



The Coordinator-General



Carmichael Coal Mine and Rail project

Final terms of reference for the environmental impact statement

May 2011

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Synopsis

The Carmichael Coal Mine and Rail project (the project) will involve developing both a greenfield open-cut coal mine and an underground coal mine in the Galilee Basin, supported by rail facilities connecting to the existing Goonyella rail system on to Hay Point. The proposed mine will produce up to 60 million tonnes per annum of product coal. The project has a potential mine life of 150 years, including construction, operation and closure. Export coal from this project will predominantly service the Indian domestic power market. The proponent for the project is Adani Mining Pty Ltd.

The Coordinator-General has declared the project to be a 'significant project' requiring an environmental impact statement (EIS) under section 26(1)(a) of the *State Development and Public Works Organisation Act 1971*.

The Commonwealth Government has determined that the project constitutes a controlled action pursuant to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The declaration of the project as a 'significant project', does not indicate support for, or approval of the project by the Coordinator-General or the Queensland Government. Rather, it is a requirement for the project to undergo a rigorous EIS process.

The EIS process is being coordinated by the Significant Projects Coordination branch of the Department of Employment, Economic Development and Innovation (DEEDI) on behalf of the Coordinator-General.

Terms of reference (TOR) set out the requirements, both general and specific, that the proponent should address in preparing the EIS. These TOR have been prepared having regard to comments and submissions received on draft TOR released for public comment over the period 12 February 2011 to 28 March 2011. These TOR are presented in two broad categories:

Part A—general information and administrative procedures

Part B—specific requirements and structure of the EIS



Part A: General information and administrative procedures

1 Project summary

The Carmichael Coal Mine and Rail project comprises of two major components:

- (1) a greenfield coal mine (over exploration permit for coal 1690), being both open-cut and underground mining, and associated mine processing facilities.
- (2) a railway line from the mine to Moranbah, joining the existing Goonyella rail system, connecting on to export facilities at Hay Point.

The proposed mine is expected to produce 60 million tonnes per annum of product coal at peak production. The project has a potential mine life of 150 years, including construction, operation and closure. Export coal from this project will predominantly service the Indian market.

It is expected operations will be six pits of combined open pit and underground workings. Each pit is expected to produce 10 million tonnes per annum at peak production. The overall workable length of the mine will be approximately 45 kilometres.

Export facilities at the Port of Hay Point (Dudgeon Point) via the existing Goonyella rail line are being pursued.

It is anticipated the mine construction will require an investment of approximately \$4.1 billion. Railway development will require a total investment of approximately \$6.8 billion for rail connectivity to the Port of Hay Point.

The mine, rail and port components are expected to employ 5000 people during construction and have a permanent work force of 4000 people for operation.

The mine is located approximately 160 kilometres to the north-west of Clermont, which in turn is located approximately 100 kilometres north of the major central Queensland regional town of Emerald (see Figure 1). The project lies within Isaac Regional Council and Mackay Regional Council.

Further information on the project can be viewed on the project website at www.dlqp.qld.gov.au/projects/mining-and-mineral-processing/coal/carmichael-coal-mine-and-rail-project.html.



Figure 1: Location of the proposed mine





2 Project proponent

The proponent, Adani Mining Pty Ltd is an Australian subsidiary of the Adani Group, a company based in Ahmedabad, India. The company has diverse interests in global trading, development and operation of ports, inland container terminals, establishment of special economic zones, oil refining, logistics, gas distribution, and power generation, transmission and trading.

Contact details for the proponent are as follows:

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3 Legislative framework

On 26 November 2010, the Coordinator-General declared the project to be a 'significant project' under section 26(1)(a) of the *Queensland State Development and Public Works Organisation Act 1971* (SDPWO Act). This declaration initiates the statutory environmental impact assessment procedure of Part 4 of the SDPWO Act, which requires the proponents to prepare an EIS for the project.

On 6 January 2011, the Commonwealth Government Minister for Sustainability, Environment, Water, Population and Communities (Commonwealth Government Minister for the Environment) determined that the project is a 'controlled action' under the EPBC Act due to the likely potential impacts on matters of national environmental significance. The controlling provisions under the EPBC Act are:

- sections 12 and 15A (World Heritage properties)
- section 15B and 15C (National Heritage places)
- sections 16 and 17B (Ramsar wetlands)
- sections 18 and 18A (listed threatened species and communities)
- sections 20 and 20A (listed migratory species)
- sections 24B and 24C (Great Barrier Reef Marine Park).

As a consequence, the project requires assessment and approval under the EPBC Act. The Commonwealth Government has accredited the EIS process, to be conducted under the SDPWO Act, under a bilateral agreement between the Commonwealth and Queensland Governments. This will enable the EIS to meet the impact assessment requirements under both Commonwealth and Queensland



legislation. The project will require approval from the Commonwealth Government Minister for the Environment under Part 9 of the EPBC Act, before it can proceed.

DEEDI has invited relevant Commonwealth, state and local government representatives, and other relevant authorities, to participate in the impact assessment process as advisory agencies.

The first step in the impact assessment process is the development of TOR for an EIS for the project. The process involves formulating draft TOR that are made available for public and advisory agency comment. The Coordinator-General will have regard to all properly made submissions received on the draft TOR, before presenting the finalised TOR to the proponent.

The proponent will prepare an EIS to address the TOR. Once the EIS has been prepared to the satisfaction of the Coordinator-General, a public notice will be advertised in relevant newspapers circulating in the region and nationally. The notice will state where copies of the EIS can be viewed or purchased, the submission period, and where submissions should be sent. The proponent may also be required to prepare a supplementary report to the EIS to address specific matters raised during the EIS submission period.

At the completion of the EIS phase, the Coordinator-General will prepare a report (Coordinator-General's report) evaluating the EIS and other relevant material, pursuant to section 35 of the SDPWO Act. The Coordinator-General's report will include an assessment and conclusion about the environmental effects of the project and any associated mitigation measures. Material that will be assessed includes:

- the EIS
- properly made submissions and other submissions accepted by the Coordinator-General
- any other material the Coordinator-General considers relevant to the project, such as a supplementary EIS, comments and advice from advisory agencies and other entities, technical reports and legal advice.

The Coordinator-General's report will be publicly notified by placing it on the project website at www.dlgp.qld.gov.au/projects/mining-and-mineral-processing/coal/carmichael-coal-mine-and-rail-project.html. The Coordinator-General's report will also be presented to the proponent, the *Sustainable Planning Act 2009* (SPA) assessment manager and the Commonwealth Government Minister.

If the project requires an application for a development approval under SPA, the Coordinator-General's report may, under section 39 of the 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
- that the approval must be a preliminary approval only.



Alternatively, the Coordinator-General's report must state for the assessment manager that:

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

Under section 45 of SDPWO Act, the Coordinator-General's report may state conditions for a proposed mining lease(s) under the *Mineral Resources Act 1989*. If conditions are included in the report, the Coordinator-General must give the Minister responsible for the Mineral Resources Act a copy of the report.

Similarly, the Coordinator-General's report may, under sections 47(c) or 49 of SDPWO Act, state conditions for any proposed environmental authority under the *Environmental Protection Act 1994* (EP Act). If conditions are included in the report, the Coordinator-General must give the minister responsible for the EP Act a copy of the report.

Similarly, the Coordinator-General's report may, under section 49(d) of SDPWO Act, state conditions for any proposed Greenhouse Gas injection and storage lease under the *Greenhouse Gas Storage Act 2009*. If conditions are included in the report, the Coordinator-General must give the minister responsible for the Greenhouse Gas Storage Act a copy of the report.

As the project was determined to be a 'controlled action' under the EPBC Act, the report will also be provided to the Commonwealth Government Minister responsible for administering Part 9 of the EPBC Act.

4 Results of consultation on these terms of reference

These TOR were developed from draft TOR that was made available for public and advisory agency comment. When finalising these TOR, the Coordinator-General considered all submissions received.

Advertisements inviting public comment on the draft TOR for the project were placed in The Weekend Australian, The Courier-Mail, Central Queensland News, Queensland Country Life, Mackay Daily Mercury and Bowen Independent newspapers on 12 February 2011. A similar notice was placed on the Coordinator-General's project website.

The public submission period closed on 28 March 2011. A total of 20 submissions were received, including nine from advisory agencies, two from regional councils, four from private individuals and five from other organisations (including one from the project proponent). Copies of submissions were provided to the proponent.



5 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 that adverse impacts are avoided or mitigated.

The project should be based on sound environmental protection and management criteria.

The EIS document should provide information for the following persons and groups, as the project stakeholders:

- for interested bodies and persons—a basis for understanding the project, prudent and feasible alternatives, affected environmental values, impacts that may occur and the measures to be taken to mitigate all adverse impacts
- for affected persons—that is, groups or persons with rights or interests in land, as defined under section 38 of the *Environmental Protection Act 1999* (Qld) or water as defined under the *Water Act 2000*—an outline of the effects of the proposed project
- for government agencies and referral bodies—a framework for decision-makers to assess the environmental aspects of the proposed 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, subject to what conditions, if any
- for the proponent—a mechanism by which the potential environmental impacts of the project are identified and understood, including information to support the development of management measures, such as an environmental management plan, to mitigate the effects of adverse environmental impacts of the development.

The proponent is required to address the TOR to the satisfaction of the Coordinator-General before the EIS is made publicly available.

6 EIS guidelines

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 adverse impacts. For each identified environmental impact, the EIS must outline the management hierarchy to be applied to addressing potential impacts on environmental values. These are:

- Avoid impacts
- Control/mitigation measures and
- Offset any remaining loss of environmental values.

The main EIS report needs to be supported by appendixes containing relevant data, technical reports and other sources of the EIS analysis. Outcomes and approvals



sought from the EIS process along with the statutory requirements of relevant legislation will determine the exact level of detail required within the EIS.

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

- scientific studies are used to predict environmental impacts and details of their methodology, reliability, and any relevant assumptions or scientific judgements are indicated
- the EIS is to present all technical data, sources or authority and other information used to assess impacts
- when addressing cumulative impacts, the EIS is to make use of publicly available information on impacts assessed for other natural resource projects in the region
- proposed measures to mitigate and manage identified issues are described and evaluated
- residual impacts that are not quantifiable are described qualitatively, in as much detail as reasonably practicable
- a discussion of the criteria adopted in assessing the proposed project and its impacts—for instance, compliance with relevant legislation, policies, standards, community acceptance is included. Standard criteria under the *Environmental Protection Act 1994* guides decision making at all levels (see Schedule 4 of that legislation). These standard criteria should be addressed in the EIS
- the level of investigation of potential/uncertain impacts on the environment is proportionate to both the severity and the likelihood of those events occurring
- issues that may emerge during the investigations and preparation of the EIS are adequately addressed and the necessary studies are undertaken and reported
- all relevant matters concerning environmental values, impacts and proposed mitigation measures are addressed for the first time in the main text of the EIS and not in an appendix or the draft environmental management plan
- adverse and beneficial effects should be presented in quantitative and/or qualitative terms as appropriate.

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

The terms 'describe,' 'detail' and 'discuss' should be taken to include both quantitative and qualitative matters as practical and meaningful. Should the proponent require any information in the EIS to remain confidential, this should be clearly indicated and separate information should be prepared on these matters.



7 Stakeholder consultation

The proponent should undertake a comprehensive and inclusive consultation plan with the stakeholders identified in part A, section 5, EIS objectives. Consultation with advisory agencies should be the principal forum for identifying legislation, regulations, policies and guidelines relevant to the project and EIS process.

The public consultation plan should identify broad issues of concern to local and regional community and interest groups and address issues from project planning through commencement, project operations and decommissioning. The consultation plan should identify:

- the types of consultation and communication activities to be undertaken
- timing of activities
- how it will target the stakeholder/community representatives
- integration with other EIS activities and the project development process
- consultation responsibilities
- communication protocols
- reporting and feedback arrangements.

8 EIS format and copy numbers

General requirements

The EIS should be written in a format matching the TOR or include guidelines (preferably as an appendix) describing how the EIS responds to the TOR. Where the project is made up of several components, the EIS should make it clear which project component is being discussed, to allow assessment agencies and other readers to differentiate between the components.

The EIS should contain (as part of the executive summary) a one-page table that explains where readers can find categories of information in the report. This should particularly cover subjects that are presented in multiple places in the EIS.

Include maps, diagrams and other illustrative material in the EIS to assist readers to interpret information.

Specific format and copy requirements

The proponent must publish the EIS as follows:

- (1) On a website that is hosted at the proponent's own expense, in both HTML and PDF formats, as follows:



- (a) pages produced in HTML format must meet the *W3C web content accessibility guidelines*¹. All cross-references to sections elsewhere in the EIS must be hyperlinked; and all external web links must be hyperlinked
 - (b) PDF files must meet the following requirements:
 - (i) no larger than two megabytes in size (documents can be uploaded in sections to meet this requirement)
 - (ii) text size and graphics files included in the PDF documents should be of sufficient resolution to facilitate reading and enable legible printing
 - (iii) produced in accordance with Adobe's PDF accessibility best practice guides available at: www.adobe.com/accessibility/products/acrobat/training.html and meet the following minimum accessibility requirements:
 - A. document structure tags and proper read order
 - B. searchable text
 - C. alternative text descriptions
 - D. security that does not interfere with assistive technology.
- (2) As a single PDF file on a CD-ROM, DVD or other electronic memory device. This PDF file, which will be read by staff from DEEDI and other assessment agencies, must include:
- (a) bookmarks (links) to all sections of the document (down to five heading levels); and the PDF file must be set to open with the bookmarks showing by default
 - (b) active (clickable) internal hyperlinks to any pages, sections or diagrams that have been cross-referenced within the EIS
 - (c) active (clickable) hyperlinks to any external websites/documents that have been included in the EIS.
- (3) Provide a PDF version of the executive summary, no larger than two megabytes in size, on a CD-ROM or DVD. This file will be placed on the project website; and the PDF file must meet the accessibility requirements listed under point (1)(b) above.
- (4) Provide all maps/diagrams/figures in JPG format, on a separate CD-ROM, DVD or other electronic memory device. All JPG files should be a minimum of 300 dpi.
- (5) Limited copies of the EIS should be produced on A4-size paper capable of being photocopied, with maps and diagrams of A4 or A3 size (discuss this requirement with DEEDI staff in the early stages of the EIS process).

¹ Refer to www.w3.org



9 Further information

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

EIS project manager—Carmichael Coal Mine and Rail project

Significant Projects Coordination

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www.dlgp.qld.gov.au/projects/mining-and-mineral-processing/coal/carmichael-coal-mine-and-rail-project.html.



Part B: Contents of the EIS

The EIS should follow the format and content outlined in these TOR; however, changes to the structure can be discussed with the EIS project manager. Detailed cross-references describing where the EIS responds to the TOR should be included in the appendices.

Executive summary

The executive summary should convey the most important aspects and options relating to the project in a concise and readable form. It should use plain English and avoid using jargon. It should be written as a stand-alone document and be structured to follow the EIS. It should be available for reproduction on request and distributed to interested parties who may not wish to read or purchase the EIS as a whole.

The executive summary should include:

- the title of the project
- the 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 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
- a brief description of the project (pre-construction, construction, operational activities and decommissioning) and the existing environment, using visual aids where appropriate
- an outline of the principal environmental impacts predicted and the proposed environmental management strategies and commitments to minimise the significance of these impacts
- an outline of the principal social and economic impacts on the local and regional community and strategies to manage those impacts and deliver benefits from the development
- a discussion of the cumulative impacts in relation to social, economic and environmental factors of associated infrastructure projects proposed within the region
- detailed maps of the proposed project location and any other critical figures.



Glossary of terms

Provide a glossary of technical terms, acronyms, abbreviations and references.

1 Introduction

Clearly explain the function of the EIS, why it has been prepared and what it sets out to achieve. Provide an overview of the structure of the document.

1.1 Project proponent

Describe the experience of the project proponent, including the nature and extent of business activities, experience and qualifications, and environmental record, including the proponent's environmental, health, safety and community policies.

1.2 Project description

Provide a brief description of the key elements of the project, along with illustrations or maps. Summarise any major associated infrastructure requirements. Detailed descriptions of the project should follow in section 2, Project description.

1.3 Project rationale

Describe the specific objectives and justification for the project, including its strategic, economic, environmental and social implications, technical feasibility and commercial drivers. Discuss the status of the project in a regional, state and national context. Discuss the project's compatibility with relevant policy, planning and regulatory frameworks.

1.4 Relationship to other projects

Describe how the project relates to any other infrastructure projects 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. Discuss any potential opportunities for co-locating infrastructure under subsection 1.6, Co-location opportunities.

1.5 Alternatives to the project

Describe feasible alternatives including conceptual, technological and locality alternatives to the proposed project; and discuss the consequences of not proceeding with the project. Discuss alternatives in sufficient detail to enable an understanding of the reasons for preferring certain options or courses of action and rejecting others. This should include a discussion of the 'no action' option. Also, discuss the methodology adopted to discern between the feasible options.

Explain the interdependencies of the project components, particularly with regard to how each of any infrastructure requirements relate to the viability of the project.



This information is required to assess why the scope of the project is as it is and to ensure that the environmentally sustainable design principles and sustainable development aspects have been considered and incorporated during the scoping of the project.

This section should also comply with the EPBC Act Regulations listed in section 2.01(g) of Schedule 4.

1.6 Co-location opportunities

Opportunities may exist for co-locating existing or proposed infrastructure, enabling efficiency gains and the mitigation of environmental, social and property impacts. The proponent should identify any proposals to develop infrastructure within the vicinity of the proposed project. 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 can be readily identified.

Whilst it may be inappropriate for this EIS to evaluate the environmental impacts of other infrastructure not directly required for this project, the EIS should describe the broad implications of locating other forms of linear infrastructure within or near the proposed project infrastructure. Where co-location may be likely, the EIS should consider opportunities to coordinate or enhance any of the impact mitigation strategies proposed through cooperation with other proponents in the locality. Discuss opportunities in sufficient detail to enable an understanding of the reasons for preferring certain options or courses of action and rejecting others.

1.7 The environmental impact assessment process

1.7.1 Methodology of the EIS

Provide an outline of the environmental impact assessment process, including the role of the EIS in the Coordinator-General's decision-making process. Include information on relevant stages of the EIS development, statutory and public consultation requirements and any interdependencies that exist between approvals sought. The information in this section is required to ensure:

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

1.7.2 Objectives of the EIS

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 the project, alternatives to it and options for its implementation



- present the likely effects of the project on the natural, social and economic environment
- demonstrate how environmental impacts can be avoided, managed or mitigated and offsets for any residual impacts

Discuss the role of the EIS in providing information to formulate the environmental management plan (EMP) for the project.

1.7.3 Submissions

Inform the reader how to properly make submissions and what form the submissions should take. The reader should be informed as to how and when properly made public submissions on the EIS will be addressed and taken into account in the decision-making process. Also, indicate any implications for submissions in the event of any appeal processes.

