the total thickness of seams or extent of the ore body
- the planned recovery of resources
- locations of any resources that would be sterilised by the planned activities and
- the quantity of coal to be mined annually including any proposed ramping-up of production or staging of development.

#### **2.4.1.2 Tenements and tenures**

- describe and illustrate any existing mining tenements and petroleum tenures overlying and adjacent to the project site, and any to be applied to this Project.

#### **2.4.1.3 Mining methods and equipment**

Specific details should be provided of the following:

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

The description should refer to, and be complemented by, the figures presented in section 2.4.1 showing the locations of key aspects of the project. Additional figures should be provided if required.

#### **2.4.1.4 Mine sequencing**

Specific details should be provided of the following:

- the proposed sequence and timing of mining of each seam within the mining lease
- the measures to be employed to manage any potential for subsidence impacts on land and water systems and road infrastructure from mining
- the physical extent of excavations, the location of stockpiles of overburden or coal reject/tailings to be handled during the Project's operation or left after mining ceases, including 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.

#### **2.4.1.5 Processing and products**

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
- chemicals to be used
- concept and layout plans highlighting proposed buildings, structures, plant and equipment associated with the processing operation
- the nature, sources, location and quantities of all materials to be handled, including the storage and stockpiling of raw materials should be described
- the quantities and characteristics of the products produced on an annual basis and
- indicative process flow-sheets showing material balances for the processing plant, and the anticipated rates of inputs, along with similar data on products (e.g. product or washed coal), wastes (e.g. tailings and coarse rejects) and recycle streams (e.g. water).


#### **2.4.1.6 Ongoing evaluation and exploration activities**

- the extent and nature of any proposed ongoing exploration or geological and geotechnical evaluation within the Project area that may be required over the life of the Project.

#### **2.4.1.7 Coal handling**

Specific details should be provided that describe:

- and show on plans at an appropriate scale, the proposed methods and facilities to be used for product storage and for transferring product from the processing plant to the storage facilities and from the storage facilities to the transport facilities

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- and include discussion of any environmental design features of these facilities including bunding or storage facilities, coal stockpiling and blending and any off-site facilities
  - the capacity of the delivery options, including rail and port facilities, to handle the proposed coal volumes generated by the Project over all phases of development
  - the cumulative longer-term demands on coal handling capacity at the Port from all regional coal export proposals, even though the capacity to manage these impacts may fall beyond the scope of this Project EIS.

### 2.4.2 Airport

This section should discuss the proposed ownership model and operation of the airport and its associated infrastructure.

The capacity of the existing airport to accept the additional aircraft necessary as a result of the growth in coal production should also be described.

## 2.5 Associated Infrastructure

This section should discuss the operation of associated infrastructure, including inspection and surveillance activities and frequency.

The operation of any new coal distribution infrastructure should be described, as well as the expected use of any such existing infrastructure. The capacity of any existing infrastructure to accept additional loadings resulting from any new or increased coal production should also be described.


Details on the operational requirements of any water supply infrastructure, including pump stations and balance tanks, should be described.

The operation of associated infrastructure should include a discussion of:

- management arrangements, including the administration and control of the facility
- chemicals and hazardous goods to be utilised
- security, public safety and emergency procedures
- power back-up in an emergency and
- appropriate sound-proofing.

### 2.5.1 Infrastructure Requirements

This section should provide descriptions, with concept and layout plans, of requirements for constructing, upgrading or relocating all infrastructure in the vicinity of the project area. The locations of any necessary infrastructure easements should be shown on the plan. The matters to be considered include such infrastructure as roads, rail, bridges, conveyors, 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).

### **2.5.2 Transport**

This section should describe arrangements for the transport of plant, equipment, raw coal, products, wastes and personnel during both the construction phase and operational phases of the Project. The description should address the use of existing facilities and all requirements for the construction, upgrading or relocation of any transport related infrastructure. The traffic impacts including transport volumes, modes and routes should be addressed under Section 3.9 of the ToR.

Provide details of proposed use of rail for transport of materials, products or wastes to and from the project site. In relation to shipping of products, details of the number of ships and their size should be documented.

Information should be provided on road transportation requirements on public roads for both construction and operational phases.

Details should be provided of new roads, road realignments or proposed road closures required as a result of the Project. Details of any impact the construction or operational activities may impose on existing rail infrastructure servicing the Bowen Basin should also be provided.

Any reliance upon proposed and/or approved development of additional rail infrastructure external to the project i.e. Northern Missing Link and Hay Point Coal Terminal should be described.


### **2.5.3 Energy**

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

### **2.5.4 Water supply and storage**

The EIS should provide information on water usage by the Project, including the quality and quantity of all water supplied to the site. 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 should be described.



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

### **2.5.5 Stormwater drainage**

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

### **2.5.6 Sewerage**

This section should describe, in general terms, the sewerage infrastructure required by the Project. The size, hydraulic capacity and equivalent person capacity of any sewage treatment processes should be described. The method and standard of sewage treatment should be described, together with the intended method of re-use or disposal of treated effluent. If it is intended that industrial effluent or relatively large amounts of domestic effluent are to be discharged into an existing sewerage system, an assessment of the capacity of the existing system to accept the effluent should be provided in Section 3.3 'Waste'. For industrial effluent, this should include detail of the physical and chemical characteristics of the effluent(s).

### **2.5.7 Telecommunications**


The EIS should describe the existing telecommunications infrastructure (such as optical cables, microwave towers, etc.) and identify the owners of that infrastructure. Any proposed use of the existing telecommunications infrastructure should be described.

### **2.5.8 Workforce and Accommodation**

This section should describe the number of personnel to be employed, the skills' base of the required workforce and the likely sources (i.e. local, regional or overseas) for the workforce during the construction and operational phases for each component of the Project. The estimated number of people to be employed during construction and operations and arrangements for their transport to and from the Project areas, including the proposed use of regional or charter air services should be provided.

Estimates should be provided according to occupational groupings and variations in the workforce numbers for the duration of the Project. The information should show anticipated peaks in worker numbers during the construction period.

The EIS should provide an outline of recruitment schedules and policies for recruitment of workers, addressing recruitment of local and non-local workers.



This section should also discuss an accommodation strategy for the construction and operational workforce that addresses the estimated housing needs of both single and accompanied construction and operational workers. This should include details of the size, location and management of any temporary construction worker accommodation that will be required either on-site or off-site. Maps should be included as necessary to illustrate the site and should include the location of any proposed construction workers' accommodation on-site or in the vicinity of the Project. The strategy should also include details of the operational workforce and how such accommodation is proposed to be supplied.

If camp sites are to be used to accommodate the workforce, during construction and operational stages, details on the number, location (shown on a map), proximity to the construction site and typical facilities for these sites should be provided. Information should include data relating to facilities for:

- food preparation and storage
- ablution facilities
- vector and vermin control
- fire safety
- dust and noise control in relation to proximity of camp site to the construction area and
- the service personnel required to maintain the camp and the supply of services to each construction camp.

Local government approvals required for establishment and operation of such camps should be outlined.

## **2.5.9 Other infrastructure**

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


- fuel storage areas
- equipment hardstand and maintenance areas and
- technical workshops and laboratories.

## **2.5.10 Waste management**

### **2.5.10.1 Character and quantities of waste materials**

The EIS should provide an inventory of wastes generated by the Project through construction, operational and decommissioning phases. In addition to the expected total volumes of each waste produced, an inventory of the per unit volume of coal produced should include:

- the tonnage of coal processed

- 
- the amount of resulting process wastes and
  - the tonnage and volume of overburden removed to extract the coal.

Schematic diagrams, which for the operational phase may be simplified versions of those provided in section 2, should 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, should cross-reference the relevant sections of the EIS where the potential impacts and mitigation measures associated with each waste stream are described. The physical and chemical characteristics of waste material from the process plant and mine overburden should 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 should be described in the appropriate sub-section below. Information should also be provided on the variability, composition and generation rates of all waste produced at the site and processing plant.

Cleaner production waste management planning should be detailed especially as to how these concepts have been applied to preventing or minimising environmental impacts at each stage of the Project. Details on natural resource use efficiency (e.g. energy and water), integrated processing design, co-generation of power and by-product reuse should be presented.

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


#### **2.5.10.2 Air emissions**

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

The methods to be employed in the mitigation of impacts from air emissions should be described in section 3.6 Air Quality.

This section should detail the methodology of how air emission data was obtained and if referenced from other sites, provide justifications that this data is relevant to the EIS site.

#### **2.5.10.3 Solid waste disposal**



Describe the quantity and quality of solid wastes (other than waste rock, subsoil and tailings addressed in other sections) and the proposed methods of their disposal.

The proposed location, site suitability, dimensions and volume of any landfill, including its method of construction, should be shown.

The EIS should detail how trackable wastes will be managed.

The EIS should detail the estimated volume of wastes to be transported to local government landfills, the proportion of additional waste this will add to existing waste streams disposed at the landfills, and impacts to landfill operation life.

Reuse and recycling options for trackable wastes should be investigated and described.

#### **2.5.10.4 Excavated waste**


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

- an estimated tonnage and/or volume of waste rock and subsoil to be produced annually
- characterisation should also address the properties of waste rock and subsoil that affect their erosion potential. Sampling should be representative with profiles of all geological units included and based on accepted statistical procedures and be in accordance with recognised guidelines
- details of any likely leachate quality expected under field conditions, including contaminants such as sulfate, pH, chloride, iron, major cations and anions, and any chemical species in sufficient quantity that is likely to be reactive and/or toxic
- measures to ensure stability of the waste dumps, particularly the management of drainage and
- slope profiles that are consistent with intended land use and acceptable post-mining land management and maintenance

Alternatives for excavated waste disposal, including in-filling of voids, off-site options and treatment of any contaminated soil.

