

CAC Detail Report

Project Ref	Project Office
205634	ES - Reg Serv - Whitsunday Coalfields - Emerald - EPA

Application Date	CAC Review Date	Application Type
27-JUL-2011	04-OCT-2011	Application

Primary Applicant/s

Client ref	Client name
667528	Dingo West Coal P/L

Location/s

Location name	Location description	Location type
ML80179	10km Northwest of Dingo	Mining Tenure

Permit/s

Permit type/s	Environmental Authority (Mining Lease) Non Code Compliant Level 1 Mining Project
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Activity/ies

Activity/ies	Mining activity - schedule 6, item 12 a level 1 mining project, other than a level 1 mining project mentioned in items 1 to 11
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Interest/s

Type	Rating	Comment
Biodiversity - rare and threatened species	Low	Endangered Remnant Regional Systems

Recommendations

Recommending officer	Kathryn Burdett
Project Director	Christopher Loveday
Project Manager	Grant Zhu
Decision Level	Level 2
EIS Required	Y
Comments	<p>APPLICATION FOR LEVEL 1 NON-CODE COMPLIANT EA: Application for Non-Code compliant EA mining lease to develop an open cut coal mine with expected capacity of 1.4 million ton of Run of Mine coal product per year. The mine lease (ML) application number was issued as ML80180.</p> <p>RECOMMENDED DECISION: Significant increase in environmental harm is likely; EIS is required.</p>

CAC Outcome

Project Director	Christopher Loveday
Project Manager	Grant Zhu
Decision level	Level 2

EIS Required	Y
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Date	Comments
04-OCT-2011	CAC agreed with recommendation.
06-OCT-2011	APPLICATION FOR LEVEL 1 NON-CODE COMPLIANT EA: Application for Non-Code compliant EA mining lease to develop an open cut coal mine with expected capacity of 1.4 million ton of Run of Mine coal product per year. The mine lease (ML) application number was issued as ML80180. RECOMMENDED DECISION: Significant increase in environmental harm is likely; EIS is required.

Chairperson:	Derek Robson
Signature of Chair:	
Date:	

Terms of Reference for the Dingo West Coal Mine Project Environmental Impact Statement (EIS)

Published on DES Disclosure Log
RTI Act 2009

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Background

The Dingo West Coal Mine Project (the Project) will be developed and operated by Dingo West Coal Pty Ltd, a wholly owned subsidiary of Bandanna Energy. Bandanna Energy is an Australian owned public company which listed on the Australian Securities Exchange's in 2008. Bandanna Energy has been in operation since 2008 and has over 1,400 million tonnes of JORC compliant Resources and Reserves.

The Project involves the development of a greenfield open cut coal mine, including supporting rail loading and rail infrastructure. The project will have a run-of-mine (ROM) production rate of up to 1.4 million tonnes per annum (Mtpa) yielding up to 1 Mtpa of product coal for the export market. The project will have a mine life of at least 30 years; however, future expansion may occur dependent on favourable exploration results.

The project site, detailed in the mining lease application (MLA 80180), is located immediately southwest of the township of Dingo in Central Queensland. The project site covers an area of approximately 4,650 ha and is located within the Central Highlands Regional Council area.

The mine infrastructure will be located to the immediate south of the Capricorn Highway at the western edge of the project site and will include:

- three open cut mine pits
- a coal handling and preparation plant
- a co-disposal area for rejects and tailings
- ROM and product coal stockpiles
- an enclosed conveyor located over the Capricorn Highway
- a rail loop and train loading facilities
- various sediment, raw and mine water dams
- an administration building and bath house; and
- workshop, warehouse and vehicle servicing facilities.

The mining method will be truck and shovel operation for removal of overburden with a coaling fleet of loader and trucks for removal and delivery of ROM coal to the stockpile at the CHPP. Consideration will also be given to in-pit crushing to produce PCI during the initial operational stages of the mine. Product coal will be transferred to the rail load out facility on the northern side of the Capricorn Highway via an enclosed conveyor.

Product coal from the project will be transported by train on the existing Blackwater line to the new Wiggins Island Coal Export Terminal (WICET) for export. Bandanna Energy is an owner / shareholder of the WICET and has a 4 Mtpa allocation in the initial 27 Mtpa capacity of Stage 1.

This project was referred to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPac) for assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The DSEWPac declared the project not a Controlled Action under the EPBC Act on 11 July and consequently no further assessment of the project under the EPBC Act is required.

CONTENT OF THE ENVIRONMENTAL IMPACT STATEMENT (EIS)

Executive summary

The executive summary conveys the project's most important aspects and options to the reader in a concise and readable form. Use plain English and avoid the use of jargon and obscure terms. The structure of the executive summary should follow that of the EIS, and focus strongly on the key issues and conclusions.

Glossary of terms

Provide a glossary of technical terms, acronyms and abbreviations before the main text of the EIS.

1. Introduction

Explain why the EIS has been prepared and what it sets out to achieve—in particular, the level of detail required to satisfy assessment of the approvals being sought. Define the audience of the EIS.

1.1 Project proponent

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

1.2 Project description

Provide and illustrate a brief description of the key elements of the project. Summarise any major associated infrastructure requirements. Detailed descriptions of the project should follow in section 3.

1.3 Project objectives and scope

State the objectives that have led to the development of the project and briefly outline the events leading up to the project's formulation, including alternatives, envisaged time scale for implementation and project life, anticipated establishment costs and actions already undertaken within the project area.

Describe the current status of the project and outline the relationship of the project to other developments or actions that may relate, whether or not they have been approved. The consequences of not proceeding with the project will also be discussed.

1.4 The EIS process

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

1.4.1 Methodology of the EIS

Describe the EIS process steps, timing and decisions to be made for relevant stages of the project. Provide a brief description of studies or surveys that have been undertaken to help develop the project and prepare the EIS. Describe any baseline studies or investigations used in the EIS that were undertaken before the EIS process started. Outline how the consultation process (which will be described in detail in section 1.5) integrated with the other components of the impact assessment, including the stages, timing and mechanisms for public input and participation.

The information in this section is required to ensure:

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

1.4.2 Objectives of the EIS

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

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

If it transpires while preparing the EIS that previously unforeseen matters not addressed in the terms of reference are found to be relevant to assessing potential impacts of the project, those matters will be included in the EIS.

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

The EIS assessment's depth and scope will be proportional to the values impacted and the scale of the impacts. When considering whether an impact is or is not significant, the proponent will take account of both the intensity of the impact and the context in which it would occur.

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

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

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

1.4.3 Submissions

The reader will be informed about how and when public submissions on the draft EIS can be made, and how they will be addressed and taken into account in the decision-making process.

1.5 Public consultation process

An appropriate public consultation program is essential to the impact assessment. This section will outline the methodology that will be adopted to identify and mitigate social and economic impacts of the project. Provide information about consultation that has already taken place and its results.