1.8 Public consultation process

The public consultation process 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 (i.e. newsletters), and other consultation mechanisms to encourage and facilitate active public consultation. The public consultation processes (community engagement) for all parts of the EIS should be integrated.

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

- identify the stakeholders and how their involvement was facilitated
- identify the processes conducted to date and the future consultation strategies and programs including those during the operational phase of the project
- indicate how consultation involvement and outcomes were integrated into the EIS process and future site activities including opportunities for engagement and provision for feedback and action if necessary.

Provide a list of the stakeholders consulted during the program; and details of any meetings held, presentations made, and any other consultation undertaken for the EIS process. Provide information about the consultation process that has taken place and the results.

1.9 Project approvals

1.9.1 Relevant legislation and approvals

Describe and list Commonwealth, state and local legislation and policies relevant to the planning, approval, construction and operation of the project. Identify all approvals, permits, licences and authorities that will need to be obtained for the proposed project. Outline the triggers for the application of each of these and identify relevant approval requirements.



Relevant Commonwealth Government legislation may include, but is not limited to:

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1994*
- *Environment Protection and Biodiversity Conservation Act 1999*
- *Native Title Act 1993.*

Outline and identify relevant Commonwealth obligations such as:

- protection of World Heritage values
- migratory animals (China–Australia Migratory Bird Agreement (CAMBA), Japan–Australia Migratory Bird Agreement (JAMBA), Republic of Korea–Australia Migratory Bird Agreement (ROKAMBA) and Bonn Convention)
- biodiversity, climate and wetlands of international importance (Ramsar).

Where relevant, refer to applicable Queensland legislation, which may include but is not limited to:

- *Aboriginal Cultural Heritage Act 2003 (ACH Act)*
- *Environmental Protection Act 1994 (EP Act)*
- *Fisheries Act 1994*
- *Forestry Act 1959*
- *Land Act 1994*
- *Land Protection (Pest and Stock Route Management) Act 2002*
- *Mineral Resources Act 1989*
- *Nature Conservation Act 1992 (NC Act)*
- *Queensland Heritage Act 1992*
- *Queensland State Development and Public Works Organisation Act 1971 (SDPWO Act)*
- *Sustainable Planning Act 2009 (SPA)*
- *Torres Strait Islander Cultural Heritage Act 2003*
- *Transport Infrastructure Act 1994*
- *Transport Operations (Road Use Management) Act 1995*
- *Transport Planning and Coordination Act 1994*
- *Vegetation Management Act 1999 (VM Act)*
- *Water Act 2000.*

Note that the Government intends to introduce and enact legislation in 2011 for regulating development on land determined to be strategic cropping land. If this EIS process is not finalised by the time the legislation comes into force, further requirements may be placed on the EIS process relating to land determined to be strategic cropping land prior to a decision being made.



“*Protecting Queensland’s strategic cropping land: a policy framework*” is available on the DERM website (<http://www.derm.qld.gov.au/land/planning/pdf/strategic-cropping/strategic-cropping-policy-complete.pdf>) and provides details of the Government’s current policy about strategic cropping land. For further information about the strategic cropping land policy framework, refer to the DERM website or email scenquiries@derm.qld.gov.au.

Legislation on dealing with offsets in development assessment and conditions has recently been passed (see *Environmental Protection and Other Legislation Amendment Act 2009* proclaimed shortly).

1.10 Relevant plans

Outline the project's consistency with the existing national, state, regional and local planning frameworks that apply to the project location. Refer to all relevant statutory and non-statutory plans, including water resource plans under the *Water Act 2000*, planning policies, guidelines, strategies and agreements.

This project is located within the Whitsunday, Hinterland and Mackay (WHAM) planning region. On 5 March 2011, the Queensland Government announced that a statutory regional plan will be prepared for the WHAM region, a draft of which is expected to be released for public comment in the first half of 2011. This plan is in an advanced state of finalisation, and will be recognised as a state interest under the Sustainable Planning Act 2009. An assessment of this project against relevant policies and provisions of the draft WHAM regional plan, once released, must be provided.

Similarly, the project may potentially impact on the Central West and Central Queensland planning regions. An assessment of this project against the Central West Regional Plan (2009) must be provided.

The proposed mine site for this project lies within the *Water Resource (Burdekin) Plan 2007* and the *Water Resource (Great Artesian Basin) Plan 2006* areas. Any relevance of these plans, the *Water Act 2000* and the *Water Regulation 2002* to the project must be addressed as part of the EIS.

1.11 Environmentally relevant activities

Briefly describe each environmentally relevant activity (ERA) and associated activities that are to be carried out in connection with the project. Present a detailed description of each ERA in section 3, Environmental values and management of impacts, and provide details of the impact on land, water, air, noise and any other relevant environmental values.

Permitting requirements for environmentally relevant activity 14 - electricity generation differs depending on connection to the grid. Should ERA 14- electricity generation be undertaken on the mining tenure, the EIS must identify if the plant will or intends to be connected to the State power network grid. Electricity generation undertaken on a mining tenure that is, or intends to be, connected to the State power network grid will require a separate development permit. Electricity generation



undertaken on a mining tenure and utilized solely for mining activities contained within the mining tenure can be permitted under a mining environmental authority.

If any electricity generated on the mining tenure is used for anything outside of the mining tenure, a separate development approval under the *Sustainable Planning Act 2009* will be required.

The EIS must identify if construction/operation camps and extractive industries located off the mining tenure will be conducting an ERA, such as sewage treatment, motor vehicle workshops, abrasive blasting, and boilermaking.

If an ERA is to be undertaken, sufficient detail must be provided about the activity, potential environmental impacts and strategies to mitigate the environmental impacts. The permitting of ERA's under a development permit will require the submission of a Site Based Management Plan and should be a separate document from a mining Environmental Management Plan.

The above information will allow for informed decisions to be made with respect to the project, consistent with the provisions of the EP Act.

1.12 Accredited process for controlled actions under Commonwealth Government legislation

The EIS will be developed pursuant to the bilateral agreement between the Commonwealth and Queensland governments for the purposes of the Commonwealth Government's assessment under Part 8 of the EPBC Act. The EIS should address potential impacts on matters of national environmental significance (MNES) that were identified when the project was determined to be a controlled action.

Section 9, Matters of national environmental significance, outlines the requirements in relation to this matter.



2 Project description

The objective of this section is to describe the project through its lifetime of pre-construction, construction, operation and potentially decommissioning. The project description also allows further assessment of which approvals may be required and how they may be managed through the life of the project.

2.1 Project overview

Provide an overview of the project to put it into context, including:

- a rationale explaining the selection of the preferred operating scenario, including details such as cost, environmental impacts and the operational efficiencies of each option
- a description of the key components of the project including the use of text and design plans where applicable
- the expected cost, timing, and overall duration of the project (distinguishing between the mine and rail components)
- a summary of any environmental design features of the project.

2.2 Location

Describe, using maps at suitable scales, the regional and local context of the project and all associated infrastructure. Provide real property descriptions of the project. Maps should show the location of the project area (with GPS locations where known), in particular the:

- location and boundaries of current or proposed land tenures, that the project area is or will be subject to
- location and boundaries of the project footprint, including easement widths and access requirements
- location of any proposed buffers surrounding the working areas (for construction and operation)
- location of existing infrastructure such as the state-controlled road network, local roads, railways, weirs, powerlines, as relevant
- location of geomorphic features such as waterways (e.g. rivers, streams, creeks, other bodies of water) and wetlands
- location of any proposed project infrastructure requirements (e.g. site offices and accommodation sites, emergency locations), with reference to size, type and use, during all project phases, including clear identification of any new infrastructure which is proposed in the bed or on banks of a watercourse.



2.3 Construction Overview

Provide the following information on the pre-construction, construction and commissioning of the project, including detailed plans where appropriate.

This section should summarise information about volumes of construction inputs/traffic generation, including worker traffic and service vehicles, methods of transport, the routes (origin – destinations), over-dimensional vehicles services and any other construction related transport activities.

2.3.1 Pre-construction activities

Describe all the pre-construction activities, including:

- any land acquisitions required, be it in full or as easements, leases etc.
- nature, scale and timing for vegetation clearing
- site access
- earthworks
- interference with watercourses (e.g. rivers, streams, creeks, other bodies of water) and floodplain areas including wetlands
- site establishment requirements for construction facilities, including access restriction measures and expected size, source and control of the construction workforce accommodation, services (water, sewage, communication, power, recreation) and safety requirements
- temporary works
- the upgrade, relocation, realignment, deviation of or restricted access to roads and other infrastructure.

2.3.2 Construction

Describe the construction elements of the project, including:

- an indicative construction timetable, including expected commissioning and start-up dates and hours of operation
- description of major work programs for the construction phase, including an outline of construction methodologies
- construction inputs, handling and storage including an outline of potential locations for source of construction materials
- major hazardous materials to be transported, stored and/or used on-site, including environmental toxicity data and biodegradability
- clean up and restoration of areas used during construction, including camp site(s) and storage areas.

The EIS must identify if construction/operation camps and extractive industries located off the mining tenure will be conducting an ERA, such as sewage treatment, motor vehicle workshops, abrasive blasting, and boilermaking.



If an ERA is to be undertaken, sufficient detail must be provided about the activity, potential environmental impacts and strategies to mitigate the environmental impacts. The permitting of ERA's under a development permit will require the submission of a Site Based Management Plan and should be a separate document from a mining Environmental Management Plan.

2.3.3 Commissioning

Describe the commissioning process including the associated environmental impacts.

2.4 Operation

Provide full details of the operation for all elements of the project, including:

- a description of the project site, including concept and layout plans of buildings, structures, plant and equipment to be employed
- nature and description of all key operational activities, including details of proposed rail project operations (e.g. number and type of trains, above and below rail operation and maintenance activities)
- the capacity of the project equipment and operations
- estimated numbers and roles of persons to be employed during the operational phase of the project
- summary of traffic generation information and transport requirements for the operations of the mine and facilities associated with the project, including movement of workers.

2.5 Associated infrastructure

Detail, with concept and layout plans, requirements for new infrastructure or upgrading/relocating existing infrastructure to service the project. Consider matters such as transportation, water supply, energy supply, sewerage, stormwater, waste disposal, accommodation and telecommunications (including the type of communications to be provided to the mine and accommodation facilities, and the capacity of the communications service to allow for additional services, e.g. broadband access for radio over internet protocol that would facilitate other users' communications needs).

In considering associated infrastructure for supplying essential services (notably water and energy), provide a detailed explanation of preferred arrangements for the project (for example new water supply pipelines or energy supply lines).

Provide a summary of typical designs for waterway crossings for relevant stream orders including waterway barrier works.

The associated rail infrastructure component of the project should contain the:

- location of the preferred rail corridor, railway and associated rail infrastructure



- location and boundaries of land tenures, in place or proposed, to which the rail component is or will be subject
- point of interface between the main rail corridor, branch line and proposed balloon loop (including the Central Rail Line, the Capricorn Highway, other local government roads, any proposed rail infrastructure and other infrastructure such as pipelines)
- location and boundaries of the rail project footprint showing all key aspects including excavations, stockpiles, areas of fill, watercourses, bridges, culverts, hardstands, open level crossings and occupational crossings etc
- location of all proposed project rail transport and coal loading infrastructure
- details of any proposed third party rail access arrangements, dependent on the final rail option pursued by the proponent.

Also consider the infrastructure requirements of resource extraction areas. Describe access roads and connection to sewage or water supply, including the design and construction standards to be met (e.g. waterway crossings and barriers should be designed to meet the requirements of the *Fisheries Act 1994* and in consultation with the Department of Employment, Economic Development and Innovation (DEEDI)). Discuss alternative approaches or the opportunity of obtaining materials from alternative sources.

2.5.1 Water distribution infrastructure

Describe the process and criteria used to select the preferred design and preferred construction techniques, including:

- the method of extracting and/or releasing water from the storage
- any treatment methods proposed
- if distribution is by pipe:
 - provision for route refinement and right of way
 - pipeline design parameters, including capacity and design life
 - above-ground facilities—physical dimensions and construction materials for surface facilities along the pipeline route, including information on pipeline markers
 - the location and/or frequency of (if applicable) cathodic protection points, off-take valves, pump stations, balance tanks, control valves (isolation points), pigging facilities and any other project facilities and linkages to existing water supply infrastructure along the pipeline route
 - design measures to prevent inter-basin transfer of aquatic flora and fauna.



2.6 Decommissioning and rehabilitation

Describe the options, strategies and methods for progressive and final rehabilitation of the environment disturbed by the project, including:

- a preferred rehabilitation strategy with a view to minimising the amount of land disturbed at any one time
- showing, on maps of suitable scale, the final topography of any excavations, waste areas and dam sites
- the means of decommissioning the project, in terms of removing equipment, structures and buildings, and the methods proposed for stabilising the affected areas
- options and methods for disposing of wastes from the demolition of the project infrastructure, discussing options in sufficient detail for their feasibility and suitability to be established
- a discussion of future land tenure arrangements post decommissioning of the project
- a strategy to ensure current and future surface and ground water quality is maintained at levels that are acceptable for users downstream of the site
- a strategy to rehabilitate affected watercourses, including removal of any redundant waterway barriers.

Discuss details of the impacts of the preferred rehabilitation strategy in the appropriate subsections of section 3, Environmental values and management of impacts. particularly with regard to issues such as final landform stability (section 4.2.2), rehabilitation of plants (section 4.9.2) and the long-term quality of water in any final voids (section 4.5.2). Implications for the long-term use and fate of the site will also be addressed, particularly with regard to the on-site disposal of waste and the site's inclusion on the Environmental Management Register or the Contaminated Land Register.

Refer also to infrastructure that is not intended to be decommissioned. In this situation, describe the entity to which the infrastructure is intended to be transferred, along with the proposed environmental management regimes.

Describe topsoil management, addressing the transportation, storage and replacement of topsoil to disturbed areas. Address the identification and management of topsoil (including stripping, handling, limitation of compaction, placement, stockpile heights, and optimal storage times) that would ensure the continued viability of the native seed bank. Also, address the identification and management of topsoil that may be contaminated with weed or exotic species and that would be unsuitable for use in rehabilitation without treatment.

Describe any proposals to divert creeks during operations and, if applicable, the reinstatement of the creeks after operations have ceased. Rehabilitation will involve the re-establishment of vegetation communities along watercourses similar to the



pre-cleared regional ecosystems in those areas. Where dams are to be constructed, describe proposals for the management of these structures after the completion of the project. Also, describe the final drainage and seepage control systems and long-term monitoring plans. Describe and illustrate where final voids and uncompacted overburden and workings at the end of mining would lie in relation to flood levels up to and including the 'probable maximum flood level' based on the Bureau of Meteorology's 'probable maximum precipitation' forecast for the locality.

3 Environmental values and management of impacts

Detail the environmental protection and mitigation measures incorporated in the planning, construction, rehabilitation, commissioning, operations and decommissioning of all facets of the project. Measures should prevent, or where prevention is not possible, minimise environmental harm and maximise environmental benefits of the project. Describe preferred measures in more detail than other alternatives. Demonstrate the protection and/or enhancement of human health (as an environmental value) throughout the construction and operation of the project.

The objectives of subsequent sections are to:

- describe the existing environmental values of the area that may be affected by the project, using background information and/or new studies to support. This shall include reference to all definitions of environmental values set out in relevant legislation, policies and plans
- describe the potential adverse and beneficial impacts of the project on the identified environmental values and the measures taken to avoid, minimise and/or mitigate those impacts
- describe any cumulative impacts on environmental values caused by the project, either in isolation or in combination with other known existing or planned projects
- present objectives, standards and measurable indicators that protect the identified environmental values
- examine viable alternative strategies for managing impacts. Present and compare these alternatives in view of the stated objectives and standards to be achieved
- discuss the available techniques to control and manage impacts in relation to the nominated objectives.

Proposals to offset any impacts should be presented in accordance with the *Queensland Government Environmental Offset Policy*².

² Environmental Protection Agency, *Queensland Government Environmental Offsets Policy*, Environmental Protection Agency, Brisbane, 2008, viewed 10 January 2010, www.derm.qld.gov.au/services_resources/item_details.php?item_id=202749



Discuss offsets with regard to impacts on EPBC Act matters, referring to the eight principles set out in the (former) Department of the Environment and Water Resources³ *Draft Policy Statement: Use of Environmental Offsets under the Environment Protection and Biodiversity Conservation Act 1999*⁴ and the accompanying discussion paper⁵ dated August 2007 (or the finalised policy and discussion paper if available when the EIS is produced).

The EIS should follow the format and content outlined in this TOR; however, changes to the structure can be discussed with the EIS project manager. The mitigation measures, monitoring programs etc. identified in this section of the EIS, should be used to develop the EMP for the project (see section 8, Environmental management plan).

3.1 Climate, natural hazards and climate change

Describe the climatic conditions that may affect management of the project. This includes a description of the vulnerability of the project area to seasonal conditions, extremes of climate and natural or induced hazards. Provide a risk assessment and management plan detailing these potential threats to the construction and operation of the project.

The most recent information on potential impacts of climatic factors should be addressed in the appropriate sections of the EIS.

Include an assessment of climate change risks and possible adaptation strategies, and the following:

- a risk assessment of changing climate patterns that may affect the viability and environmental management of the project
- the preferred and alternative adaptation strategies to be implemented
- commitments to undertaking, where practicable, a cooperative approach with government, other industry and other sectors to address adaptation to climate change.

3.1.1 Flood plain management

Due to the site location, a comprehensive flood study should be included in the EIS, including:

- quantification of flood impacts on properties surrounding and external to the project site from redirection or concentration of flows

³ Now the Department of Sustainability, Environment, Water Population and Communities (DSEWPaC).

⁴ Department of the Environment and Water Resources, *Draft Policy Statement: Use of Environmental Offsets under the Environment Protection and Biodiversity Conservation Act 1999*, Department of the Environment and Water Resources, 2007, viewed 10 January 2010, www.environment.gov.au/epbc/publications/pubs/draft-environmental-offsets.pdf

⁵ Department of the Environment and Water Resources, *Use of environmental offsets under the Environment Protection and Biodiversity Conservation Act 1999: Discussion paper*, Department of the Environment and Water Resources, 2007, viewed 10 January 2010, <http://www.environment.gov.au/epbc/publications/pubs/draft-environmental-offsets-discussion.pdf>



- identification of likely increased flood levels, increased flow velocities or increased time of flood inundation as a result of the development.

The flood study should address any requirements of local or regional planning schemes for flood affected areas. The study report should include details of all calculations along with descriptions of base data, any potential for loss of flood plain storage, and triangulated surface meshes produced in terrain modelling software. Refer to any studies undertaken by the local council in relation to flooding.

Potential impacts and mitigation measures

Provide details on the:

- potential impacts of floods at a range of flood intervals, including the probable maximum flood event
- potential impacts of flooding on environmental values due to the identified likely increased flood levels, increased flow velocities or increased time of flood inundation as a result of the project
- impacts and mitigation measures for flooding. Describe the construction of any flood protection levees with regards to construction material, design and methods.