#### **2.5.10.5 Liquid waste**

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



The Proponent should identify the methods managing and disposing of wastewater, biosolids and sludge. The disposal of wastes must consider storage including wet weather contingency, waste tracking requirements, irrigation requirements as per the Queensland Water Recycling Guidelines, use of MEDLI modelling for wastewater irrigation and health considerations.

Consideration for recycling and beneficial reuse of wastes should be investigated and possible options detailed.

The EIS may need to consider the following effects:

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


#### **2.5.10.6 Tailings**

This section should describe the tailings waste produced by preparation and/or processing plants and the proposed methods for its disposal. Describe alternative options for tailings disposal including the proposed location, site suitability and volume of any tailings storage and/or disposal site(s), including the method of construction.

Describe the approximate quantity of tailings to be produced by the project and its processing plant annually for the life of the mine.

Tailings characterisation information should also be presented in this section, including:

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



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

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


## 2.6 Rehabilitation and decommissioning

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

The strategies and methods presented for the progressive and final rehabilitation of disturbed areas at the mine should demonstrate compliance with the objectives of the *Environmental Management Policy For Mining in Queensland, 1991*, and the EPA's (2004) *A Policy Framework to Encourage Progressive Rehabilitation of Large Mines and Guideline 18: Rehabilitation requirements for mining projects*, or with updated versions of that policy 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 should have the following objectives:

- mining and rehabilitation should aim to create a landform with land use capability and/or suitability similar to that prior to disturbance unless other beneficial land uses are pre-determined and agreed
- mine wastes and disturbed land should be rehabilitated to a condition that is self-sustaining, or to a condition where the maintenance requirements are consistent with an agreed post-mining land use
- surface and ground waters that leave the lease should not be degraded to a significant extent such that environmental values of waters are not protected. Current and future water quality should be maintained at levels that are acceptable for users and environments downstream of the site and
- surface waters such as final voids or dams retained on the lease should be safe, self-sustaining and be acceptable for the final users.

The means of decommissioning the Project, in terms of the removal of plant, equipment, structures and buildings should be described, and the methods proposed for the stabilisation of the affected areas should be given. Information should be provided regarding decommissioning and rehabilitation of the plant site, removal of



processing plant, rehabilitation of concrete footings and foundations (including the airport runway if appropriate), hardstand areas and storage tanks (including any potential for reuse of these facilities). Options and methods for the disposal of wastes from the demolition of plant and buildings should be discussed in sufficient detail for their feasibility and suitability to be established.

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

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

Detail of the impacts of the preferred rehabilitation strategy should be discussed in the appropriate subsections of Section 3 (Environmental values and management of impacts) particularly with regard to such issues as final landform stability and location of reactive spoil and process plant wastes within the final landform (section 3.2.3.2), rehabilitation of flora (section 3.5.5.2) and the long-term quality of water in any final voids (section 3.4.2.2). Implications for the long-term use and fate of the site should also be addressed, particularly with regard to the on-site disposal of waste and the site's inclusion on the Environmental Management Register or Contaminated Land Register.

### 3. Environmental values and management of impacts


The Project consists of four project components:

- Daunia Mine
- Caval Ridge Mine
- Goonyella Riverside Mine Expansion and
- Moranbah Airport.

This section should address all elements of the environment (such as land, water, air, waste, noise, nature conservation, cultural heritage and transport) in a way that is comprehensive and clear. The EIS may be submitted in parts addressing each of the four project components individually. Critical information from other completed EIS parts is to be included in subsequent EIS parts.


To achieve this, the following issues should be considered for each environmental value relevant to the Project:

- describe the existing environmental values of the area which may be affected by the proposal. Environmental values are defined in section 9 of the Environmental Protection Act 1994, environmental protection policies and other documents such as the ANZECC 2000 guidelines and South East Queensland Regional Water Quality Management Strategy. Environmental values may also be derived following recognised procedures, such as described in the ANZECC 2000 guidelines. Environmental values should be described by reference to background information and studies, which should be included as appendices to the EIS
- describe the potential adverse and beneficial impacts of the proposal on the identified environmental values. Any likely environmental harm on the environmental values should be described
- impact on environmental values: describe quantitatively the likely impact of the Project on the identified environmental values of the area. In particular, any requirements and recommendations of relevant State planning policies, environmental protection policies
- examine viable alternative strategies for managing impacts. These alternatives should be presented and compared in view of the stated objectives and standards to be achieved. Available techniques, including best practice, to control and manage impacts to the nominated objectives should be discussed. This section should detail the environmental protection measures incorporated in the planning, construction, operations, decommissioning, rehabilitation and associated works for the proposal. Measures should prevent, or where prevention is not possible, minimise environmental harm and maximise socio-economic and environmental



benefits of the proposal. Preferred measures should be identified and described in more detail than other alternatives

- cumulative impacts on the environmental values of land, air and water and cumulative impacts on public health and the health of terrestrial and aquatic ecosystems must be discussed in the relevant sections. This assessment may include air and water sheds affected by the Project and other proposals competing for use of the local air and water sheds
- describe any computational model used to make predictions of impacts and/or outcomes of mitigation measures. The description should address the inputs, assumptions, limitations, sensitivities, accuracy and precision of the model
- where impacts from the Project will not be felt in isolation to other sources of impact, it is recommended that the Proponent develop consultative arrangements with other industries in the Project's area to undertake cooperative monitoring and/or management of environmental parameters. Such arrangements should be described in the EIS
- environmental protection objectives: describe qualitatively and quantitatively the proposed objectives for enhancing or protecting each environmental value. Include proposed indicators to be monitored to demonstrate the extent of achievement of the objective as well as the numerical standard that defines the achievement of the objective (this standard must be auditable). Environmental protection objectives may be derived from legislative and planning requirements which apply to the proposal including Commonwealth strategies, State planning policies, local authority strategic plans, environmental protection policies under the *Environmental Protection Act 1994*, and any catchment management plans prepared by local 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
- control strategies to achieve the objectives: describe the control principles, proposed actions and technologies to be implemented that are likely to achieve the environmental protection objectives and include designs, relevant performance specifications of plant. Details are required to show that the expected performance is achievable and realistic
- monitoring programs: describe the monitoring parameters, monitoring points, frequency, data interpretation and reporting proposals
- auditing programs: describe how progress towards achievement of the objectives will be measured, reported and whether external auditors will be employed. Include scope, methods and frequency of auditing proposed
- management strategies: describe the strategies to be used to ensure the environmental protection objectives are achieved and control strategies implemented 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 and

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- 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, etc., identified in this section of the EIS should be used to develop the Environmental Management Plan for the Project (see section 7).

## 3.1 Climate and natural disasters

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


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

- a risk assessment of how changing patterns of rainfall and hydrology, temperature and extreme weather may affect the viability, operation 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 potential impacts due to climatic factors should be addressed in the relevant sections of the EIS. The impacts of rainfall on soil erosion should be addressed in Section 3.2.3. The impacts of storm events on the capacity of waste containment systems (e.g. site bunding/stormwater management and tailings dams) should be addressed in Section 3.4 with regard to contamination of waterways and in Section 3.3 with regard to the design of the waste containment systems. The impacts of winds, rain, humidity and temperature inversions on air quality should be addressed in Section 3.6.

## 3.2 Land

This section describes the existing environment values of the land area that may be affected by the Project. It should also define and describe the objectives and



practical measures for protecting or enhancing land-based environmental values, describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed. The environmental values of the cultural landscapes of the affected area, in terms of the physical and cultural integrity of the area, should be described.

### **3.2.1 Topography and geomorphology**

#### **3.2.1.1 Description of environmental values**

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

#### **3.2.1.2 Potential Impacts and Mitigation Measures**

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


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

### **3.2.2 Geology**

#### **3.2.2.1 Description of environmental values**

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

In particular, assessment of the potential for acid rock drainage should be undertaken. A geochemical characterisation of all materials to be disturbed and



exposed to air should be performed, including in-situ materials subject to de-watering including mine waste materials and tailings, using a sufficient number of samples to effectively characterise the materials to be exposed during the life of the Project.

This should include details of methodology and results of the material characterisation that includes the potential quantity, variability and net acid producing potential of the mined waste rock and Acid Neutralising Capacity (ANC), etc), and tests that show likely outcomes under field e.g. kinetic testing where waste rocks are likely to generate acid. Sampling should be representative with profiles of all geological units included and based on accepted statistical procedures.


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

The location, tonnage and quality of the mineral resources within the project area should be described in detail as indicated below and, for coal projects, where possible it should be presented on a 'seam by seam' basis and include the modifying factors and assumptions made in arriving at the estimates. The mineral resources should be estimated and reported in accordance with the *Australasian code for reporting of mineral resources and ore reserves* (the JORC Code - available at [www.jorc.org/main.php](http://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](http://www.jorc.org/pdf/coalguidelines.pdf)) as appropriate.

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

- the location and aerial 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
- sites of geomorphological significance, such as lava tubes or karst
- 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.

If geological conditions are conducive, the Proponent should consider the possibility that significant fossil specimens (such as of dinosaurs or their tracks) may be



uncovered during construction/operations and propose strategies for protecting the specimens and alerting the Queensland Museum to the find.

Potential impacts of ARD on land rehabilitation and water quality should be discussed. Management measures describing acid rock drainage is to be monitored and managed to adequately protect environmental values through all stages of the activity from both technical and economic perspectives should be included, with preference given to prevention and minimisation rather than control and treatment. Management measures should incorporate best practice (for example see “Managing Acid and Metalliferous Drainage” published by Australian Government Department of Industry, Tourism and Resources, February 2007; information from the International Network for Acid Prevention (INAP) program ( - <http://www.inap.com.au/>).