Submitting a list of affected persons and interested persons, as well as a statement of how the proponent proposes to consult with those persons, is a statutory requirement of the EIS process under section 41 of the *Environmental Protection Act 1994*. Similar requirements, though non-statutory, are usually applied to EIS processes under other Queensland legislation.

The public consultation program should provide opportunities to educate and involve the community. It may include interviews with individuals, public meetings, interest group meetings, producing regular summary information and updates, and other means to encourage and facilitate active public consultation.

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

1.6 Project approvals

1.6.1 Relevant legislation and policy requirements

Explain the legislation and policies controlling the approvals process. Make reference to the Queensland *Environmental Protection Act 1994*, *Sustainable Planning Act 2009* and other potentially relevant Queensland laws. Include any requirements of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Identify all environmentally relevant activities that would be undertaken at the project site, including those that would otherwise require a development approval if the project was not covered by an environmental authority for a mining or petroleum activity.

If any potentially relevant legislation (such as the *Water Act 2000* for taking water, the *Nature Conservation Act 1992* for protected wildlife, or the *Vegetation Management Act 1999* for land clearing) is not applicable, this section of the EIS will explain why.

Describe local government planning controls, local laws and policies applying to the development, and provide a list of the approvals required for the project and the expected program for approval of applications. The description should include any requirements for workers' camps or villages.

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

1.6.2 Planning processes and standards

Discuss the project's consistency with existing land uses or long-term policy framework for the area (for instance, as reflected in local and regional plans such as the Central Queensland Strategy for Sustainability – 2004 and beyond), and with legislation, standards, codes or guidelines available to monitor and control operations on site. Refer to all relevant state and regional planning policies. This information is required to demonstrate how the proposal conforms to state, regional and local plans for the area.

1.7 — Accredited process for controlled actions under Commonwealth legislation

Projects that are undergoing an EIS under a State statutory process may also be controlled actions under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In which case, the Commonwealth may accredit Queensland's EIS process for the purposes of the Commonwealth's assessment under Part 8 of the EPBC Act. When a state EIS process has been accredited, it will be necessary for the TOR to address potential impacts on the matters of national environmental significance identified in the 'controlling provisions' when the project was declared a controlled action.

The matters to be addressed in the EIS are set out in Schedule 4 of the Commonwealth's *Environment Protection and Biodiversity Conservation Regulations 2000*. Provide a stand-alone report as a separate chapter of the EIS that fully addresses the matters relevant to the controlling provisions.

2. Project need and alternatives

2.1 Project justification

Describe the justification for the project, with particular reference to the economic and social benefits, including employment and spin-off business development that the project may provide. Discuss the status of the project in a regional, state and national context.

2.2 Alternatives to the project

Describe feasible alternatives, including conceptual, technological and locality alternatives to the project, and discuss the consequences of not proceeding with the project. Summarise the comparative environmental, social and economic impacts of each alternative, with particular regard to the principles of ecologically sustainable development (ESD). Discuss alternatives in sufficient detail to enable an understanding of the reasons for preferring certain options and courses of action and rejecting others.

Explain the interdependencies of the project's components, particularly how each of any industrial developments, or various combinations of industrial developments, and any infrastructure requirements relate to the viability of the proposal. Should water supply, power, transport and/or storage infrastructure be included as part of the project, describe and provide a rationale for such infrastructure.

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

3. Description of the project

Describe the project through its various stages, such as construction, operation and decommissioning. This information is required to allow complete assessment of a project from planning to its end-of-life. It also allows identification of approvals that may be required and how they may be managed through the life of the project. Maps or figures showing the position of features or boundaries will use latitudes and longitudes on the GDA94 datum. These latitudes and longitudes will also be used in the text to describe the locations of any features (such as discharge points) or boundaries that may be relevant to subsequent approvals.

3.1 Location

3.1.1 Regional context

Describe the regional context of the project, including the location of the Fitzroy Basin, and illustrate it on maps at suitable scales. The maps should include:

- existing local and state-controlled road networks systems complete with road names
- location of existing towns, places and property homestead
- location of construction activities
- surrounding land uses within the region including other major developments, possible commercial and industrial development areas.

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3.1.2 Local context

Describe the local context of the project and include real property descriptions of the project site and adjacent properties. Provide maps at suitable scales that show the precise location of the project area, and in particular:

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

Include a rectified aerial photo enlargement (preferably A3 size) to illustrate components of the project in relation to the land and mining tenures, and natural and built features of the area.

The EIS should identify the following additional information:

- proposed location of construction activities and compounds and accommodation camps
- access locations existing and proposed to the state-controlled roads
- locations and names of transport infrastructure including state and local road networks
- locations of any proposed road crossing points of existing and proposed rail infrastructure associated with the project
- pedestrian access consideration
- location of any proposed mining activities under the state-controlled road reserves to service the project
- any proposed realignment if any existing roads / rails is to be described so that potential impacts and likely costs of any infrastructure treatments can be determined.

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3.2 Construction

Describe the extent and nature of the project's construction phase. Describe the type and methods of construction, the construction equipment to be used and the items of plant to be transported onto the construction site. Describe any staging of the project and illustrate site boundaries, development sequencing and timeframes. Indicate the likely sources of the construction materials and their associated haulage routes for the assessment purposes.

3.3 Operations

Describe the location and nature of the project's operational phase, and illustrate the description as required with maps, diagrams and artist's impressions. Operational issues to be addressed will include, but not necessarily be

limited to:

- a description of plant and equipment to be employed
- the capacity of plant and equipment
- chemical and physical processes
- chemicals to be used and associated mode of transport to and from the project site.

Provide concept and layout plans highlighting proposed buildings, structures, plant and equipment associated with the processing operation. Describe the nature, sources, location and quantities of all materials to be handled, including the storage and stockpiling of raw materials.

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

3.3.1 Tenements and tenures

Describe and illustrate any existing mining tenements, petroleum, geothermal and greenhouse gas tenures and licences overlying and adjacent to the project site, and any proposed applications required for this project.

3.3.2 Resource base and mine life

Summarise the results of studies and surveys undertaken to identify the mineral and natural resources required to implement the proposal (further detail will be provided in section 4.2.1.2 Geology). Describe the required location, volume, tonnage and quality of natural resources (such as land, water, timber, energy, etc). Provide specific details of the following:

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

3.3.3 Mining methods and equipment

Provide specific details of the following:

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

The description will refer to, and be complemented by, the figures previously presented in section 3.3.1 showing the locations of key aspects of the project. Additional figures will be provided if required.

3.3.4 Mine sequencing

Provide specific details of the following:

- the proposed sequence and timing of mining of each seam/ore body within the mining lease;
- the physical extent of excavations, location of stockpiles of overburden and/or coal/mineral reject to be handled during the project's operation or left after mining ceases, including the rate of throughput of stockpiles of product, reject and overburden
- typical cross sections of the mine workings showing voids, surface profiles and geological strata
- the proposed progressive backfilling of excavations
- the area disturbed at each major stage of the project.