3.2 Land

Detail the existing land environment values for all areas associated with the project. Describe the potential for the construction and operation of the project to change existing and potential land uses of the project sites and adjacent areas.

3.2.1 Scenic amenity and lighting

Description of environmental values

Describe in general terms the existing character of the landscape and the general impression that would be obtained while travelling through and around it. Outline existing landscape features, panoramas and views that have, or could be expected to have, value to the community. Provide information in the form of maps and photographs, particularly where addressing the following issues:

- major views, view sheds, outlooks and features contributing to the amenity of the area, including assessment from private residences
- focal points, landmarks, waterways (e.g. rivers, streams, creeks other bodies of water and wetlands) and other features contributing to the visual quality of the area and the project site(s)
- character of the local and surrounding areas including vegetation and land use.

At a level of detail appropriate to the scale of the project, describe the relevant geomorphology supported by illustrative mapping highlighting any significant features and associated environmental values.



Potential impacts and mitigation measures

Describe the potential beneficial and adverse impacts of the project on landscape character and visual qualities of the site and the surrounding area. Provide details about measures to be undertaken to mitigate or avoid the identified impacts.

Lighting

Assess and describe all potential impacts of the project's lighting, during all stages, with particular reference to objectives to be achieved and management methods to be implemented to mitigate or avoid, such as:

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

3.2.2 Topography, geology and soils

Description of environmental values

Provide maps locating the project in state, regional and local contexts. The topography should be detailed with contours at suitable increments, shown with respect to Australian height datum. On the maps, highlight and comment on significant features of the landscape and topography.

Provide a description, map and a series of cross-sections of the surficial and solid geology of the project area relevant to the project components. Describe geological properties that may influence ground stability, occupational health and safety, or the quality of stormwater leaving any area disturbed by the project. In locations where the age and type of geology is such that significant fossil specimens may be uncovered during construction/operations, the EIS must address the potential for significant finds.

Review and discuss existing land system and land unit data of the Nogo-Belyando Area⁶ and land management units identified within *Lorimer, MS 2005, The Desert Uplands: an overview of the Strategic Land Resource Assessment Project, Technical Report, Environmental Protection Agency, Queensland*, for the project area.

A soil survey of the project area should be conducted at 1:100,000 scale, following the standards in Land Suitability Assessment Techniques in the *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland*.⁷

Review and discuss the relationship of the soils, land system and land unit data sets.

⁶ CSIRO, *Lands of the Nogo-Belyando Area, Queensland, comprising papers of RH Gunn (and others)*, Land Research Series, No. 18, CSIRO, Melbourne, 1967.

⁷ Department of Minerals and Energy, *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland*, Department of Mines and Energy, 1995, viewed 10 January 2010, www.derm.qld.gov.au/environmental_management/land/mining/technical_guidelines.html



Describe soil profiles according to the *Australian soil and land survey field handbook*,⁸ grouped according to their parent material and position in the landscape and classified according to the *Australian soil classification*.⁹ Include the physical and chemical properties of the materials that will influence erosion potential, stormwater run-off quality, rehabilitation and agricultural productivity of the land.

Representative soils must be sampled down the profile for laboratory analysis as outlined in the Land Suitability Assessment Techniques.⁷

Assess and document the depth and quality of useable topsoil and subsoil to be stripped and stockpiled for rehabilitation, and the physical and chemical properties of the soils.

The *State Planning Policy 2/02: Planning and Management of Development involving Acid Sulfate Soils* should be addressed as part of the Rail Corridor (particularly option 3) investigations.

Acid sulfate soil investigations should be undertaken in accordance with the *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998*.

An acid sulfate soil management plan should be prepared in accordance with the *Queensland Acid Sulfate Soil Technical Manual – Soil Management Guidelines Version 3.8 (Dear et al, 2002)*.

Mineral resources

Summarise the results of studies and surveys undertaken to identify and delineate the mineral, extractive and petroleum and gas resources within the project area (including any areas underlying or adjacent to related infrastructure including rail).

Describe in detail the location, tonnage and quality of the mineral, extractive and petroleum and gas resources within the project area (including underlying or adjacent to related infrastructure including rail) as indicated below. For coal projects, where possible, present the discussion on a 'seam by seam' basis and include the modifying factors and assumptions made in arriving at the estimates. Estimate and report the mineral resources in accordance with the *Australasian Code for Reporting of Mineral Resources and Ore Reserves* (the JORC Code),¹⁰ the principles outlined in the *Australian Guidelines for the Estimating and Reporting of Inventory Coal, Coal Resources and Coal Reserves*.¹¹

⁸ National Committee on Soil and Terrain, *Australian soil and land survey field handbook*, 3rd edn, CSIRO Publishing, Collingwood, 2009.

⁹ R Isbell, *Australian soil classification*, CSIRO Publishing, Collingwood, 2002.

¹⁰ Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia, *Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore reserves*, Joint Ore Reserves Committee, 2004, viewed 22 December 2010, www.jorc.org/main.php

¹¹ Coalfields Geology Council of New South Wales and the Queensland Mining Council, *Australian Guidelines for the Estimating and Reporting of Inventory Coal, Coal Resources and Coal Reserves*, Joint Ore Reserves Committee, 2003, viewed 22 December 2010, www.jorc.org/pdf/coalguidelines.pdf



In addition, provide maps (at appropriate scales) showing the general location of the project area, in particular, the:

- location and aerial extent of the mineral resources to be developed or mined
- location and boundaries of mining tenures, granted or proposed, to which the project area is, or will be subject
- location of the proposed mine excavation(s)
- location and boundaries of any project sites
- location and boundaries of any other features that will result from the proposed mining including waste/spoil dumps, water storage facilities and other infrastructure
- location of any proposed buffers, surrounding the working areas
- 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.

Potential impacts and mitigation measures

Provide details of any potential impacts to the topography or geomorphology associated with the project and proposed mitigation measures, including:

- a discussion of the project in the context of major topographic features and any measures taken to avoid or minimise impact to such, if required
- the objectives to be used for the project in any re-contouring or consolidation, rehabilitation, landscaping, and fencing.

Identify, for all permanent and temporary landforms, the possible soil erosion rate and describe the techniques used to manage the impact. Identify all soil types and outline the erosion potential (both wind and water) and erosion management techniques to be used. An erosion-monitoring program, including rehabilitation measures for erosion problems identified during construction, must also be outlined and acceptable mitigation strategies provided.

Include an assessment of likely erosion effects, especially those resulting from the removal of vegetation and construction of retaining walls both on-site and off-site for all disturbed areas.

Summarise methods proposed to prevent or control erosion with regard to:

- (a) the *Soil Erosion and Sediment Control—Engineering Guidelines for Queensland Construction Sites*¹²
- (b) the Environmental Protection Authority (EPA's) *Guideline: EPA Best Practice Urban Stormwater Management: Erosion and Sediment Control*¹³

¹² Institution of Engineers Australia, *Soil Erosion and Sediment Control – Engineering Guidelines for Queensland Construction Sites*, Institution of Engineers Australia Queensland Division, Brisbane, 1996.

¹³ Environment Protection Agency, *Guideline: EPA Best Practice Urban Stormwater Management – Erosion and Sediment Control*, 2008, viewed 16 December 2010, www.derm.qld.gov.au/register/p02301aa.pdf



- (c) preventing soil loss to maintain land capability/suitability and preventing degradation of local waterways.

Discuss the potential for acid generation by disturbing potentially acid forming materials during earthworks and construction; and propose measures for managing potentially acid forming materials and mitigating impacts for all site earthworks and construction activities. Should action criteria be triggered by acid generating potential as a result of testing, outline management measures in an acid mine drainage management plan, prepared in accordance with the assessment and management of acid drainage guideline of the *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland* series,¹⁴ *Managing Acid and Metalliferous Drainage*¹⁵ and any other applicable best practice guidelines.

Discuss the potential for acid, saline, neutral or alkaline drainage from waste dumps. Characterise the potential quality of leachate from the mined waste 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 cause environmental harm including nuisance.

Cross-reference to sections elsewhere in the EIS that assess in detail the potential impacts of any direct or indirect discharge of leachate on downstream sensitive environments or users of receiving waters.

Resource utilisation

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

Subsidence

Provide comprehensive surface subsidence predictions, taking into account factors such as topographic variations and geological complexities, including a full description of the methodology and an assessment of the reliability of the predictions. The results of the predictions will be shown on maps with one metre contour increments and a scale appropriate for assessing surface subsidence impacts.

Provide a detailed description of subsidence effects on surface and groundwater hydrology as well as on terrestrial ecosystems (including which vegetation communities and flora species are most likely to be effected by changes to surface hydrology).

¹⁴ Department of Minerals and Energy, *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland*, Department of Mines and Energy, 1995, viewed 10 January 2010, www.derm.qld.gov.au/environmental_management/land/mining/technical_guidelines.html

¹⁵ Department of Industry, Tourism and Resources, *Managing acid and metalliferous drainage: Leading Practice Sustainable Development Program for the mining industry*, Department of Industry, Tourism and Resources, Canberra, 2007, viewed 10 January 2010, www.ret.gov.au/resources/Documents/LPSPDP/LPSPDP-AcidHandbook.pdf



Propose mitigation measures to deal with any significant impacts that would result from subsidence. The EIS and EMP should provide a detailed subsidence management plan for remediation and monitoring of subsidence cracking and ponding; with an emphasis on limiting the impact to remnant vegetation habitats. The subsidence management plan should also address impacts on fish movement within watercourses.

Address impacts of subsidence on water resources in section 3.4.2, Potential impacts and mitigation measures.

Land disturbance

Develop a strategy that will minimise the amount of land disturbed at any one time. Describe the strategic approach to progressive rehabilitation of landforms and final decommissioning. Describe the methods to be used for the proposal, including backfilling, covering, re-contouring, topsoil handling and revegetation.

In relation to provisions of the *Forestry Act 1959*, DERM Forest Products (DERM FP) is to be advised of the footprint of the areas to be disturbed by the project, associated infrastructure and any rail alignment(s) at least 12 months in advance of any operations to allow for appropriate planning and salvage of suitable timber products from relevant lands and to identify quarry material on adjacent State lands that may be suitable to supply to the market.

DERM FP must be advised of any use of quarry material either outside the mining lease area or not consistent with the mining operation.

DERM FP request:

- (a) an assessment of the areas of State-owned land where commercial native forest log and fencing type timber will be affected and where salvage harvesting may be required 12 months in advance of any disturbance.
- (b) the identification of the sources of quarry materials both on and off the alignment for each component of the project.
- (c) Where the forest products are not salvaged prior to clearing for the project then compensation is payable to DERM FP as determined by the Chief Executive.

Where waterways are proposed to be diverted, describe the impact on land use due to hydrology changes, both upstream and downstream, and detail any long-term monitoring plans. Also describe:

- rehabilitating diverted creeks during operations and reinstating the creeks after operations cease
- removing dams or transferring responsibility for dams to the landholder and ongoing dam management
- the final drainage and seepage control systems
- the rehabilitation objectives, indicators and completion criteria.



Describe the transfer of responsibility to the landholder and the ongoing maintenance and monitoring that would be required for any features of mining activity, such as dams, levee banks, waterway diversions, other waterway barriers and other infrastructure that would remain after the mine is decommissioned.

Demonstrate where final voids and uncompacted overburden and workings at the end of mining would lie in relation to flood levels up to and including the 'probable maximum flood level', based on the Bureau of Meteorology's 'probable maximum precipitation' forecast for the locality from nearby watercourses such that the protection is sustainable for the foreseeable future. Management and maintenance arrangements should be supported by appropriate erosion and stability monitoring to substantiate long-term rehabilitation sustainability.

The EIS should include, but not be limited to:

- the predicted storage capacity of void water during annual exceedance probability 1 in 25, 1 in 50, 1 in 100, 1 in 200 and 1 in 1000-year rainfall events and potential for discharge
- the predicted quality of void water during potential release events
- the predicted impact on the environment caused by the release of any void water
- modelling and assessment of practicable management measures to mitigate contaminant increases in storage dams
- develop a monitoring program to be undertaken both during and after mining, to assess the performance of the proposed management measures
- the ability of the final void water to meet the rehabilitation criteria—being safe, stable and non-polluting.

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. Review and discuss alternatives to leaving a final void and derive a preferred option.

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 (GQAL) will be best utilised. Address minimising topsoil storage times (to reduce fertility degradation). Describe erosion and sediment control measures, particularly in relation to managing sodic and saline overburden material.

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.



3.2.3 Land contamination

Description of environmental values

Provide the following:

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

Potential impacts and mitigation measures

The EIS should discuss the management of any contaminated land and potential for contamination from construction, commissioning and operation, in accordance with the *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland*¹⁶ and the National Environment Protection (Assessment of Site Contamination) Measure 1999.

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 management of chemicals and fuels to prevent spills or leaks.

State intentions concerning classifying land contamination after project completion.

3.2.4 Land use and tenure

Description of environmental situation

Identify, with the aid of maps:

- land tenure, including reserves and extractive resource areas, tenure of special interest such as protected areas and forest reserves, identification of existing and proposed gas infrastructure, water pipelines, power lines and transport corridors, including local roads, state-controlled roads and rail corridors
- zoning and precincts of applicable local government planning schemes, development schemes and regional plans
- existing land uses and facilities surrounding the project
- provide land suitability maps of the mapped soil units and an agricultural land class map according to the *Planning Guideline: The Identification of Good Quality Agricultural Land*¹⁷. Comment on and assess any variation with the GQAL mapping shown in the planning scheme for the former Belyando Shire as required under *State Planning Policy 1/92: Development and the Conservation of*

¹⁶ Department of Environment, *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland*, Department of Environment, Brisbane, 1998, viewed 20 December 2010, www.derm.qld.gov.au/register/p00090aa.pdf

¹⁷ Department of Primary Industries and Department of Housing, Local Government and Planning, *Planning guidelines: The identification of good quality agricultural land*, 1993.



*Agricultural Land*¹⁸. Identify any land shown as strategic cropping land on current trigger maps

- areas covered by applications for native title claims or native title determinations, providing boundary descriptions of native title representative body/ies. The proponent should also identify whether there are any necessary notifications required to the representative body/ies or evidence that native title does not exist
- include the identification of affected stock routes in consultation with Stock Route Management Unit staff of the Department of Environment and Resource Management (DERM). Consider the impacts of this project on the management and operation of the Stock Route Network. Include potential impacts that are identified during the EIS process as the footprint of the development is finalised. Details should be provided on the location of proposed water pipelines, power lines and transport corridors, including local roads, state-controlled roads and rail corridors within and servicing the mining development that may impact on the Stock Route Network
- distance of the project from residential and recreational areas
- declared water storage catchments
- location of the project in relation to environmentally sensitive areas.

Assess the suitability of the soils mapped in the project area for rain fed, broad acre cropping and beef cattle grazing according to the limitations and land suitability classification system in Attachment 2 of the *Land Suitability Assessment Techniques in the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland*.¹⁹

Potential impacts and mitigation measures

Detail the potential for the construction and operation of the project to change existing and potential land uses of the project site and adjacent areas. Describe the following:

- impacts on surrounding land uses and human activities and strategies for minimisation, such as:
 - GQAL or strategic cropping land with particular reference to any residual impacts on the area, class or productivity of such land
 - key resource areas (refer to *State Planning Policy 2/07: Protection of Extractive Resources*²⁰ and its associated guideline²¹)
 - residential and industrial uses

¹⁸ Available from: www.dip.qld.gov.au/docs/ipa/spp1_92.pdf

¹⁹ Department of Minerals and Energy, *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland*, Department of Mines and Energy, 1995, viewed 10 January 2010, www.derm.qld.gov.au/environmental_management/land/mining/technical_guidelines.html

²⁰ Available from: www.dme.qld.gov.au/zone_files/land_tenure_pdf/dme_stateplan_policy.pdf

²¹ Department of Mines and Energy, *State Planning Policy 2/07 Guideline: Protection of Extractive Resources*, Department of Mines and Energy, Brisbane, 2007.



- possible effect on town planning objectives and controls, including local government zoning and strategic plans
- constraints to potential developments
- management of the immediate environs of the project including construction buffer zones
- the identification of the potential native title rights and interests likely to be impacted upon by the project and the potential for managing those impacts by an Indigenous land use agreement or other native title compliance outcomes
- mitigation strategies for potential adverse impacts of the project on the state's stock route network in consultation with DERM's Stock Route Management Unit
- proposed land use changes in any areas of high conservation value and information on how easement widths and vegetation clearance in sensitive environmental areas will be minimised
- potential issues involved in proximity and/or co-location of other current or proposed infrastructure services
- potential impacts on future road upgrades
- identification of any land units requiring specific management measures.

Avoid sterilisation of, or impact on, any of the State's coal mineral and petroleum and gas (including coal seam gas) resources and state significant extractive resources arising from the construction of the project or related infrastructure. If impact on or sterilisation of these resources is argued as unavoidable, justification should be provided.

3.3 Nature conservation

Detail the existing nature conservation values that may be affected by the proposal. The environmental values should be described in terms of:

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

The flora and fauna surveys should address species structure, assemblage, diversity and abundance. 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. Describe methodologies and standards used for flora and fauna surveys and compare them to best practice in the appendixes to the EIS.



Wherever possible, seek the involvement of the local Indigenous community to conduct field observations and survey activities, to identify the traditional and contemporary Indigenous uses of species.

Also, outline the proposed strategies to avoid, or minimise and mitigate impacts on the identified values by the project.

Identify key flora and fauna indicators for ongoing monitoring.

3.3.1 Sensitive environmental areas

Description of environmental values

On a map of suitable scale, identify areas in proximity to the project that are environmentally sensitive. This should include areas classified as having national, state, regional or local biodiversity significance, or flagged as important for their integrated biodiversity values. Refer also to both Queensland and Commonwealth Government legislation and policies on threatened species and ecological communities.