### **3.2.2.2 Potential Impacts and Mitigation Measures**

The EIS should analyse the effectiveness of the mining proposal in achieving the optimum utilisation of the coal 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.

### **3.2.3 Soils**

#### **3.2.3.1 Description of environmental values**

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

The requirement for soils mapping in terms of area and mapping scale should follow the *QDME Technical Guidelines for Environmental Management of Exploration and Mining in Queensland 1995*, specifically s.6.1 which is headed Land Suitability Techniques. These guidelines recommend that disturbed areas be mapped more intensively than non-disturbed areas and provide guidance on acceptable mapping scale and site intensity. 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*.

### **3.2.3.2 Potential Impacts and Mitigation Measures**

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

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

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

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


The impact of soil salinity, dispersiveness and fertility on land rehabilitation outcomes should be outlined for each soil and overburden type identified. Mitigation strategies should be developed to achieve the land rehabilitation outcomes.

Consideration should be given to the amendment or revocation of any approved Soil Conservation Plans as a result of Project activities.

## **3.2.4 Land use**

### **3.2.4.1 Description of environmental values**

The EIS should 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 should be shown.



Maps at suitable scales showing existing land uses and tenures, reserves, roads and road reserves, railways and rail reserves, stock routes and the like, and the Project location, should be provided for the entire Project area and surrounding land that could be affected by the development. Indicate locations of gas and water pipelines, power lines and any other easements. The maps should identify areas of conservation value areas in any locality that may be impacted by the Project. The location of existing dwellings and the zoning of all affected lands according to any existing town or strategic plan should be included.

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

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 (if applicable) 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*.

#### **3.2.4.2 Potential Impacts and Mitigation Measures**

The potential for the construction and operation of the Project to change existing and potential land uses of the Project site and adjacent areas should be detailed. Post operations land use options should be detailed including suitability of the area to be used for agriculture, industry, or nature conservation. The factors favouring or limiting the establishment of those options should be given in the context of land use suitability prior to the 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, urban development, recreation, tourism or other business and the implications of the Project for future developments in the impact area including constraints on surrounding land uses should be described. If the development adjoins or potentially impacts on good quality agricultural land, then an assessment of the potential for land use conflict is required. Investigations should follow the procedures set out in the planning guideline, *The Identification of Good Quality Agricultural Land, which supports State Planning Policy 1/92*.

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

## 3.2.5 Sensitive environmental areas

### 3.2.5.1 Description of environmental values

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

In particular, the EIS should indicate if the land affected by the proposal is, or is likely, to become part of the protected area estate, or is subject to any treaty. Consideration should be given to national parks, conservation parks, declared fish habitat areas, wilderness areas, aquatic reserves, heritage/historic areas or items, national estates, world heritage listings and sites covered by international treaties or agreements (e.g. Ramsar, JAMBA, CAMBA), areas of cultural significance and scientific reserves (see section 3.5 for further guidance on sensitive areas).

To obtain copies of plans of declared fish habitat areas contact the Queensland Department of Primary Industries and Fisheries or visit their website.

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

### 3.2.5.2 Potential impacts and mitigation measures

This section should discuss the following:

- the impact of the Project on species, communities and habitats of local, regional or national significance
- proposals to mitigate impacts (e.g. timing of works, minimise width of disturbance, proposed rehabilitation of in-stream and floodplain disturbances)
- planned rehabilitation of vegetation communities and any relevant previous experience/experiments rehabilitating these communities
- appropriate mitigation measures for remnant ecosystems that may be affected by the Project should refer to the *Regional Vegetation Management Code: SEQ Bioregion* (DNRW 2006), and address the *Policy for Vegetation Management Offsets* (DNRW 2007) and
- offsets relating to residual impacts with regard to the Policy for Vegetation Management Offsets as well as the draft policy Statement on the use of environmental offsets under the *EPBC Act 1999*.

Potential impacts and associated mitigation measures should be discussed further under Section 3.5 Nature Conservation.

## 3.2.6 Landscape character and visual amenity

### 3.2.6.1 Description of environmental values

This section should describe in general terms the existing character of the landscape that will be affected by the Project. It should comment on any changes that have already been made to the natural landscape since European settlement. It should 'set the scene' for the description of particular scenic values in the following section on visual amenity. The difference being that this section describes the general impression of the landscape that would be obtained while travelling through and around it, while the visual amenity section addresses particular panoramas and views (e.g. from constructed lookouts, designated scenic routes, etc.) that have amenity value.


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

- identification of elements within the Project and surrounding area that contribute to their image of the town/city as discussed in the any local government strategic plan - city image and townscape objectives and associated maps
- major views, view sheds, existing viewing outlooks, ridgelines and other features contributing to the amenity of the area, including assessment from private residences in the affected area along the route
- focal points, landmarks (built form or topography), gateways associated with project site and immediate surrounding areas, waterways, and other features contributing to the visual quality of the area and the project site
- character of the local and surrounding areas including character of built form (scale, form, materials and colours) and vegetation (natural and cultural vegetation) directional signage and land use
- identification of the areas of the 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.

### 3.2.6.2 Potential impacts and mitigation measures

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

This section should analyse and discuss the visual impact of the Project on particular panoramas and outlooks. It should be written in terms of the extent and significance



of the changed skyline as viewed from places of residence, work, and recreation, from road, cycle and walkways, from the air and other known vantage points day and night, during all stages of the Project as it relates to the surrounding landscape. The assessment is to address the visual impacts of the Project structures and associated infrastructure, using appropriate simulation. Sketches, diagrams, computer imaging and photos are to be used where possible to portray the near views and far views of the completed structures and their surroundings from visually sensitive locations.

Special consideration is to be given to public roads, public thoroughfares, and places of residence or work, which are within the line-of-sight of the Project.

Details of the design and colour of any major structures, buildings or fixed plant and all proposed screenings either vegetative or material should be described and discussed where relevant to the minimisation of the visual impacts of the Project.

The obstruction of sunlight due to the construction of buildings or alteration of landforms should be considered, as well as major illumination or reflection impacts on adjacent properties or roads.

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

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

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

### **3.2.7 Land disturbance**

#### **3.2.7.1 Description of environmental values**

A strategy should be developed with a view to minimising the amount of land disturbed at any one time. The strategic approach to progressive rehabilitation of landforms and final decommissioning of the Project should be described with particular regard to the impacts in the short, medium and long-term timeframes. The consistency of the approach with relevant guidelines and the results of recent research should be described. Relevant documents to be considered for the mine include:

- *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland* (DME, 1995) and

- 
- *Final Report Post Mining Landscape Parameters for Erosion and Water Quality Control*, C4011, ACARP (1998).

The methods to be used for the mine, including backfilling, covering, re-contouring, topsoil handling and revegetation, should be described. However, a description of erosion and sediment control should be addressed in section 3.2.4.2. Any proposals to disturb land that would impede or divert overland flow or waterways, and any subsequent reinstatement, during construction or operations should be first described in this section. However, the potential impacts of interfering with flow on the quantity and quality of water resources should be assessed in section 3.4. Also, the final drainage and seepage control systems and any long-term monitoring plans should be described. Consideration should be given to the use of threatened plant species during any landscaping and revegetation.


Proposals should be provided to divert creeks during construction or operations, and, if applicable, for the reinstatement of the creeks. Relevant documents in relation to stream diversions are:

- *Final Report – Maintenance of Geomorphic Processes in Bowen Basin River Diversions* C8030, ACARP (May 2000) and
- *Final Report – Monitoring Geomorphic Processes in Bowen Basin River Diversions* C9068, ACARP (January 2001).

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

In addition to assessing the operational phase of land disturbance, the EIS should address the ultimate changes following implementation of the decommissioning and rehabilitation plan described in section 2.6. The EIS should detail the proposed long-term changes that will occur to the land after mining ceases compared to the situation before mining commences. Those changes should be illustrated on maps at a suitable scale and with contours at intervals sufficient to assess the likely drainage pattern for ground and surface waters (though the assessment of the impacts on drainage and water quality should be provided in the water resources section of the EIS). The mitigation measures for land disturbance to be used on decommissioning the site should be assessed in sufficient detail to decide their feasibility. In particular, the EIS should address the long-term stability of final voids and spoil dumps, safety of access to the site after surrender of the lease, and the residual risks that will be transferred to the subsequent landholder.

Rehabilitation success criteria for land disturbance should be proposed in this section while rehabilitation success criteria for revegetation should be proposed in the section on nature conservation.



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. A description of erosion and sediment control could be deferred until section 7.

Information should be provided regarding decommissioning of any plant site, removal of processing plant, rehabilitation of 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 should consider the possibility that significant fossil specimens (such as of dinosaurs or their tracks) may be uncovered during construction/operations and propose strategies for protecting the specimens and alerting the Queensland Museum to the find.

### **3.2.7.2 Potential impacts and mitigation measures**

The EIS should contain strategies aimed at minimising the amount of land disturbed at any one time. The strategic approach to progressive rehabilitation and final decommissioning should be described. The consistency of the approach with relevant guidelines and the results of recent research should be described.


Management of all dams, roads, rail, electricity and other infrastructure during construction operation and decommissioning phases should be described in detail.

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

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

Proposed decommissioning of Project operations should be described in detail, including consolidation, revegetation, fencing, and monitoring. Discussion of any decommissioning works should address rehabilitation of concrete footings and foundations, hard stand areas and storage tanks (including any potential for reuse of these facilities).