3.3.5 Workforce

Outline the workforce numbers to be employed by the project during its various phases, such as construction, commissioning, operation and decommissioning. Make comment on the anticipated basis of employment, such as permanent, contract, etc. A detailed profile of the workforce will be provided in the society section of the EIS.

3.3.6 Workforce accommodation

Describe where personnel will be accommodated. In particular, describe and illustrate the number, size, locations and management of any workers camps or villages. The consequent impacts of constructing new or expanded accommodation will be addressed in the appropriate sections of the EIS even if the accommodation will be operated by a contractor. Identify if first-aid facilities and medical facilities will be provided within any work camp facility and include possible landing sites for both the rescue helicopter and fixed wing aircraft services, if required.

3.3.7 Processing and products

Describe the quantities and characteristics of the products that would be produced on an annual basis. Provide indicative process flow-sheets showing material balances for the processing plant, and the anticipated rates of inputs, along with similar data on products, wastes and recycle streams.

3.3.8 Ongoing evaluation and exploration activities

Describe the extent and nature of any proposed ongoing exploration or geological or geo technical evaluation within the project area that may be required over the life of the project.

3.4 Product handling

Describe and show on plans at an appropriate scale the proposed methods and facilities to be used for product storage and for transferring product from the processing plant to the storage facilities and from the storage facilities to the transport facilities. Discuss any environmental design features of these facilities including bunding of storage facilities.

3.5 Infrastructure requirements

Describe with concept and layout plans, requirements for constructing, upgrading or relocating all infrastructure associated with the project. Show the locations of any necessary infrastructure easements on the plans, including infrastructure such as roads, rail (and the rail corridor), level crossings, conveyors, bridges, ~~jetties, ferries~~, tracks and pathways, dams and weirs, bore fields, power lines and other cables, wireless technology (such as microwave telecommunications), and pipelines for any services, whether underground or above.

3.5.1 Transport—road/rail/air/ship

Provide an overview of the arrangements for the transportation, importation or exportation of plant, equipment, materials, products, wastes and personnel during both the construction, ~~commissioning, and~~ operational ~~and decommissioning~~ phases of the project. Describe the use of existing facilities, including common user transport infrastructure, and all requirements for the construction, upgrading or relocation of any transport-related infrastructure.

The description will also include detailed descriptions and diagrams of

- the main Western Rail Line
- the proposed balloon loop
- details of the interface of the proposed rail loop with the existing railway
- the proposed rail load-out facility
- the proposed on-lease haul roads

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3.5.2 Energy

Describe all energy requirements (including emergency energy provisions), including electricity, natural gas, and/or solid and liquid fuel requirements for the construction and operation of the project. Describe the likely source of the energy requirements and any associated consultation with energy providers. Show the locations of any easements on the infrastructure plan. Energy conservation will be briefly described in the context of any Commonwealth, Queensland and local government policies.

3.5.3 Water supply and storage

Provide information on proposed water usage and storage by the project, including the quality and quantity of all water supplied to, or captured at, the site. In particular, describe the proposed and optional sources of water supply such as mine dewatering, capture of overland flow, taking from a watercourse, bores, coal seam gas water and associated pipelines, and any surface storages such as dams and weirs, municipal water supply pipelines.

Estimate the average and maximum rates of supply from each source for each phase of the project's life. Any proposed water conservation and management measures should be described.

Describe any approvals and water allocations the project may need under the *Water Act 2000* for water supply and storage.

Estimate potable water demand for the project, including the temporary demands during the construction period. Provide details of any existing water supply, including town water, which would meet the requirements. If water storage and treatment is proposed on site for use by the site workforce, describe the method of treatment and storage. Describe any waste streams from water treatment, and assess the potential impacts of disposal in the appropriate sections of the EIS.

3.5.4 Stormwater drainage

Provide a description of the proposed stormwater drainage system and the proposed disposal arrangements, including any off-site services. Illustrate the description with figures with 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.

3.5.5 Sewerage

Describe, in general terms, the sewerage infrastructure required by the project. If it is intended that industrial effluent or relatively large amounts of domestic effluent are to be discharged into an existing sewerage system, provide in section 4.4 Waste an assessment of the capacity of the existing system to accept the effluent. For industrial effluent, this should detail the physical and chemical characteristics of the effluent.

3.5.6 Telecommunications

Describe any impacts on existing telecommunications infrastructure, such as optical cables and microwave towers, and identify the owners of that infrastructure.

3.5.7 Accommodation and other infrastructure

Describe any other developments directly related to the project not described in other sections, such as:

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

3.6 Waste management

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, which for the operational phase may be simplified versions of those provided in section 3.3, for each distinct stage of the project. These should indicate the processes to be used and highlight their associated waste streams. This applies to all waste outputs—solid, liquid and gaseous—including recycling efforts such as stockpiling and reusing topsoil. The schematic diagrams, or an associated table, will cross-reference the relevant sections of the EIS where the potential impacts and mitigation measures associated with each waste stream are described. Describe the physical and chemical characteristics, and the variability of composition and generation rates of each waste material.

Each subsection on waste management will 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 reuse 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.

3.6.1 Air emissions

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

3.6.2 Excavated waste

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

Estimate the tonnage and volume of waste rock and subsoil to be excavated during the various stages of operation. Estimates will be made for each separate rock and soil type. Describe the expected proportion and source of waste rock that is mineralised but currently uneconomical for processing.

Describe the chemical and physical properties of the waste rock and subsoil, and assess 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 (DME, 1995), and any other applicable best practice guidelines. 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.

Discuss the potential for acid, 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. Provide cross-references in this section to those sections of 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.

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

3.6.3 Tailings or fine rejects

Describe the methods and materials that would be used to produce tailings waste (tailings should be understood to include any fine reject material). 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, (DME, 1995).

Describe in detail the likely physical and chemical characteristics of the tailings waste and the likely chemical characteristics of waste water 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 the disposal 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 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.

3.6.4 Solid waste disposal

Describe the quantity and quality of solid wastes (other than waste rock, subsoil and tailings addressed in other sections) and the proposed methods of their disposal. Describe the proposed location, capacity and suitability of any landfill that would receive solid waste from the project. Describe and illustrate any proposed on-site landfill, including its dimensions, volume and method of construction.

3.6.5 Liquid waste

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

The EIS will consider the following effects:

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

3.7 Rehabilitation and decommissioning

Describe the options, strategic approaches and methods for progressive and final rehabilitation of the environment disturbed by the project. Include the proposed timeframe associated with decommissioning. Develop a preferred rehabilitation strategy that would minimise the amount of land disturbed at any one time, and minimise the residual loss of land with ecological or productive value. Show the final topography of any excavations, waste areas and dam sites on suitably scaled maps.