Areas regarded as sensitive with respect to flora and fauna have one or more of the following features that should be identified and mapped:

- important habitats of species listed as extinct in the wild, endangered, vulnerable or near threatened under the *Nature Conservation Act 1992* (Qld) or as extinct, extinct in the wild, critically endangered, endangered, vulnerable and conservation dependent under the EPBC Act
- regional ecosystems listed as 'endangered' or 'of concern' under state legislation, and/or ecological communities listed under the EPBC Act
- good representative examples of remnant regional ecosystems or regional ecosystems which are described as having 'medium' or 'low' representation in the protected area estate as defined in the Regional Ecosystem Description Database (REDD)²²
- 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 habitats for near-threatened or bio-regionally significant species
- sites in, or adjacent to, areas containing important resting, feeding or breeding sites for migratory species of conservation concern listed under the Convention of Migratory Species of Wild Animals, and/or bilateral agreements between Australia and Japan (JAMBA) and between Australia and China (CAMBA)
- sites adjacent to nesting beaches, feeding, resting or calving areas of species of special interest, for example, marine turtles, dugong and cetaceans

²² Available at: www.derm.qld.gov.au



- sites containing common species that represent a distributional limit and are of scientific value or which contain feeding, breeding or resting areas for populations of echidna, koala, platypus and other species of special cultural significance
- sites containing high biodiversity, for example areas identified in both the Desert Uplands and Brigalow Belt North Biodiversity Planning Assessments, 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)
 - degraded vegetation or other habitat 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 that provide important ecological functions such as
 - wetlands of national, state and regional significance
 - coral reefs
 - riparian vegetation
 - important buffer to a protected area
 - important habitat corridor between areas
- sites of palaeontologic significance such as fossil sites
- sites of geomorphological significance, such as lava tubes or karst
- protected areas which have been proclaimed under the NC Act and *Marine Parks Act 1982* (Qld) or are under consideration for proclamation
- areas of major interest, or critical habitat declared under the NC Act, high nature conservation value areas or areas vulnerable to land degradation under the VM Act.

Areas of special sensitivity include:

- the marine environment and 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
- colonial breeding species
- habitat of threatened plants, animals and communities



- protected areas which have been proclaimed under the NCA, including the Bygana West Nature Refuge.

Potential impacts and mitigation measures

Discuss all the likely direct and indirect impacts of the project on species, communities and habitats of local, regional or national significance in sensitive environmental areas as identified above. Cover terrestrial and aquatic environments and address any fragmentation impacts. Also, include human impacts and the control of any domestic animals introduced to the area.

Demonstrate how the project would comply with the following hierarchy:

- avoiding impact on areas of remnant vegetation and other areas of conservation value including listed species and their habitat
- mitigating impacts through rehabilitation and restoration including, where relevant, a discussion of any relevant previous experience or trials of the proposed rehabilitation
- measures to be taken to replace or offset the loss of conservation values where avoiding and mitigating impacts cannot be achieved.

Explain why the measures above would not apply in areas where loss would occur.

Discuss the boundaries of the areas impacted by the project within or adjacent to an endangered ecological community, including details of footprint width. Where the project area would impact upon a threatened community, the discussion should include reasons for the preferred alignment and the viability of alternatives.

Consider the high biodiversity values of Bygana West NR and, in accordance with mining best practice, first demonstrate ways to avoid impacting this area, second demonstrate mitigating measures and offsetting impacts relating to Bygana West Nature Refuge.

Address any actions of the project or likely impacts that require an authority under the NC Act, and/or would be assessable development for the purposes of the VM Act.

Outline how these measures will be implemented in the overall EMP for the project.

Where relevant, discuss environmental offset requirements in accordance with the *Queensland Government Environmental Offsets Policy*²³ and take into account the applicable specific-issue offset policies as follows:

- *Policy for Vegetation Management Offsets*²⁴

²³ Environmental Protection Agency, *Queensland Government Environmental Offsets Policy*, Environmental Protection Agency, Brisbane, 2008, viewed 10 January 2010, www.derm.qld.gov.au/services_resources/item_details.php?item_id=202749

²⁴ Department of Environment and Resource Management, *Policy for Vegetation Management Offsets*, version 2.4, Department of Environment and Resource Management, Brisbane, 2009, viewed 20 December 2010, www.derm.qld.gov.au/about/policy/documents/3450/veg_2006_2888.pdf



- *Mitigation and Compensation for Works or Activities Causing Marine Fish Habitat Loss*²⁵
- *Draft Policy for Biodiversity Offsets*²⁶
Proposals to offset unavoidable impacts to biodiversity values are to be made via use of the framework outlined in the *draft Policy for Biodiversity Offsets*, a specific issues offset policy in accordance with the Queensland Government Environmental Offsets Policy (QGEOP). The draft policy is due for finalisation in 2011. Any offset package should include offsets for the ecological values that will be lost as a result of the mine development and should be consistent with the principles of the Queensland Government Environmental Offset Policy 2008.

Describe any departure from no net loss of ecological values.

3.3.2 Terrestrial flora

Description of environmental values

Specifically assess any potential impacts on a category A or B environmentally sensitive area and propose measures to avoid impacts. Describe and assess the potential impacts of any actions of the project or likely impacts that require an authority under the NC Act, and/or would be assessable development for the purposes of the VM Act. The assessment and supporting information should be sufficient for the administering authority to decide whether an approval can be granted and to develop recommended conditions on any approval granted.

Provide vegetation mapping for all relevant project sites. 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.

Survey and describe terrestrial vegetation within the affected areas at an appropriate scale (maximum 1:10 000), *in accordance with the Queensland Herbarium's Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland*, (including reference to aerial photographs and ground-truthing), showing the following:

- location and extent of vegetation types using the regional ecosystem type descriptions in accordance with the REDD
- location of vegetation types of conservation significance based on regional ecosystem types and occurrence of species listed as protected plants under the Nature Conservation (Wildlife) Regulation 2006 and subsequent amendments, as well as areas subject to the VM Act. The EIS should identify remnant vegetation, namely areas mapped as being within remnant *least concern*, *of concern* and *endangered* regional ecosystems (REs) on the certified RE Map that occurs within

²⁵ Department of Primary Industries, *Mitigation and Compensation for Works or Activities Causing Marine Fish Habitat Loss*, Department of Primary Industries, Brisbane, 2002, viewed 20 December 2010, www.dpi.qld.gov.au/documents/Fisheries_Habitats/FHMOP005-Fish-Hab-Manage.pdf

²⁶ Environment Protection Agency, *Draft Policy for Biodiversity Offsets* (consultation draft), 2008, viewed 20 December 2010, www.derm.qld.gov.au/register/p02762aa.pdf



the project footprint. The EIS should further provide details of ground-truthing of mapped remnant vegetation to determine the actual area and extent of clearing of REs

- 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 and conservation reserves under the *Land Act 1991*)
- the location of any horticultural crops in the vicinity of the project area
- location and abundance of any exotic or weed species. Refer to Biosecurity Queensland's Annual Pest Distribution Survey 2008 data and predictive maps²⁷ and use the data in conjunction with Queensland Herbarium naturalised flora data to determine the occurrence of pest plants in the project area. Use Local Government area pest management plans to determine the occurrence of priority pest plants in the project area
- any plant communities of cultural, commercial or recreational significance.

Highlight sensitive or important vegetation types, including any marine littoral and subtidal zone and riparian vegetation, and their value as habitat for fauna, and conservation of specific rare floral and faunal assemblages or community types. The description should contain a review of published information assessing the significance of the vegetation to conservation, recreation, scientific, educational and historical interests. . The assessment should also include a description of vegetation (including re-growth and restored areas in addition to remnant vegetation) to indicate any areas of national, state, regional or local significance.

For each significant natural vegetation community likely to be impacted by the project, vegetation surveys should be undertaken at an appropriate number of sites, allowing for seasonal factors, and satisfying the following:

- the relevant regional vegetation management codes
- 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 surveys to include species structure, assemblage, diversity and abundance
- the relative abundance of plant species present to be recorded
- any plant species of conservation, cultural, commercial or recreational significance to be identified
- survey data should include tree heights, canopy cover and species composition sufficient to determine the remnant status of the vegetation and identify the regional ecosystems

²⁷ Available from: www.dpi.qld.gov.au/4790_9824.htm



- specimens of species of conservation significance, including those listed as protected plants under the Nature Conservation (Wildlife) Regulation 2006 (other than common species) are to be submitted to the Queensland Herbarium with sufficient information to enable their lodgement as voucher specimens.

Existing information on plant species may be used instead of new survey work, provided that the data is derived from previous surveys at the site consistent with the above methodology.

Potential impacts and mitigation measures

Discuss all foreseen direct and indirect impacts on vegetation and the potential level of environmental harm to the ecological values of the area arising from the construction, operation and decommissioning of the project, including clearing, removal of vegetation or salvaging of vegetation for translocation. Consideration of impacts should include the quantity of vegetation to be removed (in terms of the total area), whether the proposal will bisect remnants and the magnitude of edge effects. Short and long-term impacts should be considered with comment on whether they are reversible or irreversible.

With regard to all components of the project, include:

- any management actions to minimise vegetation disturbance and clearance
- a discussion of the ability of identified vegetation to withstand any increased pressure resulting from the project and any measures proposed to mitigate potential impacts
- where loss of native vegetation is unavoidable, a proposal for offsets consistent with the *Queensland Government Environmental Offsets Policy*²⁸
- 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
- a discussion of the potential environmental harm on flora due to any alterations to the local surface and groundwater environment with specific reference to impacts on riparian vegetation or other sensitive vegetation communities.

Outline how these measures will be implemented in the overall EMP for the project.

For clearing remnant vegetation located outside mining leases i.e. clearing for the Railway Corridor, the EIS should address *Part S: Requirements for clearing for significant projects* within the relevant regional vegetation management code (RVMC). Specifically, the EIS should demonstrate how the project meets performance requirements (PR) S.1 to S.10 of the relevant RVMC.

²⁸ Environmental Protection Agency, *Queensland Government Environmental Offsets Policy*, Environmental Protection Agency, Brisbane, 2008, viewed 10 January 2010, www.derm.qld.gov.au/services_resources/item_details.php?item_id=202749



In order to meet one or more of the PRs of the relevant RVMC, the EIS may be required to provide for vegetation management offsets. Any offset is required to meet the *Policy for Vegetation Management Offsets – version 2.4*, dated 21 October 2009. The EIS should provide evidence to show that it will be achievable for such offsets to be provided and that it is practicable for the proponent to meet the Offset Policy. The *Environmental Protection and Other Legislation Amendment Act 2009* deals with offsets in development conditions and will be proclaimed shortly.

The EIS should provide digital spatial data of clearing within the Railway Corridor in ESRI shapefile format to assist in assessment against the relevant RVMC.

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 state or federal government biodiversity protection legislation or policy should be discussed.

Weed management strategies are required for containing existing weed species (e.g. parthenium and other declared plants) and ensuring no new declared plants are introduced to the area. Refer to the local government authority's pest management plan and any strategies and plans recommended for the project area by Biosecurity Queensland. Discuss the strategies in accordance with the provisions of the *Land Protection (Pest and Stock Route Management) Act 2002* in the main body of the EIS and in the pest management plan within the EMP for the project.

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', consistent with *Queensland Government Environmental Offsets Policy*²⁸ to compensate for any loss of vegetation. Offsets must be discussed with regard to impacts on EPBC matters, reference should be made to the eight principals set out in the Department's Draft *Policy Statement: Use of Environmental Offsets under the Environment Protection and Biodiversity Conservation Act 1999*.

3.3.3 Terrestrial fauna

Description of environmental values

Describe the terrestrial and riparian fauna occurring in the areas affected by the proposal, noting the broad distribution patterns in relation to vegetation, topography and substrate. Wildlife corridors and refugia should be identified and mapped. DERM has produced draft guidelines for aquatic and terrestrial fauna surveying methodology²⁹. The methodologies within these guidelines should be used to assess fauna within the project area. Targeted surveys should be undertaken for EPBC listed fauna and flora likely to be impacted upon by the proposal and include opportunistic surveys for any other potentially occurring fauna and flora.

²⁹ *Terrestrial fauna survey assessment guidelines for Queensland v1.0 2011 (draft)*



The description of the fauna present or likely to be present in the area should include:

- species diversity (i.e. a species list) and abundance of animals of recognised significance , including birds, reptiles and mammals (including bats)
- any species that are poorly known but suspected of being near-threatened or threatened
- habitat requirements and sensitivity to changes; including movement corridors and barriers to movement
- the existence of feral or introduced animals including those of economic or conservation significance. Refer to Biosecurity Queensland's Annual Pest Distribution Survey 2008 data and predictive maps.³⁰ Use Local Government area pest management plans to determine the occurrence of priority pest animals in the project area
- existence (actual or likely) of any species/communities of conservation significance 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 or threatened species recovery plans)
- habitat requirements and sensitivity to changes, including movement corridors and barriers to movement
- an estimate of commonness or rarity for the listed or otherwise significant species
- use of the area by migratory and nomadic fauna in particular areas for breeding or significant congregations.
- an indication of how well any affected communities are represented and protected elsewhere in the bio-region where the project occurs
- provide relevant site data. Describe the occurrence of feral species in the project area.

The EIS should contain results from surveys for these species. Surveys should be conducted at the appropriate time of the year when the species is known to be present on the site, so that identification and location of these species is optimal.

The proponent must submit methodology used for fauna surveys to DERM for approval prior to commencing surveys. Fauna survey methodology should be specified in the appendices to the report. The EIS should also indicate how well any affected significant communities and species are represented and protected elsewhere in the region where the project is proposed. Relevant site data should be provided to DERM in a format compatible with the Wildlife Online³¹ database for listed threatened species.

³⁰ Available from: www.dpi.qld.gov.au/4790_9824.htm

³¹ Formerly the WildNet database. Refer to www.derm.qld.gov.au/wildlife-ecosystems/wildlife/wildlife_online/index.html



Potential impacts and mitigation measures

The assessment of potential impact should discuss all foreseen direct and indirect effects on EPBC and State listed terrestrial fauna, relevant wildlife habitat identified, including:

- direct and indirect impacts due to loss of range/habitat, food supply, nest sites, breeding/recruiting potential or movement corridors or as a result of hydrological change
- impacts on species of conservation significance
- cumulative effects of direct and indirect impacts
- identification of the conservation importance of identified populations at the regional, state and national levels
- whether the proposal will bisect habitat areas
- threatening processes leading to progressive loss.

Strategies for protecting rare or threatened species should be described, and any obligations imposed by state or federal government threatened species legislation or policy should be discussed.

Describe and assess the potential impacts of any actions of the project or likely impacts that require an authority under the NC Act, and/or would be assessable development for the purposes of the VM Act. The assessment and supporting information should be sufficient for the administering authority to decide whether an approval should be granted and to develop recommended conditions.

With respect to mitigation strategies, provide the following:

- measures to avoid and mitigate the identified impacts. Any provision for buffer zones and movement corridors, nature reserves or special provisions for migratory animals should be discussed and coordinated with the outputs of the flora assessment
- 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 complying with the objectives and management practices of relevant recovery plans.

Outline how these measures will be implemented in the overall EMP for the project. Rehabilitation of disturbed areas should incorporate, where appropriate, provision of nest hollows and ground litter.

Any EPBC or State recovery plans for potentially affected threatened species should be outlined, and strategies for complying with the objectives and management practices of relevant recovery plans should be described. 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.

Address feral animal management strategies and practices. The study should develop strategies to ensure that the project does not contribute to increased encroachment of a feral animal species. Refer to the local government authority's pest management plan and any strategies and plans recommended for the project area by Biosecurity Queensland. Discuss the strategies in accordance with provisions of the *Land Protection (Pest and Stock Route Management) Act 2002* in the main body of the EIS and in the pest management plan within the EMP for the project.

3.3.4 Aquatic ecology

Description of environmental values

Describe the aquatic flora and fauna occurring in the areas affected by the proposal, noting the patterns and distribution in the waterways (e.g. rivers, streams, creeks and other bodies of water) and any associated wetlands. The description of the flora and fauna 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 any associated wetlands
- any near-threatened or threatened aquatic species
- reference to Ramsar wetlands of international importance in terms of proximity to proposal and likelihood of impacts
- a description of the habitat requirements and the sensitivity of aquatic species to changes in flow regime, water levels and water quality in the project areas
- aquatic plants including native and exotic/weed species. Refer to Biosecurity Queensland's Annual Pest Distribution Survey 2008 data and predictive maps³² and use the data in conjunction with Queensland Herbarium naturalised flora data to determine the occurrence of aquatic pest plants in the project area. Use Local Government area pest management plans to determine the occurrence of priority aquatic pest plants in the project area
- aquatic and benthic substrate
- habitat upstream and downstream of the project or potentially impacted due to currents in associated lacustrine and aquatic environments
- an identification of all types of groundwater-dependent ecosystems occurring within and outside the project area and potentially impacted by project activities. Include a description to Order or Family taxonomic rank of the presence and nature of stygofauna occurring in groundwater likely to be affected by the project. Sampling and survey methods should be in accordance with the best practice guideline currently published by the Western Australian Environmental Protection

³² Available from: www.dpi.qld.gov.au/4790_9824.htm



Authority – Guidance for the assessment of environmental factors No.54 (December 2003) and No.54a (August 2007). Assess the environmental water requirements for protecting the identified groundwater-dependent ecosystems. Groundwater-dependent ecosystems may include:

- subterranean ecosystems
- phreatophytic terrestrial and riparian vegetation
- springs and other wetlands
- stream communities dependent on baseflow
- aquatic substrate and stream type, including the locations and extent of any permanent and semi-permanent water holes or streams potentially affected by the mine and its operations and location.

Describe the significance of national, state or regional wetlands including wetlands of international importance, and their values and importance for aquatic flora and fauna species.

A map is to be included which identifies aquatic ecosystems in the project area and regional scale.

Potential impacts and mitigation measures

Discuss the potential permanent and temporary impacts of the project on the aquatic ecosystems and describe proposed measures to avoid, minimise or mitigate actions, including:

- details of proposed stream diversions, causeway construction and crossing facilities, stockpiled material and other impediments that would restrict free movement of aquatic fauna
- measures to avoid fish spawning periods, such as seasonal construction of waterway crossings and measures to facilitate fish movements through water crossings
- details of alternatives to waterway crossings where possible
- offsets proposed for unavoidable, permanent loss of fisheries habitat
- a description of methods to minimise the potential for introducing and/or spreading weed species or plant disease
- measures to avoid or mitigate potential impacts on groundwater-dependent ecosystems. Describe the proposed monitoring for each identified groundwater-dependent ecosystem. In any groundwater aquifers found to contain stygofauna, describe the potential impacts on stygofauna of any changes in the quality and quantity of the groundwater, and describe any mitigation measures that may be applied
- monitoring of aquatic ecology health, productivity and biodiversity in areas upstream and downstream of the project area.



Address any actions of the project or likely impacts that require an authority under the relevant legislation including the NC Act and/or the *Fisheries Act 1994*. Outline how these measures will be implemented in the overall EMP for the project.

3.4 Water resources

3.4.1 Description of environmental values

Describe the existing water resources that may be affected by the project in the context of environmental values as defined in such documents as the EP Act, *Environmental Protection (Water) Policy 2009 (EPP (Water))*,³³ *Australia and New Zealand Guidelines for Fresh and Marine Water Quality*³⁴ and the *Queensland Water Quality Guidelines*.³⁵

Describe present and potential users and uses of water in areas potentially affected by the project, including municipal, agricultural, industrial and recreational uses of water, and reference to any licences held by users. Provide a detailed description of the quality and quantity of surface and groundwater resources in the area potentially affected by the project. Describe:

- existing surface and groundwater in terms of physical, chemical and biological characteristics
- existing surface drainage patterns, flows, history of flooding including extent, levels and frequency and present water uses.