A description of topsoil management should consider transport, storage and replacement of topsoil to disturbed areas. The topsoil management should also outline how soil from Good Quality Agricultural Land will be best utilised. The minimisation of topsoil storage times (to reduce fertility degradation) should also be



addressed. Erosion and sediment control measures should be described, particularly in relation to the management of sodic and saline overburden material.

### **3.2.8 Land contamination**

#### **3.2.8.1 Description of environmental values**

The EIS should describe the possible contamination of land from aspects of the Project 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 Queensland *Environmental Protection Act 1994*) should be addressed. Methods proposed for preventing, recording, containing and remediating any contaminated land should be outlined. Intentions should be stated concerning the classification (in terms of the Queensland Contaminated Land Register) of land contamination on the land, processing plant site and product storage areas after the Project completion.

A Preliminary Site Investigation (PSI) of the site consistent with the EPA's *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* should be undertaken to determine background contamination levels. The results of the PSI should be summarised in the EIS and provided in detail in an appendix.

If the results of the PSI indicate potential or actual contamination, a detailed site investigation progressively managed in accordance with the stages outlined in Appendix 5 of the EPA's *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* should be undertaken.

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

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

The EIS should address management of any existing or potentially contaminated land in addition to preventing and managing land contamination resulting from project activities. The *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* can be downloaded from the EPA website at: [www.epa.qld.gov.au/environment/business/contaminated](http://www.epa.qld.gov.au/environment/business/contaminated)). Proponents should refer study proposals to the EPA for review prior to commencement (Consult with the Contaminated Land Section in the Queensland EPA).

### 3.2.8.2 Potential impacts and mitigation measures

A strategy for managing potential contamination on those properties, which are listed on the EMR/CLR, should be developed and submitted to the EPA's Contaminated Land Unit, prior to commencement of the Project.

The EIS should discuss the management of any contaminated land and potential for contamination from construction, commissioning and operation, in accordance with EPA's *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* (1998) and the *National Environment Protection (Assessment of Site Contamination) Measure* 1999.

The EIS should also describe the possible contamination of land from aspects of the Project, including waste, reject coal, overburden, coal washing plant and spills at chemical and fuel storage and handling areas.

If the assessment of the mine wastes determines that there is a potential for acid rock drainage to occur at the project site(s) then strategies and methods for the effective management of potentially acid-forming materials should be provided. The strategies and methods should be referenced to Best Practices as outlined in the contemporary literature on this subject.

This section should describe strategies and methods to be used to prevent and manage any land contamination resulting from the Project, including the management of any acid generation or saline impacts from the mining activities and the management of chemicals and fuels to prevent spills or leaks.


## 3.3 Waste

### 3.3.1 Description of environmental values

Waste should be defined and considered in accordance with the EP Act, and the Environmental Protection (Waste Management) Policy 2000 [EPP (Waste)] and include gas, liquid or solid, or a combination of any of them.

The EIS should identify and describe all sources of waste associated with construction, commissioning, operation and decommissioning of all components of the Project. This section should describe:

- the amount and characteristics of solid and liquid waste produced
- hazardous materials to be stored and/or used on-site, including environmental toxicity data and biodegradability
- any waste treatment process involved, including site drainage and erosion controls
- selection criteria for, and location of, likely run-off/stormwater discharge points and

- 
- specific details (using maps and plans as appropriate) of:
    - generation points
    - storage methods and facilities and
    - quantities.

The EIS should provide plans showing proposed location, site suitability, dimensions and volume of overburden dumps, coal rejects dumps and coal tailings dams, including their method of construction.

The EIS should provide details of any waste water output including:

- volume estimates of industrial and domestic effluent that will be produced at each Project site
- quality of effluent produced and
- any mobile sewerage facilities to be used.

This section should introduce and briefly describe the existing environmental values that may be affected by the project's wastes. Refer to each of the waste streams described in section 2.5.10 and provide references to more detailed descriptions of the relevant environmental values in other sections of the EIS. This section should complement other sections of the EIS by providing technical details of waste treatment and minimisation, with proposed emission, discharge and disposal criteria, while other sections describe how those emissions, discharges and disposals would impact on the relevant environmental values. The purpose of this format is to concentrate the technical information on waste management into one section in order to facilitate its transfer into the EM Plan.

### **3.3.2 Potential impacts and mitigation measures**

The purpose of this section is to bring together a description of the preferred methods (and discuss any alternatives) to be used to deal with waste streams and outline their impacts. The full description of the magnitude and nature of impacts on particular environmental values due to the management of waste should be provided in the relevant sections of part 3 of the EIS. This section defines and describes the objectives and practical measures for protecting or enhancing environmental values from impacts by wastes, describes how nominated quantitative standards and indicators may be achieved for waste management, and how the achievement of the objectives will be monitored, audited and managed.

The EIS should assess the potential impact of waste output as well as existing waste disposal infrastructure. Methods to prevent seepage and contamination should be given. As part of the description, and unless issues related to excavated waste have been addressed in section 3.2 (in which case reference should be made to the appropriate subsection), this section should provide details of each waste in terms of:

- the methods used for dewatering tailings, and the methods proposed to be used for transporting and for storing coarse rejects and tailings for permanent disposal
- the impacts of storm events on the capacity of waste containment systems (e.g. site bunding/stormwater management and tailings dams)
- operational handling and fate of all wastes including storage
- on-site treatment methods proposed for the wastes
- proposed discharge/disposal criteria for liquid and solid waste
- 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, including extent of use of local government facilities
- the potential level of impact on environmental values
- methods proposed to recycle waste oil and waste oil containers
- measures to ensure stability of the mine dumps and impoundments
- methods to prevent seepage and contamination of groundwater from stockpiles and/or mine dumps
- how the facilities required for the collection, storage and disposal of any waste originating from the mining lease will minimise the potential for the attraction of vermin and insects
- market demand for recyclable waste (where appropriate)
- proposed waste minimisation techniques and processes and
- decommissioning of the site.


Having regard for the Environmental Protection (Waste) Policy 2000 (EPP(Waste)), the EIS should 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 should be addressed.

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

Details on natural resource use efficiency (e.g. energy and water), integrated processing design, any co-generation of power and by-product reuse as shown in a material/energy flow analysis are required.

## 3.4 Water resources

### 3.4.1 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 *Environmental Protection Act 1994*, *Environmental Protection (Water) Policy 1997* EPP (Water) and *Australia and New Zealand Environment Conservation Council (ANZECC) 2000*, the *National Water Quality Management Strategy (NWQMS)*, the EPA Guideline: *Establishing draft environmental values and water quality objectives* and the *Queensland Water Quality Guidelines 2006*. The definition of waters in the EPP (Water) includes the bed and banks of waters, so this section should address impacts on sediments as well as the water column.

Where a licence or permit will be required under the *Water Act 2000* to take or interfere with the flow of water, this section of the EIS should provide sufficient information for a decision to be made on the application. A dam failure impact assessment should be carried out for any proposed dams that trigger the need of such assessment under the *Water Act 2000*.

The process for water allocation and water discharge should be developed in consultation with the EPA and NRW. Consideration should also be given to the *Water Allocation and Management Plan (Fitzroy Basin) 1999* and the *Fitzroy Basin Operations Plan, 2003*. The current and proposed groundwater management rules must also be considered through discussions with NRW.


Similarly, waterway barrier works may need approval under the *Fisheries Act 1994*, and if so should be addressed in the EIS.

### **3.4.2 Surface waterways**

#### **3.4.2.1 Description of environmental values**

A description should be given of the surface watercourses and their quality and quantity in the area affected by the Project with an outline of the significance of these watercourses to the river catchment system in which they occur. Details provided should include a description of existing surface drainage patterns, and flows in major streams and wetlands. Also provide details of the likelihood of flooding, history of flooding including extent, levels and frequency, and a description of present and potential water uses downstream of the areas affected by the Project. Flood studies should include a range of annual exceedance probabilities for affected waterways, based on observed data if available or use appropriate modelling techniques and conservative assumptions if there are no suitable observations. The flood modelling assessment should include local flooding due to short duration events from contributing catchments on site, as well as larger scale regional flooding including waterways downstream.

The EIS should provide a description, with photographic evidence, of the geomorphic condition of any watercourses likely to be affected by disturbance or stream



diversion. The results of this description should form the basis for the planning and subsequent monitoring of rehabilitation of the watercourses during or after the operation of the 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 Project and at a suitable reference site(s), consistent with the requirements mentioned in the EPA's *Queensland Water Quality Guidelines 2006*. Complementary stream-flow data should also be obtained from historical records (if available) to aid in interpretation.

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

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


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

#### **3.4.2.2 Potential impacts and mitigation measures**

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

The hydrological impacts of the Project should be assessed, particularly with regard to stream diversions, levees, subsidence, 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 should be provided and illustrated with maps.

The potential for water discharges to ultimately impact on the marine areas and on the Great Barrier Reef should be assessed.



Quality characteristics discussed should be those appropriate to the downstream and upstream water uses and environmental values that may be affected. Chemical and physical properties of any waste water, drainage from any acid forming rock and contaminated stormwater (including concentrations of constituents) at the point of entering natural surface waters should be discussed along with potential adverse impacts of these discharges e.g. chemical and physical stressors and toxicity of effluent constituents to flora and fauna.

Mine activities that may affect surface waters are changes in the landform, run-off from waste rock dumps and spoil dumps, runoff from other disturbed areas including the infrastructure areas, and impacts of the voids left after mining ceases. The following investigations should be undertaken to quantify the expected or potential impacts on surface waters and groundwater:

- planning of “clean water – dirty water” systems to divert clean runoff around disturbed areas and direct run-off from disturbed areas to retention dams for treatment and
- development of detailed water and stormwater management plans to ensure water released from the project sites (if any) meets the licensed discharge limits in the environmental authority, and the water quality objectives of the receiving stream.