Evaluate the compliance of the strategies and methods for progressive and final rehabilitation of disturbed areas with the objectives of the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (DME, 1995) and DERM's guideline Rehabilitation Requirements for Mining Projects. In particular, the strategies and methods will have the following objectives:

- Mining and rehabilitation should aim to create a landform with the same or similar land use capabilities and/or suitability it had prior to the disturbance, unless other beneficial land uses are pre-determined and agreed.
- Mine wastes and disturbed land should be rehabilitated so that it is self-sustaining or to a condition where the maintenance requirements are consistent with an agreed post-mining land use.
- Surface and ground waters that leave the lease should not be degraded compared to their condition prior to the commencement of mining operations. Current and future water quality should be maintained at levels that are acceptable for users downstream of the site.

Describe the means of decommissioning the project by removing or reusing plant, equipment, structures, buildings, concrete footings and foundations, hardstand areas, storage tanks and wharfage. Describe the proposed methods for stabilising the affected sites. Discuss options and methods for the disposal of wastes from the demolition of plant and buildings in sufficient detail for their feasibility and suitability to be assessed.

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.

The description of topsoil management will address minimising topsoil storage times (to reduce fertility degradation) and the transportation, storage and replacement of topsoil to disturbed areas.

Detail of the impacts of the preferred rehabilitation strategy will be discussed in the appropriate subsections of section 4 (Environmental values and management of impacts) particularly with regard to 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.

4. Environmental values and management of impacts

The functions of this section are to:

- Describe the existing environmental values of the area that may be affected by the project. Environmental values are defined in section 9 of the *Environmental Protection Act 1994*, environmental protection policies and other documents such as the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC & ARMCANZ, 2000). Environmental values may also be derived following recognised procedures, such as described in the ANZECC & ARMCANZ 2000 guidelines. Environmental values will be described referring to background information and studies, which will be included as appendices to the EIS.
- Describe the potential adverse and beneficial impacts of the project on the identified environmental values.
- Describe any cumulative impacts on environmental values caused by the project, either in isolation or by combination with other known existing or planned development or sources of contamination.
- Propose environmental protection objectives and commitments. All environmental protection commitments must be measurable and auditable.
- Examine viable alternative strategies for managing impacts. These alternatives will be presented and compared in view of the stated objectives and standards to be achieved. Discuss available techniques, including best practice, to control and manage impacts to the nominated objectives. This section will detail the environmental protection measures to be used in the planning, construction, operations, rehabilitation and decommissioning stages of the project and any associated works. Measures will prevent, or where prevention is not possible, minimise environmental harm and maximise social, economic and environmental benefits of the project. Preferred measures will be identified and described in more detail than other alternatives.
- Describe any computational model used to make predictions of impacts and/or outcomes of mitigation measures. The description will address the inputs, assumptions, limitations, sensitivities, accuracy and precision of the model.

Any maps or figures showing the position of features or boundaries will use latitudes and longitudes on the GDA94 datum. Latitudes and longitudes on the GDA94 datum will also be used in the text to describe the locations of any features (such as discharge points) or boundaries that may be relevant to subsequent approvals.

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

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

- Environmental values affected: describe the existing environmental values of the area to be affected including values and areas that may be affected by any cumulative impacts (refer to background studies in appendices – note: such studies may be required over several seasons). Explain how the environmental values were derived, such as by citing published documents or by following a recognised procedure to derive the values.
- Impact on environmental values: describe quantitatively the likely impact of the project on the identified environmental values of the area. The cumulative impacts of the project must be considered over time or in combination with other (all) impacts in the dimensions of scale, intensity, duration or frequency of the impacts. In particular, address any requirements and recommendations ~~of the Great Barrier Reef Marine Park Authority,~~ relevant state planning policies, environmental protection policies, national environmental protection measures and integrated catchment management plans.
- Cumulative impacts on the environmental values of land, air and water and cumulative impacts on public health and the health of terrestrial, ~~aquatic and marine~~ and aquatic ecosystems must be discussed in the relevant sections. This assessment may include air and watersheds affected by the project and other proposals competing for use of the local air and water sheds.
- Where impacts from the project will not be felt in isolation to other sources of impact, it is recommended that the proponent develop consultative arrangements with other industries in the project's area to undertake cooperative monitoring and/or management of environmental parameters. Describe such arrangements in the EIS.

- Environmental protection objectives: describe qualitatively and quantitatively the proposed objectives for enhancing or protecting each environmental value. Include proposed indicators to be monitored to demonstrate the extent of achievement of the objective as well as the numerical standard that defines the achievement of the objective (this standard must be auditable). The measurable indicators and standards can be determined from legislation, support policies and government policies as well as the expected performance of control strategies. Include objectives for progressive and final rehabilitation and managing contaminated land.
- Control strategies to achieve the objectives: describe the control principals, proposed actions and technologies to be implemented that are likely to achieve the environmental protection objectives; include designs, relevant performance specifications of plant. Details are required to show that the expected performance is achievable and realistic.
- Environmental offsets: Information is required to show that measures have been taken to avoid and minimise potential adverse impacts of the project. Environmental offsets may be proposed to counterbalance any remaining loss of environmental values, consistent with the specific-issue offset policies under the framework of the Queensland Government Environmental Offset Policy 2008 ~~and the draft Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) offsets policy.~~
- Monitoring programs: describe the monitoring parameters, monitoring points, frequency, data interpretation and reporting proposals.
- Auditing programs: describe how progress towards achieving the objectives will be measured, reported and whether external auditors will be employed. Include scope, methods and frequency of auditing proposed.
- Management strategies: describe the strategies to be used to ensure the environmental protection objectives are achieved and control strategies implemented, such as by a continuous improvement framework, including details of corrective action options, reporting (including any public reporting), monitoring, staff training, management responsibility pathway, and any environmental management systems and how they are relevant to each element of the environment.
- Information quality: information given under each element will also state the sources of the information, how recent the information is, how any background studies were undertaken (e.g. intensity of field work sampling), how the reliability of the information was tested, and what uncertainties (if any) are in the information.

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

4.1 Climate

Describe the rainfall patterns (including magnitude and seasonal variability of rainfall), air temperatures, humidity, wind (direction and speed) and any other special factors (e.g. temperature inversions) that may affect management of the project including air quality within the region of the project. Discuss extremes of climate (droughts, floods, cyclones, etc) with particular reference to water management at the project site. Address the vulnerability of the area to natural or induced hazards, such as floods and bushfires. Consider the relative frequency and magnitude of these events together with the risk they pose to management of the project.

The potential impacts due to climatic factors will be addressed in the relevant sections of the EIS. The impacts of rainfall on soil erosion will be addressed in section 4.2. The impacts of storm events on the capacity of waste containment systems, such as site bunding, stormwater management and tailings dams, will be addressed in section 4.5 with regard to contamination of waterways and in section 4.4 with regard to the design of the waste containment systems. The impacts of winds, rain, humidity, and temperature inversions on air quality will be addressed in section 4.7.