Describe the surface water and groundwater quality considering seasonal variations in depth and flow and all times of natural flow in ephemeral streams. Parameters should include a broad range of water quality indicators including, but not necessarily limited to:

- electrical conductivity
- major cations and anions
- dissolved metals (including Al, Ag, As, B, Br, Ca, Co, Cr, Cu, Fe, Hg, Mo, Mn, Ni, Pb, Se, U, V, Zn)
- minor ions (such as ammonia, nitrite, nitrate, fluoride)
- hydrocarbons
- any other potential toxic or harmful substances
- turbidity

³³ Available from www.legislation.qld.gov.au

³⁴ Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, *The Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, 2000, viewed 15 December 2010, www.mincos.gov.au/publications/australian_and_new_zealand_guidelines_for_fresh_and_marine_water_quality

³⁵ Department of Environment and Resource Management, *Queensland Water Quality Guidelines 2009*, Department of Environment and Resource Management, Brisbane, 2009, viewed 20 December 2010, www.derm.qld.gov.au/environmental_management/water/queensland_water_quality_guidelines/queensland_water_quality_guidelines_2009.html



- suspended sediments
- pH.

All sampling should be performed in accordance with the *Monitoring and Sampling Manual 2009*³⁶ or the most current edition. The description of water quality should include medians, ranges and percentiles appropriate for comparison with appropriate trigger levels and guidelines for the protection of aquatic ecosystems and downstream users.

Investigate the relationship between groundwater and surface water to assess the nature of any interaction between the two resources and any implications of the proposed mine that would affect the interaction.

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

- values identified in the EPP (Water)³⁷
- physical integrity, fluvial processes and morphology, including riparian zone vegetation and form, if relevant
- any impoundments (e.g. dams, levees, weirs etc.)
- hydrology of waterways and groundwater
- sustainability, including both quality and quantity
- dependent ecosystems
- existing and other potential surface and groundwater users
- details of any proposed buffer widths between project activities and waterways (e.g. rivers, streams, creeks, other bodies of water and wetlands) and other fisheries values, as well as any potential temporary and/or permanent impacts to aquatic flora and fauna (if any)
- any water resource plans relevant to the affected catchments.

If the project is likely to use or affect local sources of groundwater, describe the groundwater resources in the area in terms of:

- a comprehensive hydrogeological description covering: the coal seams and surrounding aquifers, both artesian and sub-artesian (including the Great Artesian Basin); inter-aquifer connectivity; flow of water; recharge and discharge mechanisms; and hydrogeological processes at work
- current extraction regime
- geology/stratigraphy
- aquifer type—such as confined and unconfined

³⁶ Department of Environment and Resource Management, *Monitoring and Sampling Manual 2009*, version 2, Department of Environment and Resource Management, Brisbane, 2009, viewed 20 December 2010, www.derm.qld.gov.au/environmental_management/water/pdf/monitoring-man-2009-v2.pdf

³⁷ Available from www.legislation.qld.gov.au



- depth to and thickness of the aquifers
- depth to water level and seasonal changes in levels
- groundwater flow directions (defined from water level contours)
- interaction with surface water
- possible sources of recharge
- potential exposure to pollution
- current access to groundwater resources in the form of bores, springs, ponds, including quantitative yield of water and locations of access.

The groundwater assessment should also be consistent with relevant guidelines for the assessment of acid sulfate soils, including spatial and temporal monitoring, to accurately characterise baseline groundwater characteristics.

For the taking of groundwater, the EIS should review the significance of groundwater in the project area, together with groundwater use in neighbouring areas. Specific reference should be made to relevant legislation or water resource plans for the region. The review should also assess the potential take of water from the aquifer and how current users and the aquifer itself and any connected aquifers will be affected.

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

- location, type and status of existing water entitlements and associated infrastructure (bores, wells or excavations)
- pumping parameters
- draw down and recharge at normal pumping rates
- seasonal variations (if records exist) of groundwater levels.

Develop a network of observation points that would satisfactorily monitor groundwater resources both before and after commencement of operations.

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.

3.4.2 Potential impacts and mitigation measures

Assess potential impacts, including long-term indirect impacts of the project on water resource environmental values identified in the previous section. Define and describe the objectives and practical measures for protecting or enhancing water resource environmental values, to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed. Address and describe the following matters, including provision of maps:



- potential impacts on the flow and the quality of surface and groundwater from all phases of the project, with reference to their suitability for the current and potential downstream uses and discharge licences
- all likely impacts on groundwater depletion or recharge regimes
- the likely volume of groundwater to be dewatered during the operations, and its likely quality characteristics, including salinity
- the impacts on groundwater resources in each aquifer of any take of groundwater or dewatering as a result of the mine's operation, including any potential migration and risks associated with the inter-basin transfer of water
- how extracted groundwater will be managed in the surface water management system to minimise the likelihood of discharging highly saline water
- measures to prevent, mitigate and remediate any impacts on existing users or groundwater-dependent ecosystems
- the potential environmental impact caused by the project (and its associated project components) to local groundwater resources, including the potential for groundwater-induced salinity
- the response of the groundwater resource to the progression and finally cessation of the proposal
- the project's impact on the local groundwater regime caused by the altered porosity and permeability of any land disturbance
- any potential for the project to impact on groundwater-dependent vegetation, including avoidance and mitigation measures
- potential impacts of surface water flow on existing infrastructure, with reference to the EPP (Water) and the *Water Act 2000*
- chemical and physical properties of any wastewater including stormwater at the point of discharge into natural surface waters, including the toxicity of effluent to flora and fauna
- how contaminants and wastes are avoided, minimised, treated and managed in accordance with section 13 of EPP (Water)
- environmental monitoring to check the effectiveness of mitigation measures
- potential impacts on other downstream receiving environments, considering the available assimilative capacity of the receiving waters, if it is proposed to discharge water to a riverine system
- if it is proposed to discharge water to a riverine system, mitigation measures for water treatment
- the results of a risk assessment for uncontrolled releases to water due to system or catastrophic failure, implications of such emissions for human health and natural ecosystems, and strategies to prevent, minimise and contain impacts
- the potential to contaminate surface and groundwater resources and measures to prevent, mitigate and remediate such contamination.



Describe and address the impacts of subsidence, including but not limited to:

- surface water resources
- local drainage patterns
- floodplains and overland flows
- areas susceptible to higher levels of erosion, such as watercourse confluences
- ponding areas within the floodplain
- volumes of local and large-scale catchment runoff, including the interception of low flow events
- downstream users
- infrastructure within and above the watercourse.

Assess any potential surface water and groundwater interaction as a result of subsidence of a watercourse. Also assess the potential impacts on the groundwater regime in alluvial and deeper aquifers due to altered porosity, permeability and interconnectivity from any land disturbance, including subsidence.

Assess the potential impacts of subsidence on the sediment load within watercourses. Identify any existing Quarry Material Allocation Notice (QMAN) holders in, or downstream of, subsidence areas; and if there are any QMAN holders, assess whether there would be potential impacts on their resource or entitlement. Provide mitigation measures for any impacts on any QMAN holders.

Assess the impacts of subsidence on the ecological condition of the bed and banks of surface drainage and in-stream ecology, including fish passage.

Assess the impacts of subsidence effects on terrestrial ecosystems (including which vegetation communities and flora species are most likely to be affected by changes to surface hydrology). This section is to include a summary of international empirical research on the short-term and long-term impacts of subsidence on:

- aquatic ecosystems (including creeks, rivers and swamps)
- terrestrial ecosystems (including the impacts of lowered water tables on native vegetation)
- biota

Detail measures that would mitigate the impacts of subsidence.

Describe and illustrate any proposed diversions of watercourses, including any staging and whether the diversions are proposed to be temporary or permanent. Describe, using photographic evidence, the geomorphic condition of any watercourses likely to be affected by disturbance or stream diversion. The results of this description will form the basis for the planning and subsequent monitoring of rehabilitation of the watercourses during or after the operation of the proposal. Base the design of any diversions on the geomorphic condition of the original watercourses and demonstrate consideration of, and accordance with, best practice guidelines and



reports, such as those produced by DERM or the Australian Coal Association Research Program for mines in the Bowen Basin. The EIS should contain enough information on each diversion to demonstrate the diversion can be constructed to meet engineering requirements and be monitored and managed in accordance with relevant best practice guidelines.

Outline the impacts on all surface water resources and changes to flow immediately downstream of the project by describing:

- local overland flow catchment characteristics and estimated change to mean and median (50th percentile) annual run-off from local overland flow catchments
- changes to flows, including mean and median (50th percentile) annual flow, in watercourses immediately downstream of the site.

Describe the options for supplying water to the project, and assess the consequential impacts in relation to any water resource plan, resource operations plan and wild river declaration that may apply. Water allocation and water sources will be established in consultation with DERM. Detail the proposed capacities of water storages and indicate whether they would capture clean water (including overland flow) or would hold mine-affected water to comply with an environmental authority.

The EIS should outline all of the approvals required under the *Water Act 2000*, *Water Regulation 2002* and subordinate legislation to complete the project, including construction and operational stages

Depending on the details on site, a license or permit under the *Water Act 2000* may be required to access groundwater resources. Development permits may also be required under the *Sustainable Planning Act 2009* (SPA). Water accessed from SunWater storages would require a Water Allocation issued by DERM.

Any interference with water flow in a watercourse would require a license under the *Water Act 2000*.

Works that would normally require a riverine protection permit can be completed by following the Mining “Entities Guidelines” Guideline - *Activities in a Watercourse, Lake or Spring associated with Mining Operations WAM/2008/3435 – Version 2*.

Reference should be made to the properties of the land disturbed and processing liquid 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.

Describe the proposed stormwater drainage system and the proposed disposal arrangements, including any off-site services. Illustrate the description with figures and contours at suitable intervals (one metre contours in areas of low relief), showing drainage pathways and the locations and discharge points of sediment detention basins and any other stormwater quality improvement devices.



The stormwater drainage system should be appropriate for:

- the topography of, and climatic conditions affecting, the receiving environment
- soil type, its characteristics and the way it is managed
- the characteristics and containment of the material or waste that is exposed to rainfall or stormwater run-off.

Describe management strategies in adequate detail to demonstrate best practice management and the environmental values of receiving waters will be maintained to nominated water quality objectives. Describe the monitoring programs that will assess the effectiveness of management strategies for protecting water resources during the construction, operation and decommissioning of the project. Such programs will include upstream and downstream sampling sites at the proposed area and at reference locations, i.e. non-impacted sites. Downstream monitoring will include sites located near the proposed discharge points in addition to other relevant downstream locations. Sites will include permanent and semipermanent water holes, known aquatic habitats, weirs or reservoirs. Obtain and discuss complementary stream flow data (where available) to aid interpretation. Outline how management strategies will be incorporated into appropriate sections of the EMP.

Identify the principles and objectives of the proposed monitoring in the coal seams and surrounding aquifers and include a supporting rationale for the monitoring. The approach should describe the parameters to be monitored, the frequency of monitoring and the proposed recording mechanisms and reporting arrangements.

The EIS must address where there will be requirements for a Riverine Protection Permit. Where a Riverine Protection Permit is required the information that must be included should conform to agency advice.

Address where there will be a requirement for a Quarry Material Allocation and an associated Development Approval under the Sustainable Planning Act.

3.5 Air quality

3.5.1 Description of environmental values

Describe the existing air quality that may be affected by the project in the context of environmental values as defined by the EP Act and *Environmental Protection (Air) Policy 2008*.

Discuss the existing air shed environment—both local and regional—including:

- background levels and sources of particulates, gaseous and odorous compounds and any major constituent
- pollutants including greenhouse gases which may be affected by the project
- baseline monitoring results, sensitive receptors



- gathering data on local meteorology and ambient levels of pollutants to provide a baseline for later studies or for modelling air quality environmental harms.

Parameters should include air temperature, wind speed and direction, atmospheric stability, mixing depth and other parameters necessary for input to the models.

3.5.2 Potential impacts and mitigation measures

For air quality impacts and their mitigation:

- include an inventory of air emissions from the project expected during construction and operational activities
- accurately describe the activities carried out on the site; include a process flow diagram clearly showing all unit operations to be carried out on the premises; and provide a detailed discussion of all unit operations
- describe all pollution control equipment and pollution control techniques employed on the premises and the features of the proposal designed to suppress or minimise emissions, including dusts
- describe the back-up measures that will act in the event of primary measures failing, to minimise the likelihood of upsets and adverse air impacts
- provide an air emission inventory of the proposed site for all potential points, area and volume sources including fugitive emissions of dusts; provide a complete list of emissions to the atmosphere including SO_x, NO_x, CO₂, particulates, PM₁₀ and PM_{2.5}
- identify all expected emissions of the hazardous air pollutants and their emissions from known and fugitive sources
- estimate emission rates, based on actual measurements of samples taken from similar facilities—either full-scale facilities operating elsewhere, or experimental or demonstration-scale facilities. Where this is not possible, use published emission factors and/or data supplied by manufacturers of process and control equipment
- provide an impact assessment with relevant inputs of emissions and local meteorology to an air dispersion model to estimate the likely impacts on the surrounding environment. The model inputs should be as detailed as possible, reflecting any variation of emissions with time and including at least a full year of representative hourly meteorological data. Estimate maximum ground level concentration and monthly average dust deposition values at the nearest sensitive receptor(s). Present the results of the dispersion modelling as concentration contour plots and concentrations at the discrete sensitive receptors. The predicted ground level concentration should be made for both normal and expected maximum emission conditions and the worst case meteorological conditions should be identified and modelled where necessary
- describe the background ambient air concentration from the existing sources in the airshed and evaluate the cumulative impact on the receiving environment. Address both acute and cumulative impacts by considering the project in conjunction with existing and known future emission sources within the region



- provide an averaging period for ground level concentrations of pollutants that are modelled. This should be consistent with the relevant averaging periods for air quality indicators and goals in the EPP (Air) and the National Environment Protection (Ambient Air Quality) Measure 1998.³⁸ For example, the modelling of PM10 must be conducted for 1 hour, 24 hours and annual averaging periods
- identify the worst case meteorological conditions based on the modelled ground level predictions and, using this information, develop dust mitigation measures for the mining activities. Describe the dust management plan that will be employed to mitigate adverse air impacts under the worst meteorological conditions
- discuss the limitations and accuracy of the applied atmospheric dispersion models. The air quality modelling results should be discussed in light of the limitations and accuracy of the applied models
 - where there is no single atmospheric dispersion model that can 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
- identify 'worst case' emissions that may occur during operation. If these emissions are significantly higher than those for normal operations, it will be necessary to evaluate the worst-case impact as a separate exercise to determine whether the planned buffer distance between the facility and neighbouring sensitive receptors will be adequate
- ground level predictions should be made at any sensitive receptor including proposed accommodation camps and any residential, industrial, agricultural, commercial and community developments believed to be sensitive to the effects of predicted emissions
- discuss dust generation from construction activities, especially in areas where construction activities are adjacent to existing road networks or are in close proximity to sensitive receivers
- discuss climatic patterns that could affect dust generation and movement
- discuss vehicle emissions and dust generation along major road and rail haulage routes both internal and external to the project site
- assess human health risk associated with emissions from the facility of all hazardous or toxic pollutants.
- discuss impacts on terrestrial flora and fauna.

Discuss potential air quality impacts from emissions with reference to the National Environment Protection (Ambient Air Quality) Measure 1998 and the EPP (Air). If an emission is not addressed in these legislative instruments, the emission should be discussed with reference to its risks to human health, including appropriate health-based guidelines/standards.

³⁸ Available from www.legislation.gov.au



To ensure that appropriate coal rail transport-related dust mitigation measures are implemented at the project, the proponent should consult with QR National's Network Division to determine the likely requirements for new or upgraded coal-loading facilities, load controls and spray-on coal dust suppressant systems as a result of implementing the Transitional Environmental Program and *QR Coal Dust Management Plan* across all coal railways in Queensland.

3.6 Greenhouse gas emissions

3.6.1 Description of environmental situation

Provide an inventory of projected annual emissions for each relevant greenhouse gas, with total emissions expressed in 'CO₂ equivalent' terms for the following categories:

- scope one emissions, where 'scope one emissions' means direct emissions of greenhouse gases from sources within the boundary of the facility and as a result of the facility's activities
- scope two emissions, where 'scope two emissions' means emissions of greenhouse gases from the production of electricity, heat or steam that the facility will consume, but that are physically produced by another facility.

Briefly describe method(s) by which estimates were made.

The Department of Climate Change *National Greenhouse Accounts (NGA) Factors*³⁹ 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. As a requirement of the *National Greenhouse Accounts (NGA) Factors*, estimates should include the loss of carbon sink capacity of vegetation due to clearing and impoundment.

3.6.2 Potential impacts and mitigation measures

Discuss the potential for greenhouse gas abatement measures, including:

- a description of the proposed measures (alternatives and preferred) to avoid and/or minimise direct greenhouse gas emissions
- an assessment of how the preferred measures minimise emissions and achieve energy efficiency
- an indication of how the preferred measures for emission controls and energy consumption compare with practice in the relevant sector of industry with a view to achieving best practice environment management

³⁹ Department of Climate Change and Energy Efficiency, *National Greenhouse Accounts (NGA) Factors*, Department of Climate Change and Energy Efficiency, Canberra, 2010, viewed 20 December 2010, www.climatechange.gov.au/~media/publications/greenhouse-acctg/national-greenhouse-factors-july-2010-pdf.pdf



- a description of any opportunities for further offsetting greenhouse gas emissions through indirect means including sequestration and carbon trading.

The environmental management plan in the EIS should include a specific module to address greenhouse abatement. That module should include:

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

3.7 Noise and vibration

3.7.1 Description of environmental values

Describe the existing noise and vibration environment that may be affected by the project in the context of environmental values as defined by the *Environmental Protection (Noise) Policy 2008* (EPP (Noise)). DERM's *Noise Measurement Manual*⁴⁰ should be considered and references should be made to the EPA's *Guideline: Noise and Vibration from Blasting*.⁴¹

Identify sensitive noise receptors adjacent to all project components and estimate typical background noise and vibration levels based on surveys at representative sites. Include proposed accommodation camps as sensitive noise receptors. Discuss the potential sensitivity of such receptors and nominate performance indicators and standards. The locations of any noise sensitive receptors, as listed in Schedule 1 of EPP (Noise), should be identified on a map at a suitable scale.

Where a railway is also proposed to be constructed and operated, conduct an assessment of the acoustic impacts of the rail in the context of:

⁴⁰ Department of Environment and Resource Management, *Noise Measurement Manual*, 3rd edn, Department of Environment and Resource Management, Brisbane, 2000, viewed 20 December 2010 www.derm.qld.gov.au/register/p00367aa.pdf

⁴¹ Environment Protection Agency, *Guideline: Noise and vibration from blasting*, Environment Protection Agency, Brisbane, 2006, viewed 20 December 2010, www.derm.qld.gov.au/register/p01382aa.pdf



- the *QR Code of Practice for Railway Noise Management*⁴² for external design level noise criteria
- meeting indoor design level noise criteria to achieve average maximum sound level between 10:00pm and 6:00am of 45 decibels (dB).