Modelling of the water quality and ultimate equilibrium water levels in final voids to determine whether there is any likelihood of a permanent impact on the quality of surface water resources in the region.

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

The effects should be investigated of subsidence on existing regulated dams and licenced dams, and proposals put forward to ensure that the integrity of existing structures is preserved, and that the release of contaminants to the environment is prevented.

The need or otherwise for licensing of any dams (including referable dams) or creek diversions, under the *Water Act 2000* should be discussed. Water allocation and



water sources should be established in consultation with Department of Natural Resources and Water.

The EIS should consider that site water and regulated dam storages be designed from the findings of a mine water balance model that adequately represents all sources of mine water contributing to hazardous mine water dams, mine pits, and operations of the mine water management system. The mine water management system must have sufficient storage capacity, transfer capacity, and transfer operations to ensure that there would be no unauthorised discharges of mine water for wet season rainfall events up to a 1 in 10 year ARI wet season. The assessment must be undertaken with an appropriate period of climate data that includes representation of 1 in 10 year ARI wet season rainfall. All key assumptions and input parameters of the mine water balance model must be documented in the EIS.

The EIS should consider the cumulative impacts of salinity, sediment and trace metals from the mine site discharges that may be discharging into the sandy beds of the waterways and associated ecological systems.

The proponent must detail how the water management system has been designed to be dynamic to manage the extreme weather patterns (wet seasons/drought conditions).

The proponent must identify if open pits will be constructed and other mining operations be undertaken within the flood plain and specify the distance of open pits/voids to waterways.


The proponent must detail any levee construction designs for flood mitigation and the decommissioning of such levees.

The proponent should specify the compaction methods of backfilled voids within flood plain.

The proponent must develop and implement a monitoring methodology to establish a sample set of background quality parameters for salinity, sediment, pH and trace metals.

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

*The ANZECC 2000 National Water Quality Management Strategy, Australian Water Quality Guidelines for Fresh and Marine Waters, 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 should be discussed with particular reference to sediment, acidity, salinity, turbidity and other emissions of a hazardous or toxic nature to human health, flora or fauna.

Where it is proposed that creeks will be diverted, the EIS should detail how rehabilitation will affect both the physical and ecological condition of the creek's bed and banks and the quality of water in it.

Proposals should be provided to divert creeks during construction or operations, and, if applicable, for the reinstatement of the creeks. Relevant documents in relation to stream diversions are:

- *Draft Interim Arrangements for Stream Diversions – Central Queensland Mining Industry, DNR (1999)*
- *Final Report – Maintenance of Geomorphic Processes in Bowen Basin River Diversions C8030, ACARP (May 2000) and*
- *Final Report – Monitoring Geomorphic Processes in Bowen Basin River Diversions C9068, ACARP (January 2001).*

The EIS should describe the monitoring that will be undertaken after decommissioning, and who will have responsibility for management measures and corrective action, to ensure that rehabilitated creeks do not degrade.


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

Key water management strategy objectives include:

- 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
- minimisation of impacts on flooding levels and frequencies both upstream and downstream of the Project.

### **3.4.3 Groundwater**

#### **3.4.3.1 Description of environmental values**



The EIS should include an assessment of the potential environmental harm caused by the proposal to local groundwater resources. This assessment should include an assessment of the quality, quantity and significance of groundwater in the Project and neighbouring areas.

The assessment should include a survey of existing groundwater supply facilities (bores, wells, or excavations) within the area of any potential environmental harm.

Groundwater assessment should consider cumulative impacts of existing mining operations in the impacts of groundwater cones of depression.

Groundwater modelling must consider the effects of operations on existing groundwater harvester and the time frames associated with replenishment of the resource and potential new resource users. The information to be gathered for analysis is to include:

location;

- pumping parameters and yield at nearby bores
- 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 should include reference to:

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

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

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

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

#### **3.4.3.2 Potential impacts and mitigation measures**

The EIS should include an assessment of the potential environmental harm caused by the proposal to local groundwater resources as expressed in the EPP (Water).

The impact assessment should define the extent of the area within which groundwater resources are likely to be affected by the proposed operations and any final void(s) left after mining ceases, 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 proposal should be described.

An assessment should 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 and any final void(s) left after mining ceases.

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

Water management controls should be described, addressing groundwater quality and quantity. The beneficial (environmental, production and recreational) use of nearby groundwater should be discussed. Monitoring programs should be described which will assess the effectiveness of management strategies for protecting water quality during the construction, operation and decommissioning of the proposal.

## **3.5 Nature conservation**

### **3.5.1 Description of environmental values**

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

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

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

- aquatic and terrestrial ecosystems.

A discussion should be presented on the nature conservation values of the areas likely to be affected by the proposal. The flora and fauna communities which are rare or threatened, environmentally sensitive localities including waterways, riparian zone, old growth indigenous forests, wilderness and habitat corridors should be described. The description should include a plant species list, a vegetation map at appropriate scale and an assessment of the significance of native vegetation, from a local and regional and state perspective. The description should indicate any areas of state or regional significance identified in an approved Biodiversity Planning Assessment (BPA) produced by the EPA (e.g. see the *draft Regional Nature Conservation Strategy for SE Qld 2001-2006*).

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

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

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

- important habitats of species listed under the *Nature Conservation Act 1992* and/or *EPBC Act 1999* as presumed extinct, endangered, vulnerable or rare
- regional ecosystems listed as 'endangered' or 'of concern' under State legislation, and/or ecosystems listed as presumed extinct, endangered or vulnerable under the *EPBC Act 1999*
- good representative examples of remnant regional ecosystems or regional ecosystems which are described as having representation in the protected area estate as defined in the *Regional Ecosystems Description Database (REDD)* available at EPA's website
- sites listed under international treaties such as Ramsar wetlands and World Heritage areas
- sites containing near threatened or bio-regionally significant species or essential, viable habitat for near threatened or bio-regionally significant species

- sites in, or adjacent to, areas containing important resting, feeding or breeding sites for migratory species of conservation concern listed under the Convention of Migratory Species of Wild Animals, and/or bilateral agreements between Australia and Japan (JAMBA) and between Australia and China (CAMBA)
- sites containing common species which represent a distributional limit and are of scientific value or which contains feeding, breeding, resting areas for populations of echidna, koala, platypus and other species of special cultural significance
- 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 NC Act 1992 or are under consideration for proclamation and/ or
- areas of major interest, or critical habitat declared under the NC1992 or high nature conservation value areas or areas vulnerable to land degradation under the VM Act 1999.

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

The Queensland VM Act 1999 and the findings of any regional vegetation management plan should also be referenced.

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

Key flora and fauna indicators should be identified for future ongoing monitoring. Surveys of flora and fauna need to be conducted throughout the year to reflect seasonal variation in communities and to identify migratory species.

The EPA's guidelines for "*Fauna and Flora Assessment in EIA*" provide further details.

### **3.5.2 Terrestrial flora**

### 3.5.2.1 Description of environmental values

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

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

Vegetation mapping should provide mapping for all relevant project sites including new transport infrastructure, and irrigation land if relevant. Adjacent areas should also be mapped to illustrate interconnectivity. Mapping should also illustrate any larger scale interconnections between areas of remnant or regrowth vegetation where the project site includes a corridor connecting those other areas.

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

- location and extent of vegetation types using the EPA's regional ecosystem type descriptions in accordance with the Regional Ecosystem Description Database [REDD] available at the EPA's website
- location of vegetation types of conservation significance based on EPA's regional ecosystem types and occurrence of species listed as protected plants under the *Nature Conservation (Wildlife) Regulation 1994* and subsequent amendments, as well as areas subject to the VM Act 1999
- the current extent (bioregional and catchment) of protected vegetation types of conservation significance within the protected area estate (national parks, conservation parks, resource reserves, nature refuges)
- any plant communities of cultural, commercial or recreational significance should be identified and
- location and abundance of any exotic or weed species.

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

- site data should be recorded in a form compatible with the Queensland Herbarium CORVEG database

- the minimum site size should be 10 by 50 metres
- a complete list of species present at each site should be recorded
- the relative abundance of plant species present should be recorded
- any plant species of conservation, cultural, commercial or recreational significance should be identified and
- specimens of species listed as protected plants under the *Nature Conservation (Wildlife) Regulation 1994*, other than common species, are to be submitted to the Queensland Herbarium for identification and entry into the HERBRECS database.

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

### **3.5.2.2 Potential impacts and mitigation measures**

This section should discuss all foreseen direct and indirect effects on terrestrial flora and the potential level of environmental impact identified. Action plans for protecting rare or threatened species and vegetation types identified as having high conservation value should be described, and any obligations imposed by Queensland or Australian Government biodiversity protection legislation or policy should be discussed.

Construction and operation of the Project involving clearing, salvaging or removal of vegetation should be described, and indirect impacts on vegetation not cleared should be discussed.

Impacts during construction and operation of the Project should be assessed. Short-term and long-term durations should be considered.

Measures to mitigate the impacts of the Project on vegetation types identified as having high conservation values, listed species and sensitive habitat or the inhibition of propagation should be described. This should also include the identification of potential offset areas, in an "Offset Strategy" to compensate for any loss of vegetation.