4.1.1 Climate change adaptation

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

- a risk assessment of how changing patterns of rainfall and hydrology, temperature, extreme weather and sea level (where appropriate) may affect the viability and environmental management of the project
- the preferred and alternative adaptation strategies to be implemented

- a commitment to undertake, where practicable, a cooperative approach with government, other industry and sectors to address adaptation to climate change.

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

4.2 Land

4.2.1 Description of environmental values

Describe the existing environment values of the land area that may be affected by the project. Define and describe the objectives and practical measures for protecting or enhancing land-based environmental values, describe how nominated quantitative standards and indicators may be achieved, and how achieving the objectives will be monitored, audited and managed.

4.2.1.1 Topography

Describe and illustrate the topography of the project site and the surrounding area, and highlight any significant features shown on the maps. Such features would include any locations subsequently referred to in the EIS (such as noise sensitive locations) that are not included on other maps in section 4.2. Maps will have contours at suitable increments (at least every metre in areas of low relief), shown with respect to Australian Height Datum (AHD) and drafted to the GDA 94 datum.

4.2.1.2 Land use

Describe and illustrate land uses in and around the project area in relation to current land tenures, show the location of existing dwellings, and make particular mention of any land with special attributes. Include any surrounding land ~~or marine~~ areas that could be affected by the project. Show the location of any native title applications or determinations. Describe and illustrate the zoning of land in and around the project area according to any existing town or strategic plan.

4.2.1.3 Geology and geomorphology

Provide a description, map and a series of cross-sections of the geology of the project area. Describe the geomorphology of the project site and the surrounding area. Make particular reference to the physical and chemical properties of surface and sub-surface materials and geological structures that could have an influence on, or be influenced by, the project's activities. Describe geological properties that may influence ground stability (including seismic activity, if relevant), occupational health and safety, rehabilitation programs, or the quality of wastewater leaving any area disturbed by the project. Describe known sites of palaeontologic significance and address the potential for significant fossil finds in locations where the age and type of geology is such that significant specimens may be uncovered during construction or operations. Describe any sites of geomorphological significance, such as lava tubes or karst.

4.2.1.4 Mineral resources and ore reserves

Provide a summary of the results of studies and surveys undertaken to identify and delineate the mineral resources and ore reserves within the project area (including any areas underlying related infrastructure).

Report the mineral resources (measured, indicated or inferred) and ore reserves (proved or probable) in accordance with the Australasian Code for Reporting of Mineral Resources and Ore Reserves (the JORC Code – available at <www.jorc.org/main.php>) and the principles outlined in the Australian Guidelines for the Estimating and Reporting of Inventory Coal, Coal Resources and Coal Reserves (available at <www.jorc.org/pdf/coalguidelines.pdf>) and include the modifying factors and assumptions made in arriving at the estimates. Describe in detail the location, tonnage and quality of the mineral resources and ore reserves within the project area. For coal projects, the description it should be presented on a 'seam by seam' basis.

In addition, provide appropriately-scaled maps showing the general location of the project area, and in particular:

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

- any part of the resource not intended to be mined and any part of the resource that may be sterilised by the proposed mining operations or infrastructure.

4.2.1.5 Soils

Conduct a soil survey of the area that would be affected by the project in accordance with section 6.1 Compilation of Land Resources Inventory (LRI) – Pre Mining Studies, of the Land Suitability Assessment Techniques in the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (DME, 1995). Undertake soil tests and laboratory analyses of representative samples down the soil profile, with particular reference to the physical and chemical properties of the materials that will influence erosion potential, storm water run-off quality, rehabilitation and agricultural productivity of the land. For pipeline routes, undertake the analysis and classification at least to the depth of excavation. Provide geotechnical information on the soils' stability and suitability for construction of project facilities.

Describe, map and illustrate soil types and profiles according to the Australian Soil and Land Survey Field Handbook (National Committee on Soil and Terrain, 2009), Guidelines for Survey Soil and Land Resources (McKenzie et al, 2nd Ed., 2008) and Australian Soil Classification (Isbell, 2002).

Describe the depth and quality of usable topsoil and subsoil to be stripped and stockpiled for rehabilitation.

For land where acid sulfate soils (ASS) may be present, undertake an investigation in accordance with the guidelines and methods published by the Queensland Acid Sulfate Soils Investigation Team (QASSIT) and the Queensland Acid Sulfate Soils Management Advisory Committee (QASSMAC). The management of ASS will address the State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils.

4.2.1.4.2.1.6 Land suitabilities

Provide an Agricultural Land Class map of the project site and the surrounding area according to the Planning Guideline: the Identification of Good Quality Agricultural Land (DPI/DHLGP, 1993). Highlight any good cropping land.

Describe and map the land use suitabilities, and their classes, of the potentially affected area in accordance with the rain-fed broadacre cropping and beef cattle grazing land suitability classification system in Attachment 2 of Land Suitability Assessment Techniques in the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (DME, 1995).

Provide an Agricultural Land Class map of the project site and the surrounding area according to the Planning Guideline: the Identification of Good Quality Agricultural Land (DPI/DHLGP, 1993).

Discuss the good quality agricultural land status and explain any variation with the good quality agricultural land mapping shown in the relevant regional council planning scheme.

Describe and illustrate the usual agricultural use of the land of the project site and the surrounding area, including any crop rotations.

Include an assessment of Strategic Cropping Land in accordance with the most recent DERM information based on the document Protection Queensland's Strategic Cropping Land: A Policy Framework.

Show the location of any cropping land in the vicinity of the site, highlighting any strategic cropping land, and describe the crops commonly grown on the land, including any rotations.

4.2.1.4.2.1.7 Contaminated land

Describe and illustrate the nature and extent of any areas listed on the Environmental Management Register (EMR) or the Contaminated Land Register (CLR) under the *Environmental Protection Act 1994*, and any existing potentially contaminated sites that are not on the registers but the history of the site suggests may be present.

Conduct a preliminary site investigation consistent with DERM's Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland. If the results of the preliminary site investigation indicate potential or actual contamination, conduct a detailed site investigation progressively managed in accordance with the stages outlined in Appendix 5 of the Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland. The results of the site investigations should be summarised in the EIS and provided in detail in an appendix.

4.2.1.4.2.1.8 Infrastructure

Describe and show on suitably-scaled maps the location and owners or custodians of all infrastructure and easements on the potentially affected land, including roads and road reserves, railways and rail reserves, stock routes, and power lines. Indicate the locations of any buried gas or water pipelines, power lines, or telecommunication cables. Describe the environmental values affected by the existing infrastructure.

4.2.1.4.2.1.9 Environmentally sensitive areas

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Describe and show on suitably-scaled maps the proximity of the project to any category A or B environmentally sensitive areas under the Environmental Protection Regulation 2008. In particular, indicate if the land affected by the project is, or is likely, to become part of the protected area estate, or is subject to any treaty.