3.7.2 Potential impacts and mitigation measures

Describe the impacts of noise and vibration generated during the construction and operational phases of the project. Noise and vibration impact analysis should include:

- the levels of noise and vibration generated, including noise contours, assessed against current typical background levels, using modelling where appropriate
- impact of noise, including low frequency noise (noise with components below 200 Hz) and vibration at all potentially sensitive receivers compared with the performance indicators and standards nominated above
- impact on terrestrial and aquatic fauna
- proposals to minimise or eliminate these effects, including details of any screening, lining, enclosing or bunding of facilities, or timing schedules for construction and operations that would minimise environmental harm and environmental nuisance from noise and vibration.

Any impact on human health at sensitive receptors (including accommodation camps) must be appropriately mitigated to achieve a satisfactory internal noise level for the preservation of health and well-being identified within the *Environmental Protection (Noise) Policy 2008*. Provide management options at sensitive receptors when noise attenuation at the source does not adequately reduce noise generation.

3.8 Waste

3.8.1 Waste generation

Provide an inventory of all wastes to be generated by the project during the construction, operational and decommissioning phases of the project. In addition to the expected total volumes of each waste produced, include an inventory of the following per-unit volume of product produced:

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

Provide schematic diagrams of processes to be used at each distinct stage of the project, indicating each waste stream and its intended fate. This applies to all waste outputs—solid, liquid and gaseous—including fugitive emissions from coal seams, and recycling efforts such as stockpiling and reusing topsoil. The schematic diagrams, or an associated table, will cross-reference the relevant sections of the EIS

⁴²QR National, *QR Code of Practice for Railway Noise Management*, 2007, viewed 18 January 2011, www.qrnational.com.au/Corporate/OurCommitment/Environment/Documents/Noise_Code_Practice_2007.pdf



where the potential impacts and mitigation measures associated with each waste stream are described. Describe the physical and chemical characteristics and the variability of composition and generation rates of each waste material.

In each subsection on waste management, assess how the proposed methods for waste management at each stage of the project achieve the highest possible level on the waste management hierarchy with regard to the principles in the *Environmental Protection (Waste Management) Policy 2000*.

Describe how the project would achieve natural resource use efficiency (such as minimum use of energy and water, and minimum footprint on used land), integrated processing design, co-generation of power and by-product re-use as shown in a material/energy flow analysis. This information is required to enable the resource management agencies and other stakeholders to assess the efficiency of resource use, and allocation issues.

3.8.2 Waste management

Having regard for best practice waste management strategies and the *Environmental Protection (Waste Management) Policy 2000* and the Environmental Protection (Waste Management) Regulation 2000, assess the potential impact of all wastes generated during construction and operation and provide details of each waste in terms of:

- the options available for avoidance/minimisation
- operational handling and fate of all wastes including storage
- on-site treatment methods proposed for any wastes
- methods of disposal proposed to be used for any trade wastes, liquid wastes and solid wastes (including the need to transport wastes off site for disposal)
- the potential level of impact on environmental values
- measures to ensure stability of the waste storage areas and impoundments
- methods to prevent seepage and contamination of groundwater from stockpiles and/or storage areas and impoundments
- measures to minimise attraction of vermin, insects and pests
- options available for using recycled materials
- market demand for recyclable waste (where appropriate)
- decommissioning of the construction site.

Provide details of waste management strategies (including reduction, re-use, recycling, storage, transport and disposal of waste) which demonstrate that waste minimisation and cleaner production techniques and designs have been implemented through the selection of processes, equipment and facilities to prevent or minimise environmental impacts.



Provide information on the variability, composition and generation rates of all waste produced at the site and processing plant.

Detail cleaner production waste management planning, especially how these concepts have been applied to prevent or minimise environmental impacts at each stage of the proposal. Present measures to improve natural resource use efficiency (e.g. energy and water), integrated processing design, any co-generation of power and by-product re-use, as shown in a material/energy flow analysis.

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

Air emissions

Provide information on air emissions, including particulates, fumes and odours during the construction and operation stages of the project. Particulate emissions include those that would be produced by any industrial process, or disturbed by wind action on stockpiles and conveyors, or by transportation equipment (e.g. trucks—either by entrainment from the load or by passage on unsealed roads). The methods to be employed in the mitigation of impacts from air emissions should be described in section 3.5, Air quality.

Excavated waste

Describe the materials to be excavated as waste; describe and illustrate the location, design and methods for constructing dumps for waste rock and any subsoil that will not be replaced in rehabilitation, including the following:

- an estimation of the tonnage and volume of waste rock and subsoil to be excavated during the various stages of operation
 - provide an estimate for each separate rock and soil type; describe the expected proportion and source of waste rock that is mineralised but currently uneconomical for processing
- a description of the chemical and physical properties of the waste rock and subsoil, and assessment of the properties that affect their erosion and leaching potential
 - undertake the characterisation of the waste in accordance with the Assessment and Management of Acid Drainage guideline of the *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland* series,⁴³ *Managing Acid and Metalliferous Drainage*⁴⁴ and any other applicable best practice guidelines

⁴³ Department of Minerals and Energy, *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland*, Department of Mines and Energy, 1995, viewed 10 January 2010, www.derm.qld.gov.au/environmental_management/land/mining/technical_guidelines.html

⁴⁴ Department of Industry, Tourism and Resources, *Managing acid and metalliferous drainage: Leading Practice Sustainable Development Program for the mining industry*, Department of Industry, Tourism and Resources, Canberra, 2007, viewed 10 January 2010, www.ret.gov.au/resources/Documents/LPSDP/LPSDP-AcidHandbook.pdf



- the characterisation of waste rock and subsoil will include, but not necessarily be limited to:
 - sulfides
 - metals
 - pH
 - conductivity and chloride of slurry samples
 - the Net Acid Producing Potential (NAPP) and Net Acid Generation (NAG) potential of the mined waste
- pay particular attention to materials such as waste rock immediately above or below coal seams, where potentially acid forming material may be concentrated. The sampling effort must be sufficient to provide a statistically valid characterisation of each of the various types of waste rock, taking account of the geological variability and complexity within and between rock types
- a discussion of the potential for acid, neutral, alkaline or saline drainage from waste dumps
 - characterise the potential quality of leachate from the mined waste 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 cause environmental harm including nuisance
 - cross-reference to sections elsewhere in the EIS that assess in detail the potential impacts of any direct or indirect discharge of leachate on downstream sensitive environments or users of receiving waters
- use the estimated amounts and characteristics of excavated waste to develop appropriate measures for dealing with that waste, including designs for waste dumps, and alternatives for excavated waste disposal such as in-filling of voids, off-site options and treatment of contaminated soil. Assess the likely performance of the proposed waste disposal options with particular regard to:
 - segregating and encapsulating sub-economic but mineralised rock and/or potentially acid-forming rock
 - managing surface drainage and sub-surface leachate, both during operations at the mine and after mining ceases (note: avoid placing dumps across drainage lines that would pond water behind the dump and cause infiltration)
 - slope profiles and the stability and erosion potential of waste dumps
 - the intended land use after mining ceases, and the land management and maintenance requirements for the subsequent landholder
- consideration of the physical, geo-mechanical and chemical properties of waste rock in both fresh and weathered forms when determining their suitability for constructing stable slopes and developing measures to avoid acid generation from waste rock dumps and backfilling operations



- illustration of the location and cross-sections of the proposed dumps on maps, drawings and diagrams relative to topography and other natural features of the area.

Tailings

Describe the methods and materials that would be used to produce tailings waste (tailings should be understood to include any fine reject material) including the following:

- State whether the methods to be used to produce and treat tailings would be novel or established. For novel methods, describe the testing undertaken to determine if the method would be suitable for the proposed use. For established methods, provide examples of where the method has been, or is being, used and assess the equivalence of those examples to the proposed use.
- Estimate the annual production of tailings waste at the various stages of the project.
- Describe how the methods used to produce and treat tailings would be in accordance with the waste management hierarchy and the tailings management principles in the tailings management guideline of the *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland* series.⁴⁵
- Describe in detail the likely physical and chemical characteristics of the tailings waste and the likely chemical characteristics of wastewater from the pressing plant, the decant water from any tailings storage facility (TSF), and the pore water and leachate from any dump containing tailings.
- Describe and illustrate the proposed locations of any pits, dams, bunds or dumps that would be used for disposing of tailings.
- Describe and illustrate the proposed design of any TSF, including any cells for non-flowable tailings within waste rock dumps. Note: a shear strength of greater than 1000 pascals would generally be required of pastes suitable for dry tailings stacking, while pastes with lower shear strength must be contained in a regulated dam. However, the slumping and plastic properties of any tailings considered for disposal by dry stacking will be derived from tests on representative samples and reported in the EIS.
- Describe the source, and assess the suitability, of the materials to be used to construct containment systems. Describe any proposed staging of the construction for any TSF or disposal cells and demonstrate that the design has been produced by a suitably qualified and experienced engineer.
- Conduct, and report on, a risk assessment and describe how it has been used to derive the design storage allowance for any regulated dams. Assess whether the proposed design and methods of disposal would minimise the potential hazards and risks, particularly in relation to the potential impacts of failure caused by mass

⁴⁵ Department of Minerals and Energy, *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland*, Department of Mines and Energy, 1995, viewed 10 January 2010, www.derm.qld.gov.au/environmental_management/land/mining/technical_guidelines.html



release from structural failure or contaminant release from overflow. Also, assess whether the proposed design maximises site efficiency, such as by minimising the footprint.

- If some form of co-disposal of fine and coarse rejects is proposed, describe the range of proportions, size fractions and mixing method that would produce a stable deposit.
- Describe the proposed discharge locations and conditions for any TSF. Describe the flow path any discharge would take, illustrated on contour maps, and provide an overview of the potentially affected receiving environment with particular regard to downstream sensitive ecosystems or users of receiving waters. Discharge should be taken to mean any planned or unplanned overflow or release, any leachate, or any potentially contaminated runoff leaving a TSF. Assess in detail the potential impacts of any discharge on downstream sensitive environments or users of receiving waters in the appropriate sections of the EIS and cross-reference to them in this section.
- Describe the proposed monitoring network and regime that would be used to detect any leak from the TSF.
- Describe the proposed measures to be used to decommission any TSF or dump used for the disposal of tailings. Assess any legacy issues for the subsequent landholder.
- Provide a detailed description of tailings disposal facilities stability, capping and rehabilitation, including hydraulic performance of the tailings disposal facilities during operation and post-decommissioning.

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

Liquid waste

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

The EIS may need to consider the following effects:

- groundwater from excavations
- rainfall directly onto disturbed surface areas
- run-off from roads, plant and industrial areas, chemical storage areas
- drainage (i.e. run-off plus any seepage or leakage)
- seepage from other waste storages



- water usage for:
 - (a) process use
 - (b) dust suppression
 - (c) domestic purposes
- evaporation
- domestic sewage treatment—disposal of liquid effluent and sludge
- water supply treatment plant—disposal of wastes.

3.9 Transport

3.9.1 Existing infrastructure

Present the transport assessment in separate reports for each project-affected mode (road, rail, air and sea) as appropriate. These assessment reports should provide sufficient information to allow an independent assessment of how existing transport infrastructure will be affected by project transport at the local and regional level. They should also include all base data assumptions, including current condition of the affected network and its performance.

An overview map of the state-controlled road (SCR) network showing other major inventory features (e.g. bridges) should be included to enable the site to be fully understood in context of this network. The map should include the location of construction activities, access locations (existing and proposed) to the SCR network (if applicable), and potential crossings of the SCR network associated with the proposed rail line, as well as any construction camps likely to be used.

3.9.2 Transport tasks and routes

For all phases of the project, describe the following (for example traffic data should be presented as average annual daily traffic and percentage of vehicle by class—including light vehicles, heavy vehicles etc):

- expected volumes of project inputs and outputs of transported raw materials, wastes, hazardous goods, finished products
- how identified project inputs and outputs will be moved through the transport network (volume, composition, trip timing, routes and haulage of materials)
- traffic generated by construction and operational workforce personnel including visitors (volume, composition, timing and routes) and likely accommodation facilities including possible bussing strategies to manage peak hour travel from major accommodation centres
- likely heavy and oversize/indivisible loads (volume, composition, timing and routes) highlighting any vulnerable bridges and structures along proposed routes.



3.9.3 Potential impacts

Impact assessment reports should include:

- details of the adopted assessment methodology (for impacts on roads, the road impact assessment report in general accordance with the *Guidelines for Assessment of Road Impacts of Development*⁴⁶)
- description of input data and assumptions
- a summary of consultation undertaken with transport authorities and Queensland Police Service (QPS) regarding scope of impact assessment and methodology.

Assess project impacts on:

- capacity, safety, efficiency and condition of transport operations, services and assets (from either transport or project operations)
- any other proposed rail projects in the vicinity of the subject proposal
- possible interruptions to transport operations
- possible impacts on the existing road network from building the proposed rail infrastructure (e.g. haulage of construction inputs)
- road safety and efficiency due to where and how rail crossings will be built
- the natural environment within the jurisdiction of an affected transport authority (e.g. road and rail corridors)
- the nature and likelihood of product-spill during transport if relevant
- driver fatigue for workers travelling to and from regional centres and key destinations
- any existing or proposed strategies for public passenger transport and active transport and address, where relevant, requirements of Part 2A of the *Transport Planning and Coordination Act 1994*
- access to transport for people with a disability.

Detail any proposed new rail infrastructure to be constructed and operated. For listed species with the potential to occur within or near the proposed site, provide an analysis of all direct and indirect impacts of the each railway option, including; habitat lost, edge effects, incursion of vertebrate pests, noise and disturbance, habitat fragmentation, as a direct source of mortality and cumulative impacts as a result of the presence of other linear infrastructure (eg where habitat becomes isolated between the proposed railway and other linear infrastructure). This section must discuss the uncertainties in information provided and risks to the viability of listed species populations locally, regionally and nationally.

⁴⁶ Department of Main Roads, *Guidelines for Assessment of Road Impacts of Development*, Department of Main Roads, Brisbane, 2006, viewed 20 December 2010, www.tmr.qld.gov.au/~media/ace67ef2-b6c3-46a3-91a7-39f790c309fe/garid_guidelines_200406.pdf



3.9.4 Infrastructure alterations

Detail:

- any proposed alterations or new transport-related infrastructure and services required by the project (as distinct from impact mitigation works)
- construction of any project-related plant and utilities, within or impacting on the jurisdiction of any transport authority
- requirements to upgrade existing level crossings due to increased project traffic during both the construction and operations phases of the project including community indirect costs and benefits and later staged upgrading requirements over the life of the mine.

3.9.5 Transport management mitigation strategies

Discuss and recommend how identified impacts will be mitigated so as to maintain safety, efficiency and condition of each mode. Prepare these mitigation strategies in close consultation with relevant transport authorities and QPS, considering each authority's works program and forward planning.

Use the findings of studies and transport infrastructure impact assessments to prepare a transport management plan.

3.10 Indigenous cultural heritage

3.10.1 Description of existing Indigenous cultural heritage values

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

Also describe how, in conjunction with the appropriate Indigenous people, the cultural heritage values were ascertained. This could include the results of any Aboriginal cultural heritage survey undertaken; the DERM Aboriginal Cultural Heritage Register and database; any existing literature relating to Indigenous cultural heritage in the project area.

3.10.2 Potential impacts and mitigation measures

Define and describe the objectives and practical measures for protecting or enhancing Indigenous cultural heritage environmental values. Describe how nominated quantitative standards and indicators may be achieved for cultural heritage management, and describe how the achievement of the objectives will be monitored, assessed and managed.

To the greatest extent practicable, significant cultural heritage areas should be avoided by the project. Assess the likely effects on sites of Indigenous cultural heritage values, including but not limited to the following:



- description of the significance of artefacts, items or places of conservation or cultural heritage values likely to be affected by the project and their values at a local, regional and national level
- recommended means of mitigating any negative impact on cultural heritage values and enhancing any positive impacts.

As a minimum, impact assessment, management and protection strategies should satisfy statutory responsibilities and duties of care.

A 'native title agreement' (NT agreement) (as defined under the *Aboriginal Cultural Heritage Act 2003* (ACH Act)), that includes management and protection strategies for Indigenous cultural heritage, or a Cultural Heritage Management Plan (CHMP) (as defined under the ACH Act) should be initiated during the EIS process. An NT agreement or an approved CHMP, in a form which complies with Part 7 of the ACH Act, will ensure that the project meets the Aboriginal cultural heritage duty of care imposed by the ACH Act.

If an NT agreement is not finalised or a CHMP has not been approved when the EIS is submitted to the Coordinator-General, provide the following:

- an outline of the draft CHMP or draft plan within the NT agreement that addresses management and protection strategies for cultural heritage, subject to any confidentiality provisions, outlining the position of the relevant parties
- details of the proposed steps and timeframes for finalising the CHMP or NT agreement.

An NT agreement or CHMP should be negotiated between the proponent and the appropriate native title/Indigenous parties and should address and include:

- a process for including Indigenous people associated with the development areas in protecting and managing Indigenous cultural heritage
- processes for mitigating, managing and protecting identified cultural heritage sites and objects in the project areas, including associated infrastructure developments, during both the construction and operational phases of the project
- provisions for managing the accidental discovery of cultural material, including burials
- a clear recording process to be developed to assist initial management and recording of accidental discoveries
- a cultural heritage induction for project staff
- the development of a cultural heritage awareness program to be incorporated into the contractor/employee manual and induction manual. This is to be in the form of a plain language, short document which is easy for contractors and 'on-the-ground' staff to understand
- a conflict resolution process.



3.11 Non-Indigenous cultural heritage

3.11.1 Description of existing non-Indigenous cultural heritage values

Include a cultural heritage study that describes non-Indigenous cultural heritage sites and places, and their values. Any such study should be conducted by an appropriately qualified cultural heritage practitioner and should include the following:

- the desktop component of the cultural heritage study will include a literature review of:
 - local, regional and thematic histories
 - primary sources as appropriate
 - any existing literature available from Queensland Government sources or provided to the consultants by local community groups and organisations relating to the affected areas
 - any other relevant heritage surveys, reports and publications
- consultation with:
 - the Australian Heritage Places Inventory
 - the Queensland Heritage Register and other information regarding places of potential non-Indigenous cultural heritage significance
 - any local government heritage register
 - any existing literature relating to the heritage of the affected areas
- liaison with relevant community groups/organisations (e.g. local historical societies) concerning:
 - places of non-Indigenous cultural heritage significance
 - opinion regarding significance of any cultural heritage places located or identified
- locations of culturally and historically significant sites, shown on maps, that are likely to be impacted by the project
- a constraints analysis of the proposed development area to identify and record non-Indigenous cultural heritage places.