With regard to the Project area, this section should include:

- the significance of impacts at a local, catchment, bioregional, state or national levels
- impact on any plants of potential or recognised environmental or economic significance
- a discussion of the ability of identified stands of vegetation to withstand any increased pressure resulting from the Project and identify measures proposed to mitigate impacts

- a description of the methods to ensure rapid rehabilitation of disturbed areas following construction, including the species chosen for revegetation which should be consistent with the surrounding associations. Details of any post construction monitoring programs and what benchmarks would be used for review of monitoring should be included
- a description of methods of minimising the potential for the introduction and/or spread of weeds or plant disease, including:
  - identification of the origin of construction materials, machinery and equipment
  - the need for vehicle and machinery wash-down and any other hygiene protocols
  - staff/operator education programs and
  - determination of the potential for the introduction of or facilitation of exotic, non-indigenous and noxious plants.
- a weed management plan should be included in an Environmental Management Plan (EM Plan), to be developed in consultation with local government environmental officers, to cover construction, rehabilitation and operation periods.

### **3.5.3 Terrestrial fauna**

#### **3.5.3.1 Description of environmental values**

The terrestrial and riparian fauna occurring in the areas affected by the proposal should be described, noting the broad distribution patterns in relation to vegetation, topography and substrate. The description of the fauna present or likely to be present in the area should include that supports the scale of vegetation mapping (i.e. 1:10,000 or better):

- 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 occurrence of fauna of conservation significance should be cross-referenced to mapped vegetation units or habitats, which can then be used in section 3.4 to propose areas to be protected.

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

### 3.5.3.2 Potential impacts and mitigation measures

This section should discuss all foreseen direct and indirect effects on terrestrial fauna. Strategies for protecting rare or threatened species should be described, and any obligations imposed by Queensland or Australian Government threatened species legislation or policy should be discussed. Impacts during construction and operation of the Project should be assessed. Short and long-term durations should be considered. Measures to mitigate the impact on habitat or the inhibition of normal movement, breeding or feeding patterns, and change to food chains should be described. Any provision for buffer zones and movement corridors, or special provisions for migratory or nomadic animals should be discussed.

With regard to terrestrial and riparian fauna, the assessment of potential impact should consider:

- impacts the Project may have on terrestrial fauna, relevant wildlife habitat and other fauna conservation values, including:
  - direct (or short term) and indirect (or long-term) impacts due to loss of range/habitat, food supply, nest sites, breeding/recruiting potential or movement corridors
  - cumulative effects of direct and indirect impacts
  - impacts on rare and threatened or otherwise noteworthy animal species
  - threatening processes leading to progressive loss and
  - identification of the conservation importance of identified populations at the regional, state and national levels.
- measures to minimise wildlife capture and mortality during construction and operation
- details of the methodologies that would be used to avoid injuries to livestock and native fauna as a result of the Project's construction and operational works, and if accidental injuries should occur the methodologies to assess and handle injuries
- strategies for protecting any rare or threatened species should be described, and any obligations imposed by State or Commonwealth legislation or policy or international treaty obligations (i.e. JAMBA, CAMBA) should be discussed
- strategies for collecting and preserving any significant fossils should be described
- rehabilitation of disturbed areas should incorporate, where appropriate, provision of nest hollows and ground litter
- methods for minimising the introduction of feral animals, and other exotic fauna such as declared pest ant species (fire ants and yellow crazy ants) and
- review of control measures to prevent increases in local populations and spread of biting insect species of pest and health significance associated with construction activities and disposal of construction wastes.

## **3.5.4 Aquatic biology**

### **3.5.4.1 Description of environmental values**

The aquatic flora and fauna occurring in the areas affected by the Project should be described, including any biota surveys and/or studies previously been conducted in and downstream of the Project area, the aquatic flora and fauna occurring in the areas affected by the proposal should be described, noting the patterns and distribution in the waterways and associated wetland and lacustrine environments. The description of the fauna and flora present or likely to be present in the area should include:

- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways within the affected area, and/or those in any associated lacustrine environment
- any rare or threatened species and its habitat
- aquatic and benthic substrate
- aquatic plants and
- habitat downstream of the project or potentially impacted due to currents in associated lacustrine environments.


### **3.5.4.2 Potential impacts and mitigation measures**

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

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

The discussion should cover all likely direct and indirect environmental harm due to the project on flora and fauna particularly sensitive areas.

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



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

Weed management strategies are required for containing existing weed species and ensuring no new declared plants are introduced to the area. The study should develop strategies to ensure that the project does not contribute to increased encroachment of a feral animal species.

Reference should be made to the local government authority's pest management plan when determining control strategies. The strategies for both aquatic flora and fauna should be discussed in the main body of the EIS and provided in a working form in a Pest Management Plan as part of the overall EM Plan for the project.

## 3.6 Air quality

This section describes the existing air environment that may be affected by the proposal. The following topics may be addressed (note - the topics are not an exhaustive treatment of all possible air or impacts).

### 3.6.1 Air


#### 3.6.1.1 Description of environmental values

A description of the existing air shed environment should be provided having regard for particulates and gaseous and odorous compounds. The background levels and sources of suspended particulates, oxides of sulphur (SO<sub>x</sub>) and nitrogen (NO<sub>x</sub>), and any other relevant constituent, whether major or minor, of the air environment that may be affected by the proposal should be discussed.

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

#### 3.6.1.2 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 should be




submitted on the use of new technologies to reduce air emissions from the stack(s) or other emission sources.

The objectives for air emissions should be stated in respect of relevant standards (ambient and ground level concentrations), relevant emission guidelines, and any relevant legislation, and the emissions modelled using a recognised atmospheric dispersion model.

The proposed levels of emissions should be compared with the *National Environmental Protection Measures (NEPM) for ambient air quality (1998)* and the *Environmental Protection (Air) Policy (1998)(EPP (Air))*.

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

- air quality predictions should be compared to the relevant goals in the National Environmental Protection Council (Ambient Air Quality) Measure and the EPP (Air) goals
- provide an air emission inventory of the proposed site for all potential point, line, area and volume sources including fugitive emissions. Provide a complete list of emissions to the atmosphere including SO<sub>x</sub>, NO<sub>x</sub>, VOC, CO, CO<sub>2</sub>, particulates (including dust), PM<sub>10</sub>, trace metals, odours and any toxic, persistent and/or hazardous substances
- a description of the pollution control equipment and pollution control techniques to be employed on the premises and the features of the proposal designed to suppress or minimise emissions, including dusts and odours
- a description of the back up measures to be incorporated that will act in the event of failure of primary measures to minimise the likelihood of plant upsets and adverse air impacts
- the assessment of proposed levels of emissions of dust, fumes and odours should include emissions during both normal and upset conditions. Consideration should be given to the range of potential upset condition scenarios and the air emissions that may be generated as a result
- where there is no single atmospheric dispersion model that is able to handle the different atmospheric dispersion characteristics exhibited in the proposal area (e.g. sea breezes, strong convection, terrain features, temperature inversions and pollutant re-circulation), a combination of acceptable models will need to be applied

- 
- the limitations and accuracy of the applied atmospheric dispersion models should be discussed. The air quality modelling results should be discussed in light of the limitations and accuracy of the applied models
  - air shed management and the contribution of the proposal to air shed capacity in view of existing and future users of the air shed for assimilation and dispersion of emissions
  - If odour is an issue, conduct odour impact assessment using the criteria described in the Queensland EPA Guideline Odour Impact Assessment from Developments. The guideline sets out various approaches to assess potential impacts from developments proposals. Guidance provides the use of air dispersion modelling as a tool to predict ground level odour concentrations and comparison must be made with guideline values to determine the likelihood of adverse odour impacts and
  - Any modelled air quality concentrations at the most exposed existing or likely future off-site sensitive receptors must be compared with the appropriate national and international ambient air quality standards including the Environmental Protection (Air) Policy 1997 and the National Environmental Protection Council (Ambient Air Quality) Measure.

Where there is no single atmospheric dispersion model that is able to handle the different atmospheric dispersion characteristics exhibited in the proposal area (e.g. sea breezes, strong convection, terrain features, temperature inversions and pollutant re-circulation), a combination of acceptable models will need to be applied.

## 3.7 Climate change

### 3.7.1 Greenhouse gas emissions and abatement


#### 3.7.1.1 Description of environmental values

This section of the EIS should:

- provide an inventory of projected annual emissions for each relevant greenhouse gas, with total emissions expressed in 'CO<sub>2</sub> equivalent' terms
- estimate emissions from upstream activities associated with the 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) can be used as a reference source for emission estimates and supplemented by other sources where practicable and appropriate. Coal mining projects should 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.

#### 3.7.2.2 Potential impacts and mitigation measures



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

- a description of the proposed measures (alternatives and preferred) to avoid and/or minimise greenhouse gas emissions directly resulting from activities of the project, including such activities as transportation of products and consumables, and energy use by the project
- an assessment of how the preferred measures minimise emissions and achieve energy efficiency
- a comparison of how the preferred measures for emission controls and energy consumption with best practice environmental management in the relevant sector of industry 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 environmental management plan in the EIS should include a specific module to address greenhouse abatement. That module should include consideration of the following:

- 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.

## 3.8 Noise and vibration

### 3.8.1 Description of environmental values

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

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

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

The following guidelines and standards should be considered:

- AS1055.1 and AS1055.2, 1997. "Description and Measurement of Environment Noise, Recognised Sleep Disturbance Criteria", British Standards BS7385, part 2, 1993
- "Evaluation and Measurement for Vibration in Buildings, Guide to Damage Levels from Ground-borne Vibration", BS6472, 1992 - Evaluation of Human Exposure to Vibration in Buildings (1Hz to 80 Hz)
- Australian/New Zealand Standard AS/NZS 2107-2000, Acoustics – "Recommended Design Sound Levels and Reverberation Times for Building Interiors" and
- "World Health Organisation Guidelines for Community Noise, 1999".

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

### 3.8.2 Potential impacts and mitigation measures

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

The EIS should describe the modelled impacts of noise and vibration generated by all components of the Project during the construction and operational phases.