4.2.1.124.2.1.10 Landscape character

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

4.2.1.134.2.1.11 Visual amenity

Describe existing landscape features, panoramas and views that have, or could be expected to have, value to the community whether of local, regional, state-wide, national or international significance. Information in the form of maps, sections, elevations and photographs is to be used (and photo montages prepared, where necessary), particularly where addressing the following issues:

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

4.2.2 Potential impacts and mitigation measures

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

4.2.2.1 Resource utilisation

With regard to resource stewardship, analyse the effectiveness of the mining proposal in achieving the optimum utilisation of the 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.

Describe how the company plans to manage low grade or currently uneconomic deposits or excavated material to ensure that this potential future resource is not sterilised. Also describe measures to ensure the minimal dilution of mineralised but currently sub-economic waste rock by non-mineralised waste rock. Provide details and maps of expected residual or remnant resources within the project area including any low grade stockpiles, tailings and currently uneconomic material.

4.2.2.2 Land use and suitability

Assess the potential for the project's construction and operation to change existing and potential land uses of the project site and adjacent areas. Detail the proposed land use options after mining ceases, including the suitability of the area to be used for primary production, industry, or nature conservation. Assess the factors favouring or limiting the establishment of those options compared to land use and suitability prior to construction of the project and assess the potential liabilities for long-term management.

Assess the potential environmental harm caused by the project on the adjacent areas currently used for agriculture, urban development, recreation, tourism, other business. Assess the implications of the project for future

developments in the impact area, including constraints on surrounding land uses. Propose mitigation measures for any potentially adverse impacts on stock route operations during the construction and operational phases of the development. If the development adjoins or potentially impacts on good quality agricultural land, assess the potential for land use conflict. Investigations will follow the procedures set out in the planning guideline The Identification of Good Quality Agricultural Land (DPI & DHLGP, 1993), which supports State Planning Policy 1/92: Development and the Conservation of Agricultural Land.

Assess incompatible land uses, whether existing or potential, adjacent to all aspects of the project, including essential and proposed ancillary developments or activities and areas directly or indirectly affected by the construction and operation of these activities. Propose measures to avoid or mitigate adverse impacts.

4.2.2.3—Subsidence [UNDERGROUND MINING ONLY]

~~Provide comprehensive surface subsidence predictions taking into account factors such as topographic variations and geological complexities, with a full description of the methodology and including an assessment of the accuracy and precision of the predictions. Show the results of the predictions on maps with one metre contour increments and a scale appropriate for assessment of surface subsidence impacts. Propose detailed mitigation measures for any significant impacts that would result from subsidence.~~

4.2.2.4.2.2.3 Land disturbance

Develop and detail a strategy that will minimise the amount of land disturbed at any one time. The strategy will address progressive rehabilitation and final decommissioning with particular regard to the impacts in the short, medium and long-term timeframes. Describe the methods to be used for managing disturbed land, including backfilling, covering, re-contouring, topsoil handling and revegetation. However, a description of erosion and sediment control could be deferred to section 4.2.2.6. Any proposals to disturb land that would impede or divert overland flow or waterways, and any subsequent reinstatement, during construction or operations will be first described in this section. However, the potential impacts of interfering with flow on the quantity and quality of water resources, the final drainage and seepage control systems, and any long-term monitoring plans will be assessed and described in section 4.5.

In addition to assessing the operational phase of land disturbance, address the ultimate changes following implementation of the decommissioning and rehabilitation plan described in section 3.7. Detail the proposed long-term changes that will occur to the land after mining ceases compared to the situation before mining commences. Those changes will be illustrated on suitably scaled maps with contours at intervals sufficient to assess the likely drainage pattern for ground and surface waters (however, the assessment of the impacts on drainage and water quality will be provided in the water resources section of the EIS). Assess the proposed mitigation measures for land disturbance to be used on decommissioning the site in sufficient detail to decide their feasibility. In particular, address the long-term stability of final voids and spoil dumps, safety of access to the site after surrender of the lease, and the residual risks that will be transferred to the subsequent landholder.

Rehabilitation success criteria for land disturbance will be proposed in this section while rehabilitation success criteria for revegetation will be proposed in the section on ecology.

If geological conditions are conducive, the proponent should consider the possibility that significant fossil specimens may be uncovered during construction or operations and propose strategies to protect the specimens and alert the Queensland Museum to the find.

4.2.2.5.4.2.2.4 Land degradation or contamination

Assess the possible degradation or contamination of land that could result from any aspects of the project. The assessment should not be limited to activities that would result in the land being entered on the EMR or the CLR. Rather, it should include any activity that could have a detrimental impact on land. Matters to be considered include:

- the long-term use for dust-suppression of water with sufficient dissolved salts to affect soil condition
- disposal to land of any waste water
- waste rock disposal;
- tailings disposal
- disturbance of acid sulfate soils
- spills at chemical and fuel storage areas.

Propose measures that would prevent or remediate any degradation or contamination of land due to the proposed activities. Also, propose any measures required for the management and possible remediation of any existing contamination on the site.

~~For activities that may disturb acid sulfate soils, also propose management measures that would prevent the contamination of groundwater or surface water. The proposed management measures will be in accordance with the State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils and the guidelines published by the Queensland Acid Sulfate Soils Investigation Team (QASSIT) and the Queensland Acid Sulfate Soils Management Advisory Committee (QASSMAC).~~

Assess any activities or proposed contamination that would result in the land being newly entered on the EMR or the CLR. Also assess the consequences, particularly for the subsequent landholder, of any intention to leave the site on either register when mining ceases. Prepare a site management plan for any land remaining on the EMR or the CLR, and describe when, how and by whom it will be implemented.

4.2.2.64.2.2.5 Erosion and stability

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

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

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

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

4.2.2.74.2.2.6 Landscape character

Describe the potential impacts of the project on the landscape character of the site and the surrounding area. Make particular mention of any changes to the broad-scale topography and vegetation character of the area, such as due to spoil dumps, excavated voids and broad-scale clearing.

Provide details of measures to be undertaken to mitigate or avoid the identified impacts.

4.2.2.84.2.2.7 Visual amenity

Assess and discuss the visual impact of the project on particular panoramas and outlooks. Assess the extent and significance of the changed skyline including views from places of residence, work, and recreation, from road, cycle and walkways, from the air and other known vantage points day and night, and during all stages of the project. Illustrate the visual impacts of the project structures and associated infrastructure using appropriate simulation. Use sketches, diagrams, computer imaging and photos to portray the near views and far views of the completed structures and their surroundings from visually sensitive locations.

Provide detail of how impacts on visual amenity would be mitigated or avoided.

4.2.2.94.2.2.8 Lighting

Assess the potential impacts of lighting during all stages of the project particularly regarding:

- the effects of night operations, maintenance or increased vehicular traffic on residents
- changed habitat conditions for nocturnal animals
- the attraction of animals to lights at night.

Propose measures to mitigate or avoid all potential impacts due to lighting.

4.3 Transport

The transport section of the EIS will have separate subsections describing infrastructure associated with the various modes of transport, such as road, rail, pipeline, conveyor, air and sea.