Describe a systematic field survey of non-Indigenous cultural heritage of the project footprint area undertaken by a qualified heritage professional. The report of the survey should address:

- legislative and regulatory framework
- background research and relevant environmental data
- methods used



- results of field surveys, with an illustrated description (including location, photographs, maps etc.) of the significant artefacts, items, places or landscapes of conservation or cultural heritage values likely to be affected by the project
- an assessment of the significance of artefacts, items or places of conservation or non-Indigenous cultural heritage value likely to be affected by the project and their values at a local, regional, state and national level.

3.11.2 Potential impacts and mitigation measures

Assess any likely effects on sites of non-Indigenous cultural heritage values, including but not limited to the following:

- description of the significance of artefacts, items or places of conservation or non-Indigenous cultural heritage value likely to be affected by the project and their values at a local, regional, state and national level
- recommended means of mitigating any negative impacts on non-Indigenous cultural heritage values and enhancing any positive impacts
- strategies to manage places of historic heritage significance, taking into account community interests and concerns.

As a minimum, investigation, consultation, impact assessment, management and protection strategies should satisfy statutory responsibilities and duties of care, including those under the EPBC Act and *Queensland Heritage Act 1992*.

Assess the potential impacts on non-Indigenous historical cultural heritage values. Propose measures to avoid or mitigate impacts, and enhance identified values, in a historical heritage management plan. The historical heritage management plan will:

- address the legislative requirements
- include practical measures for recognising, reporting and preserving cultural heritage material
- provide a process for managing yet undiscovered values should they become apparent during development of the project
- describe training that will be provided to site personnel during the site induction
- require a plain English manual summarising the training that will be given to all site workers for their future reference.

4 Social values and management of impacts

4.1 Description of existing social values

The social impact assessment (SIA) should be conducted in consultation with the DEEDI Social Impact Assessment Unit. Consider matters such as the social and cultural area, community engagement, a social baseline study, a workforce profile, potential impacts and mitigation measures and management strategies.



4.1.1 Social and cultural area

The SIA should define the project's social and cultural area of influence, including the local, district, regional and state level as relevant, taking into account the:

- potential for social and cultural impacts to occur
- location of other relevant proposals or projects
- location and types of physical and social infrastructure, settlement and land use patterns
- social values that might be affected by the project (e.g. including integrity of social conditions, visual amenity and liveability, social harmony and wellbeing, and sense of community)
- Indigenous social and cultural characteristics such as native title rights and interests and cultural heritage.

4.1.2 Community engagement

Consistent with national and international good practice, the proponent should engage at the earliest practical stage with likely affected parties to discuss and explain the project, and to identify and respond to issues and concerns regarding social impacts.

Detail the community engagement processes used to conduct open and transparent dialogue with stakeholders. This dialogue should include the project's planning and design stages and future operations including affected local and state authorities. Engagement processes will consider social and cultural factors, customs and values, and links between environmental, economic, and social impact issues. The Australian standard for consultation is the International Association for Public Participation's Public Participation Spectrum⁴⁷.

Prepare a community consultation report detailing outcomes of consultations with stakeholders during the community engagement process.

4.1.3 Social baseline study

A targeted baseline study of the people residing in the project's social and cultural area is required to identify the project's critical social issues, potential adverse and positive social impacts, and strategies and measures developed to address the impacts. The social baseline study should be based on qualitative, quantitative, and participatory methods. It should be supplemented by community engagement processes, and reference relevant data contained in Local and State government publications, reports, plans, guidelines and documentation, including regional plans and, where available, community plans.

The social baseline study should describe and analyse a range of demographic and social statistics determined relevant to the project's social and cultural area including:

⁴⁷ Available online at <http://www.iap2.org.au/sitebuilder/resources/knowledge/asset/files/36/iap2spectrum.pdf>



- major population trends/changes that may be occurring irrespective of the project
- total population (the total enumerated population for the social and cultural area and the full-time equivalent transient population), 18 years and older
- estimates of population growth and population forecasts resulting from the proposal
- family structures
- age and gender distributions
- education, including schooling levels
- health and wellbeing measures
- cultural and ethnic characteristics
- the Indigenous population including age and gender
- income including personal and household
- labour force by occupation and industry including occupational skill groups and potential skills shortages
- housing costs (monthly housing repayments (per cent of dwellings in each category), and weekly rent (per cent dwellings in each category), housing tenure type and landlord type, household and family type
- housing availability and affordability:
 - the rental market (size, vacancy rate, seasonal variations, weekly rent by percentage dwellings in each category)
 - the availability and typical costs of housing for purchase
 - monthly housing repayments by percentage dwellings in each category
 - the availability of social housing
- disability prevalence
- the social and economic index for areas, index of disadvantage—score and relative ranking
- crime, including domestic violence
- any other indicators determined through the community engagement process as relevant.

The social baseline study should take account of current social issues such as:

- the social infrastructure including community and civic facilities, services and networks (for definition see the *South East Queensland Regional Plan 2005–2026 Implementation Guideline No.5*)⁴⁸

⁴⁸ Department of Infrastructure, *South East Queensland Regional Plan 2005–2026: Implementation Guideline No. 5: Social impact assessment*, Department of Infrastructure, Brisbane, 2007, viewed 21 December 2010, www.dip.qld.gov.au/resources/guideline/Implementationguideline5.pdf



- settlement patterns including the names, locations, size, history and cultural aspects of settlement in the social and cultural area
- the identity, values, lifestyles, vitality, characteristics and aspirations of communities in the social and cultural area, including Indigenous communities
- land use and land ownership patterns including:
 - rural properties, farms, croplands and grazing areas including on-farm activities near the proposed activities
 - the number of properties directly affected by the project
 - the number of families directly and indirectly affected by the project including Indigenous traditional owners and their families, property owners, and families of workers either living on the property or workers where the property is their primary employment
- use of the social and cultural area for forestry, fishing, recreation, business and industry, tourism, aquaculture, and Indigenous cultural use of flora and fauna.

This section should cross reference with Section 5.1.

4.1.4 Workforce profile

The SIA should include a profile of the workforce which describes 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
- estimated number of people to be employed during construction and operation, and arrangements for their transport to and from the project areas, including proposed use of regional or charter air services
- estimates should be provided according to occupational groupings and variations in the workforce numbers for the duration of the project and show anticipated peaks in worker numbers during the construction period.

Provide an outline of recruitment schedules and policies for recruiting workers, addressing recruitment of local, non-local and overseas workers including Indigenous workers, people from culturally and linguistically diverse backgrounds and people with a disability.

If worker accommodation villagers are to be used to accommodate the workforce, provide details on the number, size, location (shown on a map), management, proximity to the construction site, and typical facilities for these sites for each phase of the project. Information should outline any local government or other regulatory approvals required for establishing and operating such camps, including building, health and safety and waste disposal purposes.

Provide information on the location of other major projects or proposals under study within the social and cultural area, together with workforce numbers.



4.2 Potential impacts

Assess and describe the type, level and significance of the project's social impacts (both beneficial and adverse) on the local and cultural area, based on outcomes of community engagement processes and the social baseline study. Furthermore:

- describe and summarise outcomes of community engagement processes including the likely response of the affected communities, including Indigenous people
- include sufficient data to enable affected local and state authorities to make informed decisions about the project's effect on their business and plan for the provision of social infrastructure in the project's social and cultural area. If the project is likely to result in a significant increase in the population of the area, then the proponent should consult the relevant management units of the state authorities (including QPS) and summarise the results of the consultations
- address direct, indirect and secondary impacts from any existing projects and the proposed project, assessing the size, significance, and likelihood of these impacts at the local and regional level. Consider the following:
 - key population/demographic shifts; disruptions to existing lifestyles, the health and social wellbeing of families and communities; social dysfunction including alcohol and drugs, crime, violence, and social or cultural disruption due to population influx
 - the needs of vulnerable groups including women, children and young people, the aged and people with a disability
 - Indigenous peoples including cultural property issues
 - local, regional and state labour markets during the construction and operational phases, with regard to the source of the workforce. Present this information according to occupational groupings of the workforce. Information is required as to whether the proponent, and/or contractors, is likely to employ locally or through other means and whether there are initiatives for local employment business opportunities and how these workforce strategies relate and align to state and Commonwealth resource work force planning, skill development and training strategies and policies
 - proposed new skills and training related to the project, including the occupational skill groups required and potential skill shortages anticipated
 - how much service revenue and work from the project would be likely to flow to the project's social and cultural area
 - impacts of construction and operational workforces, their families, and associated contractors on housing and accommodation availability and affordability, land use and land availability. The capability of the existing housing and rental accommodation, to meet any additional demands created



by the project should be discussed including direct impacts on Indigenous people.

Evaluate the potential cumulative social impacts resulting from the project including an estimation of the overall size, significance and likelihood of those impacts. In this context, 'cumulative impacts' is defined as the additional impacts on population, workforce, accommodation, housing, and use of community infrastructure and services, from the project, and other proposals for development projects in the area which are publicly known or communicated by DEEDI, if they overlap the proposed project in the same timeframe as its construction period.

4.2.1 Mitigation measures and management strategies

For identified social impacts, social impact mitigation strategies and measures should be presented to address the:

- recruitment and training of the construction and operational workforces and the social and cultural implications this may have for the host community, including if any part of the workforce is sourced from outside the social and cultural area
- Local labour market impacts. A local employment plan should be developed that describes:
 - strategies to address anticipated skills shortages
 - employment initiatives and strategies to support local employment, including recruitment procedures for securing local employment and provisions for contractors
 - skills development and training opportunities, including apprenticeship programs and support programs targeted to local unemployed and vulnerable groups, including disadvantaged job-seekers, under-employed people
 - strategies which maximise employment opportunities for local participation and training and minimise impacts on other businesses and industry
 - plans, procedures and strategies for Indigenous employment
 - social inclusion strategies, where appropriate
 - cross-industry partnerships
- Worker accommodation requirements and impacts on housing affordability and availability as a result of worker accommodation requirements. An Integrated Housing Strategy (the strategy) should be developed in collaboration and consultation with relevant local authorities and state government agencies. The strategy should describe:
 - projected size, nature and location of the workforce for the resource project (for both construction and operational phases) including the projected proportion of workers who will fly, drive or ferry in and out (FIFO or DIDO)



- towns and cities in which FIFO or DIDO employees and their families are likely to be permanently residing
- plans for accommodating the proportion of the workforce who will not readily access local accommodation
- If worker accommodation villages and permanent operational villages are being considered to accommodate the workforce, address the management of health and safety issues associated with these accommodation types in consultation with relevant local authorities and state government agencies
- demographic changes in the profile of the region and the associated sufficiency of current social infrastructure to support community health, safety and wellbeing; education, employment and training; policing and emergency services
- adequate provision of education, training and employment opportunities for women, people with a disability and Indigenous peoples
- collaborative stakeholder engagement strategies/partnership arrangements to develop and implement project benefit strategies and social impact mitigation measures.

Describe any stakeholder engagement processes regarding the development and acceptance of proposed mitigation strategies and measures, and how practical management and monitoring regimes are proposed to be implemented.

Prepare a draft social impact management plan (SIMP) that promotes an active and ongoing role for impacted communities and local authorities through the project life cycle. The draft SIMP should be consistent with the *Social Impact Assessment: guideline to preparing a social impact management plan* (DIP 2010). The SIMP, which will be subject to external review, should focus on action plans to implement mitigation strategies and include performance measures against which annual progress can be reported and should cover:

- assignment of accountability and resources
- updates on activities and commitments
- mechanisms to respond to public enquiries and complaints
- mechanisms to resolve disputes with stakeholders
- periodic evaluation of the effectiveness of stakeholder engagement processes
- practical mechanisms to monitor and adjust mitigation strategies and action plans.



5 Economies and management of impacts

5.1 Economy

5.1.1 Description of affected local and regional economies

Describe the existing economy in which the project is located and the economies materially impacted by the project. It should include:

- a map illustrating the local and regional economies (local government areas) that could be potentially affected by the project
- gross regional product or other appropriate measure of annual economic production
- population
- labour force statistics
- economic indicators
- the regional economy's key industries and their contribution to regional economic income
- relevant government programmes and policies that affect the project
- the key regional markets relevant to the project:
 - labour market
 - housing and land markets
 - construction services and building inputs market
 - regional competitive advantage and expected future growth.

With regard to the region's key industries and factor prices, provide information on:

- current input costs (wage rates, building costs, housing rent etc.)
- land values in the region by type of use.

This section should be cross referenced to section 4.1.4.

5.1.2 Potential impacts and mitigation measures

The potential impacts should consider local, regional, state and national perspectives as appropriate to the scale of the project.

Describe both the potential and direct economic impacts including estimated costs, if material, on industry and the community by assessing the following:

- property values
- industry output
- employment



- potential land severance issues as a result of proposed rail infrastructure and proposed mitigation measures (including rail crossings)
- the indirect impacts likely to flow to other industries and economies from the development of the project (and the implications of the project for future development). Include the volume of extractive materials to be used (particularly limited local resources) and any measures proposed to mitigate identified impacts
- the distributional effects of the proposal including proposals to mitigate any negative impact on disadvantaged groups
- mitigation strategies to manage project impacts through relevant government policies and programmes.

Strategies for local participation

The assessment of economic impacts should outline strategies for local participation, including:

- strategies for assessing the cost effectiveness of sourcing local inputs from the regional economy during the construction, operation and rehabilitation of the project
- employment strategies for local residents including members of Indigenous communities and people with a disability, including a skills assessment and recruitment and training programs to be offered
- strategies responding to relevant government policy, relating to:
 - the level of training provided for construction contracts on Queensland Government building and construction contracts, with regard to the *Queensland Government Building and Construction Contracts Structured Training Policy* (the 10 percent policy)
 - Indigenous employment opportunities, with regard to the *Indigenous Employment Policy for Queensland Government Building and Civil Construction Projects* (the 20 percent policy)
 - the use of locally sourced goods and services, with regard to the Queensland Department of Employment, Economic Development and Innovation's *Local Industry Policy*⁴⁹.
- the potential impact on extractive resource availability in the regions both during and after construction and any economic consequences for the regions.

Impact upon property management

Address the current and future management processes for adjacent properties that are likely to be impacted by the project during construction and/or operation. Mention the:

⁴⁹ Available online at <http://www.industry.qld.gov.au/documents/AdvancedManufacturing/local-industry-policy.pdf>



- impact of the project on existing agricultural land uses and management practices (e.g. disruption to stockyards, fences, water points, sowing or harvesting of crops, movement of livestock, agricultural machinery and any loss of agricultural land)
- range of measures required to mitigate real and potential disruptions to rural practices and management of properties.

5.2 Sustainable development

Provide a comparative analysis of how the project conforms to the objectives for 'sustainable development'—see the *National Strategy for Ecologically Sustainable Development*.⁵⁰

This analysis should consider the cumulative impacts of the project (both beneficial and adverse) 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 Hazard and risk assessment

Describe the potential hazards and risks to people and property that may be associated with the project, which may include but are not restricted to:

- identifying potential hazards, accidents, spillages and abnormal events that may occur during all stages of the project, including possible frequency of occurrence
- identifying all hazardous substances to be used, stored, processed or produced and the rate of usage
- potential wildlife hazards, natural events and implications related to climate change.

A preliminary risk assessment for all components of the project shall be undertaken as part of the EIS process in accordance with *Australia/New Zealand AS/NZS ISO 31000:2009 Risk management – Principles and guidelines*. With respect to risk assessment:

- the EIS should deal comprehensively with external and on-site risks including transport risks
- the study should assess risks during the construction, operational and decommissioning phases of the project

⁵⁰ Ecologically Sustainable Development Steering Committee, *National Strategy for Ecologically Sustainable Development*, Australian Government Publishing Service, Canberra, 1992, viewed 21 December 2010, www.environment.gov.au/about/esd/publications/strategy/index.html



- analysis of the consequences of each hazard on safety in the project area should be conducted, examining the likelihood of both individual and collective consequences, involving injuries and fatalities to workers and to the public
- quantitative levels of risks should be presented from the above analysis.

With regard to fires, in consultation with emergency services agencies (including QPS), outline strategies to manage the provision of:

- fire management systems—to ensure the retention on-site of fire water or other fire suppressants used to combat emergency incidents
- building fire safety measures—for any construction or permanent accommodation
- details of any emergency response plans and bushfire mitigation plans under *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*⁵¹
- on-site fire fighting equipment provided and the level of training of staff who will be tasked with emergency management activities
- detailed maps showing the plant outline, potential hazardous material stores, incident control points, fire fighting equipment, etc.
- an outline of any dangerous goods stores associated with the plant operations, including fuel storage and emergency response plans.

Provide details on the safeguards that would reduce the likelihood and severity of hazards, consequences and risks to persons, within and adjacent to the project area(s).

Present a comparison of assessed and mitigated risks with acceptable risk criteria for land uses in and adjacent to the project area(s).

Provide a risk management plan.

6.2 Health and safety

6.2.1 Description of public health and safety community values

Describe the existing health and safety values of the community, workforce, suppliers and other stakeholders in terms of the environmental factors that can affect human health, public safety and quality of life, such as air pollutants, odour, lighting and amenity, dust, noise and water.

6.2.2 Potential impact and mitigation measures

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

⁵¹ Department of Local Government and Planning, Department of Emergency Services, *State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*, 2003, viewed 22 December 2010, www.emergency.qld.gov.au/publications/spp/pdf/spp.pdf



Assess the cumulative effects on public health values and occupational health and safety impacts on the community and workforce from project operations and emissions. Assess the impact the project will have on regional health services and describe any necessary management strategies, including but not limited to consultation with the appropriate health service district.

Assess the potential for mosquito breeding sites to be created by the project. Where sites may be created, develop a 'mosquito management plan' for the entire site and in particular, areas where significant volumes of water will be ponded. Guidance is available in Queensland Health's *Guidelines to minimise mosquito and biting midge problems in new development areas*⁵².

Recommend any practical monitoring regimes in this section.

6.3 Emergency management plan

The development of emergency planning and response procedures is to be determined in consultation with state and regional emergency service providers.

Provide an outline of the proposed integrated emergency management planning procedures (including evacuation plans, if required) for the range of situations identified in the risk assessment developed in this section. This includes strategies to deal with natural disasters during operation and construction.

7 Cumulative impacts

Provide a summary of the project's cumulative impacts and describe these cumulative impacts both in isolation and in combination with those of existing or proposed project(s) publicly known or advised by DEEDI to be in the region, to the greatest extent practicable. Cumulative impacts should be assessed with respect to both geographic location and environmental values. Also assess cumulative impacts on the groundwater resources in the area, including impacts on existing users and any groundwater-dependent ecosystems. Present the methodology used to determine the cumulative impacts of the project, detailing the range of variables considered, including where applicable, relevant baseline or other criteria upon which the incremental aspects of the project have been assessed.