Information, including mapped noise contours from a suitable acoustic model, should be submitted based on the proposed generation of noise. The potential environmental harm of noise and vibration at all potentially sensitive places, in particular, any place of work or residence should be quantified in terms of objectives, standards and indicators to be achieved and measurable indicators. Particular consideration should be given to emissions of low-frequency noise; that is, noise with components below 200Hz.

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

Information should be supplied on blasting which might cause ground vibration or fly rock on or adjacent to, the site with particular attention given to places of work, residence, recreation, worship and general amenity. The magnitude, duration and frequency of any vibration should be discussed. A discussion should be provided of measures to prevent or minimise environmental nuisance and harm. Blasting noise and vibration limits are provided in section 61 of the Environmental Protection Regulation 1998. Reference should also be made to the “EPA Guideline: Noise and Vibration from Blasting”.

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

Any potential for ground vibration effects on underground pipelines and telecommunication lines should be examined.

## 3.9 Transport

### 3.9.1 Description of environmental values

The EIS should describe (including with the use of maps and data tables) transport methods and routes for all aspects of the transport task associated with the construction and operation of the Project. The description must address the use of existing facilities and all requirements for the construction, upgrading or relocation of any transport related infrastructure. Information should include:

- existing traffic volumes on the proposed transport routes
- volumes, tonnage, and composition of construction inputs and production outputs
- hazardous or dangerous material that may be transported
- method of transport (e.g. sea, rail, road) and the type of vehicles most likely to be used for transport
- number and type of workforce traffic and service vehicles
- number of trips generated (both light and heavy vehicles)
- origin and destination of inputs and outputs and transport routes proposed (with the use of maps)
- details of over-dimension or excess mass loads
- timing and duration of transport activities.

The EIS should clearly and fully describe transport information for all stages of the Project including:


- all requirements for the construction, upgrading or re-location of any transport-related infrastructure, including any need for increased road maintenance and
- any new access requirements to state-controlled or local government roads.

This section should discuss how transport elements of the Project relate to Queensland Transport's existing transport strategies for the region and the future infrastructure needs of this area as presented in local and state government documentation.

The EIS should provide sufficient details to allow the Department of Main Roads (DMR), Queensland Rail, Queensland Transport and Department of Transport and Regional Services (DoTARS) to ascertain compliance with legislative and design requirements to ensure the safe and efficient operation of state-controlled roads, railways and airports are not compromised and the integrity of preserved transport corridors is protected.

This section should provide sufficient information for an assessment of how the state-controlled and local government road and the rail networks will be affected by the Project.


### 3.9.2 Potential impacts and mitigation measures



Details of the relative impacts generated by each of the Project's components to existing transport infrastructure during construction, operation and decommissioning phases should be provided.

An assessment of impacts to existing transport infrastructure associated with Project activities should be provided and include the following:

- the likely impacts and mitigation strategies of any new roads or road realignments that are required as a result of the Project
- the likely impacts and mitigation strategies of increased traffic on local and regional road networks (with appropriate directional distributions), with reference to:
  - volumes of project inputs and outputs (types and quantities), vehicles, their origin, destination and routes used for transport, including plant, raw materials, wastes, hazardous materials, finished products
  - volume of traffic generated by workforce personnel, visitors and service vehicles, method of transport (vehicle type and number), anticipated times at which movements may occur and likely routes
  - details of heavy and oversize/indivisible loads (including types and composition), and the proposed transport routes including waterway crossings
  - road safety issues, including safe access to and from construction sites and school bus routes within the Project area (e.g. consideration of the need for turning lanes, improved sight lines, waiting areas, off-road parking locations)
  - reduced efficiency of traffic flows or intersections along key routes, especially during construction
  - additional wear or reduced life of pavements requiring additional or accelerated rehabilitation and maintenance, if any
  - changes in waterway areas/catchment and drainage lines which may impact on road operations and assets (particularly rail crossing), not addressed in Section 3.4
  - operation of existing bus routes and services
  - risks of driver fatigue of workers driving between the project to regional destinations
  - proposed traffic control and traffic management
  - public transport requirements of the development
  - steps to prevent public access to construction access ways that are not public roads.
- specific issues related to construction phase activities, including:
  - site depot location and access
  - construction traffic on local road networks, daily movement patterns, possible road closures and emergency access, especially in rural and urban residential areas
  - methods to be adopted to avoid obstruction to other road users during construction.



This section should detail the impacts of all road and rail construction and maintenance. An evaluation should also be made of the impact of the Project on existing roads, railways, powerlines, pipelines, telecommunication lines, waterways and stormwater flow-paths. This evaluation should include any potential requirements to reschedule existing infrastructure maintenance programs.

This section should identify impacts to the state-controlled road and rail networks and local government road networks and indicate clearly the corrective measures necessary to address adverse road impacts including a wet weather management strategy. An estimate of costs involved in corrective measures should also be detailed. Any upgrades to existing transport infrastructure, and associated costs, should be discussed.

Special reference should be made to any relationship between Project road works and works proposed in the current Road Implementation Program of the DMR. Road infrastructure should be described and assessed according to DMR's "Guidelines for Assessment of Road Impacts of Development Projects (April 2006)".

This section should address the impact of traffic generated by the Project on both the local government and state-controlled road network in terms of adverse road impacts including pavement degradation, intersection and road network performance, road safety and other environmental impacts.

Strategies for managing the impacts of the Project on road safety, including access for emergency response vehicles especially with regard to proposed road diversions, should be presented.

The impacts of increased traffic on existing school bus routes and services should be discussed.


Necessary measures to eliminate or minimise the impact on the operation of these services and any infrastructure proposed (such as bus pull-off areas) to maintain current safety standards should be presented.

A comparison of the traffic situation and road conditions with and without the Project should be shown.

## 3.10 Cultural heritage

### 3.10.1 Description of environmental values

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



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

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

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

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

The scope of the archaeological investigation should be based upon the results of the desktop analysis. The archaeological investigation is to be conducted by an appropriately qualified person, as required by the *Queensland Heritage Act 1992*, and should address all types of historical cultural heritage places located within the project area (i.e. built, archaeological and cultural landscape values).

The discovery and protection of any previously unidentified archaeological artefacts or archaeological places during the course of the historical cultural heritage study must comply with Part 9 of the *Queensland Heritage Act 1992*.


### **3.10.2 Potential impacts and mitigation measures**

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

#### **3.10.2.1 Indigenous cultural heritage**

The potential impacts on indigenous cultural heritage values in the vicinity of the project must be managed under a cultural heritage management plan (CHMP) developed and approved under Part 7 of the *Aboriginal Cultural Heritage Act 2003*. Development of the CHMP should follow the guidelines gazetted under section 85 of the *Aboriginal Cultural Heritage Act 2003*.

The CHMP will provide a process for the management of cultural heritage places both identified and sub-surface at the project sites. It is usual practice for the CHMP



to be based on information contained in archaeological and/or anthropological reports on the survey area and cultural reports and/or information from affiliated traditional owners.

The CHMP should address and include the following:

- a process for including Aboriginal people associated with the development areas in protection and management of indigenous cultural heritage
- processes for mitigation, management and protection of identified cultural heritage places and material in the project areas, including associated infrastructure developments, both during the construction and operational phases of the project
- provisions for the management of the accidental discovery of cultural material, including burials
- the monitoring of foundation excavations and other associated earthwork activities for possible sub-surface cultural material
- cultural awareness training or programs for project staff and
- a conflict resolution process.

The development of the CHMP should be negotiated with the lead agency for indigenous cultural heritage, the Department of Natural Resources and Water. The EPA's EIS Coordinator must be made aware of the progress of the CHMP approval process and of any related issues that should be addressed in the EIS assessment report.

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

Any potential impacts on non-indigenous historical cultural heritage values and their avoidance or mitigation should also be addressed in a management plan. The historical heritage management plan will specifically address identified values and provide a process for managing yet undiscovered values should they become apparent during development of the project.

If one is required, the development of a historical heritage management plan should be negotiated with the lead agency (the Cultural Heritage Branch, Environmental Protection Agency) and any other relevant stakeholders.

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

- processes for the mitigation, management and protection of identified historical cultural heritage values during excavations of the construction, operational, rehabilitation and decommissioning phases of the project

- processes for reporting, as required by section 89 of the *Queensland Heritage Act 1992*, the discovery of any archaeological artefact not previously identified in the historical cultural heritage study
- procedures for the collection of any artefact material, including appropriate storage and conservation
- historical cultural heritage awareness training or programs for project staff
- a report is to be produced detailing the results of the study, including:
  - results of desktop analysis
  - detail of community consultation (e.g. local historical societies) concerning:
    - places of non-indigenous cultural heritage significance and
    - opinion regarding significance of any cultural heritage places located or identified.
- results of field survey detailing:
  - all identified cultural heritage items, sites/places, landscapes and potential archaeological deposits and
  - an assessment of the significance of all cultural heritage features at a local, state and national level.

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


## 3.11 Cumulative Impacts

### 3.11.1 Description of environmental values

The cumulative impacts associated with the Project should be assessed as part of each respective environmental value. This section of the EIS should provide clear and concise summary of the cumulative impacts associated with the Project. In addition, the cumulative impacts that could occur as a consequence of the Project either from the inter-related elements of the project (if any), or from this project in conjunction with the development of other proposals that are currently under study should be considered, including the interrelationship of these impacts as they relate to particular issues (e.g. water, air, noise, cultural heritage, social, economic etc.).

### 3.11.2 Potential impacts and mitigation measures

These impacts should be considered over time or in combination with other impacts because of the scale, intensity, duration or frequency of the impacts. In particular, the requirements of any relevant State Planning Policies, Environmental Protection Policies, National Environmental Protection Measures and other strategies and



regulations should be addressed in assessing the cumulative impacts of the Project on the existing environment.