4.3.1 Description of existing infrastructure and values

Provide details of the proposed use of existing infrastructure to transport materials, products or wastes to and from the project site. Provide details of any assets within the jurisdiction of any transport authority that could be impacted by the project (including the state-controlled network and local council roads). Also provide details, either in the transport section of the EIS or by cross-reference to other sections, of the environmental values that would be affected by the altered use of existing transport infrastructure or the construction of new or altered infrastructure.

For road, rail or conveyor transport, separately describe in detail and illustrate the existing networks that would be used by the project including information on the transportation modes between the accommodation facilities and the project site and including the projected background traffic growth. Describe and illustrate any stock routes potentially affected by the project.

In relation to air transport, describe the existing air fields and associated infrastructure that would be used by the project.

In relation to importing or exporting materials and products, identify any port that would be used by the project. Provide details of those ports, including: the berths to be used; the size and types of vessels that the berths can accommodate; the typical turnaround time for vessels; and the associated infrastructure that moves and stores material between the ships and the rail and/or road networks.

4.3.2 Potential impacts and mitigation measures

For each mode of transport and each phase of the project, the EIS will describe the:

- proposed construction, realignment, structural alteration, or changed use of any access and haul roads (including conceptual designs of any necessary new intersections or intersection upgrades), conveyor easements, rail loops and load-out facilities, and rail crossings (over or under the track) used by any transport associated with the project including the location of relevant services and utilities in the road reserves and locations and standards of existing access points and other relevant issues
- expected volumes and weights of materials (including a description of excess mass and excess dimension load impacts), products, hazardous goods or wastes
- types of vehicles, rolling stock, vessels and craft to be used
- likely number and timing of trips (including movements at shift changes)
- a detailed description and plans of the interface of the proposed rail balloon loop rail system
- a detailed description and plans of the rail load-out facility.

Provide sufficient information to make an independent assessment of how transport infrastructure will be affected by each phase of the project at a local and regional (including the state-controlled road network) level, including short-term haulage by road in the event of delays in commencement of rail operations level. Similarly, provide sufficient information to make an independent assessment of how transport used by the project will impact on environmental values. In both cases, the impacts along the whole length of each affected route will be discussed and measures proposed to avoid or mitigate the impacts.

Details will be provided of the:

- results of any modelling of transport impacts (including any impacts and mitigation measures from subsidence) on safety and efficiency in accordance with the Department of Transport and Main Roads' Guideline for Assessment of Road Impacts and Development
- assessment methodology used, including a summary of consultation undertaken with transport authorities regarding the scope of the impact assessment and methodology to be used
- base data assumptions, including an assessment of the current condition of the affected network and its performance (e.g. the current pavement (width, condition, age, levels of service and speed environments))
- possible interruptions to transport operations
- possible interference with, or risk to, school bus services and the safety of school children assembling, travelling and disembarking from buses, and proposed mitigation measures
- risks of spills of products or hazardous materials during transport, prevention measures to be used, and the

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requirements for dealing with any spills.

Assess any impacts on stock routes due to the project's activities. Propose mitigation measures for any disruptions to movement of travelling stock on stock routes. Outline, and cross-reference to more detailed descriptions with the EIS, the impacts of transport associated with the project on amenity, human health and ecological values as a result of dust, noise, vibration, and any other environmental effects. Also consider cumulative impacts with particular reference to public safety and the state-controlled networks.

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The assessment of road impacts will be in accordance with the latest version of the Department of Transport and Main Road's Guidelines for Assessment of Road Impacts of Development, available from the website: <www.mainroads.qld.gov.au>. Provide details of any heavy or oversized loads, including the number and type of vehicles, with a description of the likely timing and routes of those loads highlighting any vulnerable bridges or other structures along the proposed routes.

Also provide details of the likely traffic to be generated by workforce personnel and service providers including information on the transportation arrangements for the permanent and temporary workforces and centres such as Blackwater, Emerald and Rockhampton.

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In relation to road impacts, the EIS will include an assessment of impacts on:

- the safety, efficiency and condition of road operations and assets, including driver fatigue, accommodation and work cycles and will confirm whether a Road Use Management Plan is required for the project,
- heavy vehicle swept paths at state-controlled intersections,
- sensitivity checks on the worst case scenario for traffic on state-controlled roads and intersections
- any existing or proposed pedestrian cycle networks
- any existing public transport networks (assets and services) including a pavement assessment for the state controlled roads in accordance with the Department of Transport and Main Roads' Guideline for Assessment of Road Impacts of Development and any associated cost implications and the structural integrity of the state controlled road and road reserves
- watercourses and overland flows, and their interaction with the current and future road network (note: impacts on water values due to transport infrastructure will be outlined in the transport section of the EIS and cross-referenced to a detailed assessment in the water resources section).

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The assessment of impacts on the rail network itself, or on environmental values affected by changes in rail traffic, such as due to dust, noise or vibration, will also consider the following matters:

- the likely size of trains and the number of train paths needed to move materials, products or wastes to or from the project site
- new or altered rail transport infrastructure to meet demand from the project
- impacts on rail freight and other transport services (e.g. variability on existing train path availability)
- ~~impacts on passenger transport and services~~
- impacts at interface points with other private and public transport pathways such as roadway level crossings or occupational crossings (i.e. those crossings which form part of private access pathways to and from residential or business sites). Any impact to level crossings should be assessed using the Australian Level Crossing Assessment Model (ALCAM)
- the requirements for any approvals needed for rail crossings by roads or other infrastructure.

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Assess the impacts of the construction and operation of any conveyors. The direct impacts on any other transport infrastructure, such as those due to road or rail crossings, will be addressed in the transport section of the EIS, while the impacts on other matters (such as ecology, noise, etc) will be addressed in the appropriate sections of the EIS, but cross-referenced in the transport section.

In relation to the importation or export of materials and products, identify any aspects of the project that will increase the shipment of materials through any port. Provide details of the likely size and number of additional vessels that would use the port.

Assess any impacts on any port due to the import or export of materials or products, including the need for:

- ~~new coastal works, such as berth construction or alteration, land reclamation, etc~~
- ~~any dredging for shipping channels and swing basins~~
- ~~new or altered stockpile areas~~

- new, altered, or increased use of existing, infrastructure to handle materials between ships and road or rail transport.

~~Also assess any impacts on nearby areas due to the handling or storage of materials at ports, including dust, noise or lighting.~~

Assess any potential impacts of the project on water traffic in rivers and dams.

In relation to air transport, describe the new, and/or altered air fields and associated infrastructure that would be needed for the project. Describe the likely additional number of flights, frequency, timing (particularly any increase in night arrivals or take-offs), and size of aircraft. Describe any features of the project that could impact on air transport, such as the placement of waste dumps, stacks or flares beneath flight paths.