8 Environmental management plan

The EMP should encompass both the construction and operation phases of the project. The EMP should be developed from, and be consistent with, the information in the EIS. The EMP must address discrete project elements and provide life-of-proposal control strategies. It must be capable of being read as a stand-alone document without reference to other parts of the EIS.

⁵² Available online at <http://www.health.qld.gov.au/ph/documents/cdb/14804.pdf>



The EMP must comprise the following components for performance criteria and implementation strategies:

- the proponent's commitments to acceptable levels of environmental performance, including environmental objectives, performance standards and associated measurable indicators, performance monitoring and reporting
- impact prevention or mitigation actions to implement the commitments
- corrective actions to rectify any deviation from performance standards
- an action program to ensure the environmental protection commitments are achieved and implemented, including strategies in relation to:
 - continuous improvement
 - environmental auditing
 - monitoring
 - reporting
 - staff training
 - a rehabilitation program for land proposed to be disturbed under each relevant aspect of the proposal.

The recommended structure of each element of the EMP is:

- element/issue—the 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 (e.g. 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).



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

The EMP for mining activities must be consistent with the content requirements of the Environmental Protection Act 1994.

9 Matters of national environmental significance

This section of the EIS should be a stand-alone section and should address the issues relevant to the relevant controlling provisions of the EPBC Act. This section should bring together assessments of impacts on MNES in other chapters (e.g. water resources, flora and fauna, cumulative impacts) and produce a stand-alone assessment in a format suited for assessment under the EPBC Act.

The controlling provisions under the EPBC Act have been determined as:

- sections 12 and 15A (World Heritage properties)
- section 15B and 15C (National Heritage places)
- sections 16 and 17B (Ramsar wetlands)
- sections 18 and 18A (listed threatened species and communities)
- sections 20 and 20A (listed migratory species)
- sections 24B and 24C (Great Barrier Reef Marine Park).

Predictions of the extent of threat (risk), impact and the benefits of any mitigation measures proposed, should be based on sound science and quantified where possible. Provide references for all sources of information relied upon and estimate the reliability of predictions provided. Identify and evaluate any positive impacts.

Offsets must be discussed with regard to impacts on EPBC matters. Reference should be made to the eight principles set out in the Department's Draft *Policy Statement: Use of Environmental Offsets under the Environment Protection and Biodiversity Conservation Act 1999*.

The extent of any new field work, modelling or testing should be commensurate with risk and should be such that when used in conjunction with existing information, provides sufficient confidence in predictions that well-informed decisions can be made. Obligations under and implications of any species recovery plans must be specifically addressed.



9.1 Introduction

Provide background to the project, including:

- how the action 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 region affected by the action
- a list of persons and agencies consulted during the preparation of the EIS
- the names, qualifications and experience of the persons involved in preparing the EIS, including sub-consultants and reviewers.

9.2 Matters of national environmental significance

Describe the matters protected under the EPBC Act that may potentially be affected by the proposed action. Include the listed threatened species, migratory species and ecological communities. This information will serve as a baseline against which impacts and management of the proposal and alternatives can be assessed.

9.3 World Heritage Areas, National Heritage places and the Marine Park

9.3.1 Description of environmental values

Identify and describe the characteristics and values of the Great Barrier Reef World Heritage Area and National Heritage places that are likely to be impacted by the project. This is also to include a detailed discussion on the potential impacts of the proposal on the Great Barrier Reef Marine Park (the Marine Park).

9.3.2 Potential impacts and mitigation measures

Potential impacts on the World and National heritage values of the Great Barrier Reef and the Great Barrier Reef Marine Park (Marine Park) must be addressed in the EIS. The assessment of environmental variables such as water quality and other MNES, such as threatened species and communities, will be relevant to the assessment of impacts on the National and World heritage and the Marine Park.

The EIS should consider the potential impacts on the World and National heritage values under each of the criteria against which the place was listed. The criteria and examples of the values are available: www.environment.gov.au/heritage.

The EIS is to also address the potential direct, indirect and consequential impacts on Great Barrier Reef World Heritage Area, National Heritage places and the Marine Park resulting from:

- Modification, destruction, fragmentation, isolation or disturbance of an important or substantial, sensitive or vulnerable area of habitat or ecosystem component such that an adverse impact on marine ecosystem health, functioning or integrity in the Great Barrier Reef Marine Park



- A substantial change in air or water quality (including temperature) which may adversely impact on biodiversity, ecological integrity, social amenity or human health
- Persistent organic chemicals, heavy metals, or other potentially harmful chemicals accumulating in the marine environment such that biodiversity, ecological integrity, social amenity or human health may be adversely affected
- The potential impacts on important amenities, navigation, culturally and historically significant sites, threatened or migratory species or sensitive habitats
- loss or modification of in stream habitat important for species important to the values of the Great Barrier Reef World Heritage Area (including fragmentation, altered land use, fire regimes, altered nutrient cycle, altered hydrological cycles etc.).

The EIS is to also include the following:

- baseline data on listed threatened migratory and marine species and any other species of conservation significance, including cetaceans and detail the likely effects of the proposed construction and operation on a population of a species or cetacean including its life cycle (for example, breeding, feeding, migration behaviour, life expectancy) and spatial distribution
- impacts resulting from potential changes to the water quality of the Great Barrier Reef arising from runoff from construction and operational activities; spills of contaminants during construction and operation, disturbance of potential acid sulphate soils and changes to the hydrology or quality of water in watercourses entering the World Heritage Area and Marine Park
- baseline data on the nature, extent and value of benthic communities likely to be impacted by the proposal, including seagrass beds, and information on their regional significance, including as habitat for flora and fauna
- baseline information on surface and groundwater hydrology
- matters identified in Section 3.1 and likely impact on the Marine Park and World heritage values.

A description of mitigation and management measures proposed to protect or enhance impacts on the Great Barrier Reef World Heritage Area, National Heritage Place and the Marine Park should be discussed within the EIS.

9.4 Listed threatened species

Identify listed threatened species that could be affected, directly and indirectly, as a consequence of the proposal. Include the following information:

- baseline information on the distribution, ecology, and habitat preferences of listed threatened species
- for listed threatened species provide details of the regional importance of the population



- for each of the identified threatened species provide a detailed discussion of known threats
- listed threatened species that need to be addressed includes, but is not limited to:
 - *Acacia deuteroneura*
 - *Acacia ramiflora*
 - *Dichanthium queenslandicum* (King Blue-grass)
 - *Eucalyptus raveretiana* (Black Ironbox)
 - *Leucopogon cuspidatus* (Northern beard heath)
 - *Digitaria porrecta* (Finger panic grass)
 - *Cycas ophiolitica* (Marlborough blue cycad)
 - *Acacia ramiflora* (White's mountain Wattle)
 - *Ozothamnus eriocephalus*
 - *Geophaps scripta scripta* (Squatter Pigeon (southern))
 - *Neochmia ruficauda ruficauda* (Star Finch (eastern), Star Finch (southern))
 - *Poephila cincta cincta* (Black-throated Finch (southern))
 - *Rostratula australis* (Australian Painted Snipe)
 - *Furina dunmalli* (Dunmall's Snake)
 - *Denisonia maculata* (Ornamental Snake)
 - *Egernia rugosa* (Yakka Skink)
 - *Paradelma orientalis* (Brigalow Scaly-foot)
 - *Dasyurus hallucatus* (Northern Quoll)
 - *Nyctophilus timoriensis* (Greater long-eared bat)
- maps for listed threatened species showing:
 - all potential habitat for each species
 - habitat components important for each species such as breeding habitat
 - the location of known records (including those from databases and all surveys previously conducted in the project area).
- a description of mitigation and management measures proposed to protect or enhance listed threatened species.



9.4.1 Listed threatened ecological communities (TECs)

Identify listed TECs that could be affected, directly and indirectly, by the proposal. Include baseline information on known distribution of the TEC (including a description of vegetation condition) and discuss the relative importance of the occurrence of the TEC that occurs in the proposed project area.

Address the following TECs:

- Brigalow (*Acacia Harpophylla* dominant and co-dominant)
- Weeping Myall Woodlands
- natural grasslands of the Queensland Central Highlands and the northern Fitzroy Basin
- the community of native species dependent on natural discharge of groundwater from the Great Artesian Basin.

Include the following information:

- known information on the distribution of TECs
- maps showing the distribution of TECs in the project area
- maps showing vegetation condition of TECs
- regional importance of the TEC occurrence in the project area
- for each of the identified TECs, a detailed discussion of known threats
- a description of mitigation and management measures proposed to protect or enhance listed threatened ecological communities.

9.4.2 Listed migratory species

Identify listed migratory species that could be affected, directly and indirectly, as a consequence of the proposal. Include the following information:

- a description of the distribution, ecology, and habitat preferences of listed migratory species
- listed migratory species that need to be addressed includes, but must not be limited to:
 - *Merops ornatus* (Rainbow bee-eater)
 - [*Monarcha trivirgatusi*](#) (Spectacled Monarch)
 - [*Monarcha melanopsis*](#) (Black-faced Monarch)
 - *Hirundapus Caudacutus* (White-throated Needle-tail)
 - *Ardea alba s. lat* (Great Egret)
 - *Ardea ibis* (Cattle Egret)



- *Apus pacificus* (Fork-tailed Swift)
- maps for listed migratory species showing:
 - all potential habitats for each species
 - habitat components important for each species such as breeding habitats
 - the location of known records (including those from databases and all surveys previously conducted in the project area).
- a description of any mitigation and management measures proposed to protect or enhance listed migratory species.

9.5 Ramsar (wetland of international importance)

9.5.1 Description of environmental values

Identify and describe the wetlands of international importance that are likely to be impacted by the project.

9.5.2 Potential impacts and mitigation measures

Provide relevant discussion concerning potential impacts, including:

- description of the location, extent and ecological characteristics and values of those wetlands that are potentially affected by the proposal (including the use of a map)
- substantial and measurable changes to the hydrological regime of the wetlands, for example a substantial change to the volume, timing, duration or frequency of ground and surface water flows to and within the wetland
- the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependant upon the wetland being seriously effected
- substantial and measurable change in the water quality of the wetlands – for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health
- invasive species that may be harmful to the ecological character of the wetlands, if introduced to or spread in the wetland.

A description of any mitigation measures proposed to protect or enhance impacts on the wetlands of international importance should be discussed within the EIS.

9.5.3 Species surveys

Adequate and detailed surveys are required to provide baseline information to further refine information described above and may provide a baseline for monitoring. This section should:

- justify survey methods used
- describe the expertise of staff undertaking surveys



- describe the survey effort, including targeted survey effort for EPBC-listed species
- describe why certain areas required more detailed survey effort than other areas
- describe how TECs were identified.

9.6 Relevant impacts

Assess in detail the relevant impacts of the proposal addressing all the identified environmental values. Any technical data and other information used or needed to make a detailed assessment of the relevant impacts (reliability of forecasts and predictions, confidence limits and margins of error) should be indicated, and where necessary, included as an appendix. Risk assessment should be conducted and documented to address potential impacts, including direct and indirect impacts and those impacts possible in both the short and long-term, as well as consequential and cumulative impacts.

9.6.1 Land clearing

Clearly describe the potential impacts that clearing vegetation will have on listed species and communities, including but not limited to:

- the approximate area (in hectares) of native vegetation to be cleared as a result of all mining activities
- a map showing approximate area to be cleared
- a description of the impacts of fragmentation and edge effects
- the impacts of vegetation loss on surface and groundwater hydrology.

9.6.2 Subsidence

Provide a description of subsidence and subsidence effects. This section should include, but not be limited to:

- a description of the causes of subsidence
- a description of long-wall mining and the physical process of subsidence
- an overview of the historical underground mining techniques used for coal mining in Australia (including width of long-wall panels used in Australia over time), and the level of subsidence that occurred from different methods
- a detailed description of the known or likely subsidence effects on surface and groundwater hydrology
- a detailed description of subsidence effects on terrestrial ecosystems (including which vegetation communities and flora species are most likely to be affected by changes to surface hydrology)
- a summary of the impact of subsidence effects on freshwater ecosystems from existing long-wall mining in central Queensland, and other parts of Australia with similar underlying geology that have been undermined
- a description of the known impacts of subsidence on groundwater



- a description of any known incidents where subsidence effects have (or been implicated to have) caused damage to the environment in Queensland
- geological features, such as faults, that may affect the level of subsidence or subsidence effects, must be described and mapped
- a detailed description and analysis of the likely level of subsidence from the proposed action, including maps showing expected subsidence level contours
- a detailed description of potential impacts to aquatic and terrestrial threatened species and ecological communities from subsidence effects as a result of the proposed mine.

9.6.3 Water resources and pollution

Describe all water consumption that will occur during the construction, operation and decommissioning of the proposed action, including but not limited to:

- a description of water sources
- approximate volumes (megalitres per annum) of all water that may be used during the operation of the proposed mine from the various sources.

Describe how much wastewater will be produced by the mine, what pollutants wastewater may contain, and how wastewater will be managed, including:

- a description of the expected impacts upon surface and groundwater from the mine
- a summary of the cumulative impacts on water resources for the proposed action with regard to present water use in the region, expected water consumption from the mine, loss of ground or surface water from subsidence, and indirect increases in water demand that may result from the mine.

9.6.4 Weeds and exotic fauna

Identify and describe the potential impacts of the proposed action on exotic fauna and weeds within and adjacent to the study area including a description of the potential:

- for mining activities and infrastructure (such as roads) in increasing the threat of weeds and exotic fauna within and adjacent to the project area
- impacts that an increase or change in exotic fauna or weeds may have on listed species and communities.

9.6.5 Impact assessment for MNES

Include a detailed assessment of the impacts of subsidence on listed threatened species, migratory species and TECs. Specific impacts that must be assessed in detail include (but should not be limited to):

- for each of the identified threatened species, migratory species and TECs, discuss how potential impacts may affect threatened species, migratory species and TECs



in the project area (and downstream of the project area) in the short-term and long-term

- a discussion of cumulative impacts upon threatened species, migratory species and TECs, where potential impacts are in addition to impacts of other existing or planned activities, considering threatening processes for threatened species, migratory species and ecological communities that occur in the project area.

9.7 Avoidance and mitigation measures to reduce the impacts to matters of national environmental significance

Explore any feasible alternatives to the action, in particular, options to reduce the impacts on listed species and communities. Discuss how ecological values were defined in the referral to determine which features should be buffered and include sufficient details to make it clear why any alternative is preferred to another.

9.7.1 Avoidance

Avoidance measures that must be considered in the EIS include potential options to the project as proposed in the referral, in regard to:

- longwall setback (offset) distances to potential habitat for listed species and communities
- longwall design (panel width and gap between longwall panels), including 'strip pillar mining'.

9.7.2 Mitigation measures

Include the following regarding mitigation measures:

- an outline of an EMP that sets out the framework for continuing management and mitigation
- a description of how the mitigation measures will be funded in the long-term
- evidence demonstrating the efficacy of the proposed mitigation measures; include the results of studies that have been used to test and demonstrate the techniques proposed.

9.8 Proposed offsets for residual impacts

Provide a detailed description of proposed mitigation measures and offsets, and include:

- a consolidated list of mitigation measures and offsets proposed to be undertaken or provided to minimise or compensate for the relevant impacts of the action, including mitigation measures proposed to be taken by state governments, local governments or the proponent
- a detailed description of proposed offsets.



9.9 Monitoring and reporting

This section of the EIS must:

- outline the environmental impacts to be monitored
- identify any baseline monitoring that will be required before the proposal commences
- identify the parameters to be monitored, and their response trigger values and response activities, along with procedural and compliance audit programs and reporting requirements and arrangements to be implemented.

10 Conclusions and recommendations

Make conclusions and recommendations with respect to the project, based on the studies presented, the EMP and conformity of the project with legislative and policy requirements.

11 References

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

12 Appendices

12.1 Final TOR for this EIS

Include a copy of the final TOR in the EIS.

12.2 TOR cross-reference table

Provide a cross reference table that links the requirements of each section/subsection of the TOR with the corresponding section/subsection of the EIS and where those requirements have been addressed.

12.3 Project approvals

Present a list of the project approvals required by the project.

12.4 Consultation report

The report should include the methodology used in the public consultation plan including:

- criteria for identifying stakeholders and the communication methods used (the consultation plan)
- a list of stakeholders identified, including the Commonwealth, Queensland and Local government agencies, and/or the affected parties (as defined by the EP Act)



- a summary of the issues raised by stakeholders and the means by which the issues have been addressed
- plans for ongoing consultation to be outlined and included in the EMP.

12.5 Study team

Provide details of the relevant qualifications and experience of the key study team members and specialist sub-consultants.

12.6 Glossary of terms

Provide a glossary of technical terms.

12.7 Specialist studies

All reports generated on specialist studies undertaken as part of the EIS are to be included as appendices. These may include, but are not limited to:

- air pollution, noise and vibration
- groundwater and surface water hydrology
- geology and geomorphology
- economic studies and/or cost-benefit analyses
- transport studies
- cultural heritage
- hazard and risk studies
- land use and land capability studies.

12.8 Corporate environmental policy

The proponent should attach a copy of its corporate environmental policy and planning framework document.

12.9 List of proponent commitments

Provide a list of all commitments made by the proponent in the EIS, together with a reference to the relevant section in the report.



Abbreviations

The following abbreviations have been used in this document:

ACH Act	<i>Aboriginal Cultural Heritage Act 2003</i>
AS/NZS	Australian standard/New Zealand standard
CAMBA	China–Australia Migratory Bird Agreement
CHMP	cultural heritage management plan
DERM	Department of Environment and Resource Management, Queensland
DEEDI	Department of Employment, Economic Development and Innovation, Queensland
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities, Commonwealth Government
TMR	Department of Transport and Main Roads, Queensland
EIS	environmental impact statement
EMP	environmental management plan
EP Act	<i>Environmental Protection Act 1994</i> (Qld)
EPA	former Environmental Protection Agency, Queensland
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth)
EPP	environmental protection policy (water, air, waste, noise)
ERA	environmentally relevant activity
FIFO	fly-in-fly-out
GQAL	good quality agricultural land
IP Act	<i>Integrated Planning Act 1997</i> (Qld)
JAMBA	Japan–Australia Migratory Bird Agreement
JORC	Joint Ore Reserve Committee
MNES	matters of national environmental significance (under the EPBC Act)
NC Act	<i>Nature Conservation Act 1992</i>
NGA	National Greenhouse Accounts
NT agreement	native title agreement



QMAN	Quarry Material Allocation Notice
QPS	Queensland Police Service
REDD	Regional Ecosystem Description Database
ROKAMBA	Republic of Korea–Australia Migratory Bird Agreement
SDPWO Act	<i>State Development and Public Works Organisation Act 1971 (Qld)</i>
SIA	social impact assessment
SPA	<i>Sustainable Planning Act 2009 (Qld)</i>
TECs	threatened ecological communities
The proponent	Adani Mining Pty Ltd
TOR	terms of reference
TSF	tailings storage facility
VM Act	Vegetation Management Act 1999