Information regarding how these cumulative impacts will be mitigated should be outlined.

## 3.12 Cross-reference

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



## 4. Social values and management of impacts

### 4.1 Social

#### 4.1.1 Description of social values

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

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


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

Describe the social values for the affected area in terms of the integrity of social conditions, including amenity and liveability, harmony and well being, sense of community, access to recreation, and access to social and community services and infrastructure.

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 within section 3.10 Cultural Heritage and Section 5 Economy.

#### 4.1.2 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 is to be carried out in consultation with affected local authorities and relevant State authorities, such as the: Isaac Regional Council; Department of Infrastructure and Planning; Department of Communities; Department of Housing; Department of Tourism, Regional Development and Industry; Department of Local Government, Sport and Recreation; Queensland Health; and Education Queensland. The assessment of impacts should describe the likely response of affected communities and identify possible beneficial and adverse impacts (both immediate and cumulative).

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

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

The social impact assessment of the project is to be carried out in consultation with the Department of Communities and the Department of Infrastructure's Social Impact Assessment team. The assessment of impacts should describe the likely response of affected communities and identify possible beneficial and adverse impacts (both immediate and cumulative). These impacts should be considered both at the regional and local level and identify measures to address the impacts by the proponent, and local and State authorities.

The EIS should address the following matters:

- include an assessment of impacts on local, district and regional residents, current land uses and existing lifestyles and enterprises
- include an assessment of impacts on local, regional 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


- include an assessment of the skills, training and employment opportunities provided by the project for indigenous people and the long-term unemployed
- the EIS should address impacts of both construction and operational workforces and associated contractors on housing demand, housing affordability, 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 at a local, regional and state scale
- the assessment of impacts should take account of relevant demographic, social, cultural and economic profiles
- identify any new skills and training to be introduced in relation to the project. Adequate provision should be made for apprenticeship and worker training schemes. If possible, the occupational skill groups required and potential skill shortages anticipated should be indicated
- provide comment on how much service revenue and work from the project (e.g. provisioning, catering and site maintenance) would be likely to flow to existing communities in the area of the project, particularly if a fly-in, fly-out workforce is proposed
- include an assessment of impacts on existing local and regional 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 proposal on local and regional residents, including land acquisition and relocation issues and property valuation and marketability, community services and recreational activities.

Discuss the potential environmental 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 proposal for future developments in the local area including constraints on surrounding land uses.

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

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



For identified impacts to social values, suggest mitigation and enhancement strategies and facilitate initial negotiations towards acceptance of these strategies. Practical monitoring regimes should also be recommended. The social impact mitigation strategies to be described in this section should pay particular attention to:

- the sourcing of the construction and operational workforce and the social and cultural implications this may have for the host community particularly if any part of the workforce is sourced from overseas
- the availability of accommodation for the project's workforce and the possible cumulative impact on the housing and rental market
- an accommodation strategy, where necessary, in consultation with relevant local and State government agencies, which will detail proposals that avoid, mitigate or offset any short and medium term adverse effects on the local housing market
- documenting the demographic changes in the profile of the region and the associated sufficiency of current infrastructure and services and
- developing a community consultation management plan that promotes an active role for impacted communities.

Proponents of projects that are likely to result in a significant increase in population of an area should consult the relevant management units of the State authorities, and summarise the results of the consultations in the EIS. The summary should discuss how the impacts of population increase on public services, particularly health and education, would be mitigated.

## 4.2 Health and safety


### 4.2.1 Description of environmental values

This section describes the existing community values for public health and safety that may be affected by the proposal. For projects proposing air emissions, and/or those with the potential to emit odours, nearby and other potentially affected populations should be identified and described. Particular attention should be paid to those sections of the population, such as children and the elderly, that are especially sensitive to environmental health factors.

### 4.2.2 Potential impacts and mitigation measures

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

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



safety of the community, workforce, suppliers and other stakeholders should be detailed in terms of health, safety, quality of life from factors such as air emissions, odour, dust and noise.

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

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



# 5. Impacts on State and Local economies and management of those impacts

## 5.1 Economy

### 5.1.1 Description of affected local and regional economies

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

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

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


### 5.1.2 Potential impacts and mitigation measures

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

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

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

- the significance of this proposal on the local and regional economic context
- the long and short-term beneficial (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 6
  - the distributional effects of the proposal including proposals to mitigate any negative impact on disadvantaged groups
  - the value of lost opportunities or gained opportunities for other economic activities anticipated in the future and
  - impacts on local property values.

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

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

## 5.2 Sustainable Development

The EIS should provide a comparative analysis of how the Project conforms to the objectives for “sustainable development” (see the “National Strategy for Ecologically Sustainable Development (1992)”, available from the Australian Government Publishing Service).

This analysis should consider the cumulative impacts (both beneficial and adverse) of the Project from a life-of-project perspective, taking into consideration the scale, intensity, duration and frequency of the impacts to demonstrate a balance between environmental integrity, social development and economic development.

This information is required to demonstrate that sustainable development aspects have been considered and incorporated during the scoping and planning of the Project.

## 6. Hazard and risk

### 6.1 Description of potential hazards

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

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

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

### 6.2 Potential impacts and mitigation measures

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

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

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

Details should be provided of:

- safeguards proposed on the transport, storage, use, handling and on-site movement of the materials to be stored on-site

- the capacity and standard of bunds to be provided around the storage tanks for classified dangerous goods and other goods likely to adversely impact upon the environment in the event of an accident and
- the procedures to prevent spillages, and the emergency plans to manage hazardous situations.

The proponent must prepare a risk management system that identifies scenarios leading to environmental harm and threatened environmental values. The risk monitoring program must address possible zones of impact to monitor for any potential environmental harm and include:

- locations for monitoring/sampling
- parameters monitored
- frequency of monitoring/sampling and
- trigger levels for each location.

The risk monitoring program must include a process that will be implemented following the exceedence of the trigger levels, including the following steps:

- evaluation of the risk associated with the exceedence in accordance with the risk treatment process and

recommend actions arising from the risk treatment evaluation which may include measures to prevent unauthorised environmental harm.

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

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



The plan should include the following components:

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

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

## 7. Environmental management plan

This section of the EIS should present a draft environmental management plan (EM Plan) for the Project addressing each of the elements of the Project. The EM Plan should be developed from, and be consistent with, the preceding information in the EIS.

The proponent must ensure that the EM plan is a stand alone document to the EIS. Commitments made in the EIS must be also transferred into the EM plan. The studies and findings of the EIS should be summarised in the EM plan to enable separation of the two documents. The EM plan should provide enough detail to allow the document to be an auditable document.

The EM plan must provide long-term rehabilitation commitments, strategies and criteria.

The EM plan must meet the requirements of s203 of the *Environmental Protection Act 1994*.

The EM Plan should provide control actions in accordance with agreed performance criteria for specified acceptable levels of environmental harm. In addition, EM should identify:

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

The aims of the EM Plan should be to provide:

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

The recommended structure of each element of the EM Plan is:

Element/issue:	Aspect of construction or operation to be managed (as it affects environmental values)
Operational Policy:	The operational policy or management objective that applies to the element
Performance Criteria:	Measurable performance criteria (outcomes) for each element of the operation
Implementation Strategy:	The strategies, tasks or action program (to nominated operational design standards) that would be implemented to achieve the performance criteria
Monitoring:	The monitoring requirements to measure actual performance (i.e. specified limits to pre-selected indicators of change)
Auditing:	The auditing requirements to demonstrate implementation of agreed construction and operation environmental management strategies and compliance with agreed performance criteria
Reporting:	Format, timing and responsibility for reporting and auditing of monitoring results
Corrective Action:	The action (options) to be implemented in case a performance requirement is not reached and the person(s) responsible for action (including staff authority and responsibility management structure).

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

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

## 8. References

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

## 9. Recommended appendices

### 9.1 Final terms of reference for the EIS

A copy of the final TOR should be included in the EIS. Where it is intended to bind appendices in a separate volume from the main body of the EIS, the TOR at least should be bound with the main body of the EIS for ease of cross-referencing. A summary, cross-referencing specific items of the TOR to the relevant section of the EIS, should also be provided in Section 3.12 Cross Reference of the EIS. For this purpose the TOR should be line numbered.

### 9.2 Development approvals

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

### 9.3 EPBC Act Report

A stand alone report addressing potential impacts of the Project on matters of national environmental significance is recommended.

### 9.4 Standard Criteria

A brief summary of the proposal's compatibility with ESD policy and other relevant policy instruments such as the standard criteria as defined by the *Environmental Protection Act 1994* should be presented. Consideration should focus on *The National Strategy for Ecologically Sustainable Development*, published by the Commonwealth Government in December 1992 (available from the Australian Government Publishing Service). Each principle should be discussed and conclusions drawn as to how the proposal conforms. A life-of-project perspective should be shown.

### 9.5 Research

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

## 9.6 Study team

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

## 9.7 Consultation report

A list of advisory agencies should be provided in a summary Consultation Report, which should also list the Australian, state and local government agencies consulted, and the individuals and groups of stakeholders consulted. A summary of the issues raised by these groups, and the means by which the issues have been addressed, should be provided in the text of the EIS.

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

Information about identifying affected parties (as defined by the EPBC Act) and interested and/or affected persons (as defined by the EP Act) should be included.

## 9.8 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, Cost Benefit Analysis and
- hazard and risk studies.

## 9.9 Corporate Environmental Policy

BMA should include a copy of its corporate environmental policy.

## 9.10 List of Proponent Commitments

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