Assess any impacts on environmental values due to the need to redevelop or construct new airfields; and any impacts on amenity due to increased air traffic. The proposal and assessment should have regard to State Planning Policy 1/02: Development in the Vicinity of Certain Airports and Aviation Facilities. Assess any potential impacts on air safety, including the raising of landforms or the construction of stacks, flares or lighting within flight paths.

If the works that could result in impacts, or the associated mitigation works for identified impacts, are the responsibility of the proponent then the EIS will fully assess those impacts, detail the mitigation works and carry the environmental protection commitments forward into the project's EM plan.

If the proponent will not be responsible for the works associated with the impacts (for example, dredging at a port), the EIS will clearly identify the entity that will be responsible and what approvals would be needed. Nevertheless, in this case, the EIS will provide enough assessment of the likely impacts of all associated activities for the regulatory authorities to have confidence that approval of the project, subject to this EIS process, would not have unacceptable flow-on impacts due to necessary works farther down the transport chain.

Describe detailed measures to avoid or mitigate impacts on each transport mode. The mitigation measures will ensure the safety, efficiency and condition of each mode is maintained. These mitigation measures are to be prepared by the proponent in close consultation with the relevant transport authorities. Any residual impacts that cannot be avoided will be identified and quantified.

Mitigation strategies must include:

- ~~consideration of any transport authority's works program and forward planning~~
- proposed construction plans of all required transport infrastructure works, including upgrades to roads, in accordance with relevant and accepted authority standards and practices (including where relevant the Department of Transport and Main Roads' Road Planning and Design Manual and the Interim Guide to Road Planning and Design Practice) ~~proposed construction plans of all required transport infrastructure works in accordance with relevant and accepted authority standards and practices~~
- the responsible parties for any works
- estimates of costs
- details on the timing of the works
- a summary of relevant approvals and legislative requirements needed to implement mitigation strategies and transport infrastructure works required by the project.

Also consider public transport requirements and links to, or development of pedestrian and cycle networks.

4.4 Waste

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

4.4.1 Description of environmental values

Briefly describe the existing environment values that may be affected by the project's wastes. Refer to each of the waste streams described in section 3.6 and provide references to more detailed descriptions of the relevant environmental values in other sections of part 4 of the EIS.

4.4.2 Potential impacts and mitigation measures

The purpose of this section is to bring together a description of the preferred methods (and discuss any

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alternatives) to be used to deal with waste streams and outline their impacts. The full description of the magnitude and nature of impacts on particular environmental values due to managing waste will be provided in the relevant sections of part 4 of the EIS.

Define and describe the objectives and practical measures for protecting or enhancing environmental values from impacts by wastes. Assess the management measures against the waste hierarchy, describe how nominated quantitative standards and indicators may be achieved for waste management, and how the achievement of the objectives will be monitored, audited and managed.

As part of the description, and except where issues related to waste have been addressed in section 3.6 (in which case reference will be made to the appropriate subsection), provide details of each waste with regard to:

- operational handling, storage, treatment, disposal and fate of all wastes
- any methods and locations to be used to transport and dispose of wastes off the project site
- hazards associated with the handling and storage of wastes
- the potential level of impact on environmental values
- proposed discharge/disposal criteria for liquid and solid wastes
- measures to ensure stability of the dumps and impoundments
- methods to prevent seepage and contamination of surface water or groundwater from stockpiles and/or dumps
- design criteria to be used to ensure that waste containment and/or storage facilities perform satisfactorily
- market demand for recyclable waste
- waste minimisation processes
- measures to ensure wastes does not attract or propagate pests, disease vectors or vermin, and do not impact on public health
- decommissioning of the site.

Consider 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. 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.

~~[This paragraph for gold mineral processing only] Describe options for removing or reducing cyanide from the waste streams entering tailings storage, and develop a preferred option. Provide predictions of the concentrations of cyanide, in total and in relevant chemical species, resulting from the preferred option for all components of the waste streams, including settled solids and supernatant effluent in tailings storage facilities.~~

Having regard to the Environmental Protection (Waste Management) Policy 2000 (EPP(Waste)), indicate the results of investigating the feasibility of using waste minimisation and cleaner technology options during all phases of the project. Apply waste minimisation and treatment, and cleaner production techniques, to gaseous wastes, particularly methane, nitrogen oxides, sulfur oxides, particulates and carbon dioxide. Pay particular attention to measures that will maximise energy efficiency and minimise internal energy consumption in the project.

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

4.5 Water

4.5.1 Description of environmental values

Describe the existing resources and environmental values of water that may be affected by the project. Environmental values will be defined according to the *Environmental Protection Act 1994*, Environmental Protection (Water) Policy 2009 (EPP(Water)), the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC & ARMCANZ, 2000), the Queensland Water Quality Guidelines 2009 (DERM, 2009) and the guideline Establishing Draft Environmental Values and Water Quality Objectives (EPA, 2002). Make reference to Queensland Wetland Mapping and any available Aquatic Conservation Assessments produced by DERM. ~~Include estuarine and marine waters if they could be impacted by the project.~~ The definition of waters in the EPP(Water) includes the bed and banks of waters, so this section will address benthic sediments as well as the water column.

Develop and describe suitable water quality and resource indicators for measuring environmental values, and objectives that would protect the identified values.

Describe and illustrate the surface watercourses, overland flow, palustrine and lacustrine wetlands, ~~estuaries and marine waters~~. The description will include suitably scaled maps of catchments, watercourses, drainage pathways, wetlands, or sources of water supply (such as farm dams) potentially affected by the project, whether on or off the project site. Describe, with supporting photographs, the geomorphic condition of any watercourses likely to be affected by disturbance or stream diversion. The results of this description will form the basis for the planning and subsequent monitoring of rehabilitation of the watercourses during or after the operation of the project.

Describe the hydrology of watercourses and overland flow in the project area and any downstream locations potentially affected by the project.

Provide details of the likelihood and history of flooding, including the extent, levels and frequency of floods in and around the project site. Flood studies will include a range of annual exceedance probabilities for potentially affected waterways, based on observed data if available or use appropriate modelling techniques and conservative assumptions if there are no suitable observations. The flood modelling assessment will include local flooding due to short duration events from contributing catchments on site, as well as larger scale regional flooding including waterways downstream.

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.

Describe the quality of surface waters in the area potentially affected by the project with an outline of the significance of these waters to the river catchment system in which they occur. The description of water quality should include medians, ranges and percentiles for available data appropriate for comparisons with guidelines, as recommended in the ANZECC and ARMCANZ water quality monitoring and reporting (2000). ~~(note: impacts on coastal water quality will be discussed in section 4.6 (Coastal environment)).~~ The description will be based on a monitoring program, with sampling stations located upstream at reference sites that would not be impacted and downstream of the project. Monitoring will include sites closest to the proposed discharge points and at downstream locations that would be below any mixing zone. Sites will include permanent and semi-permanent water holes, known aquatic habitat, weirs or reservoirs. Available complementary stream-flow data will also be obtained from historical records to help interpretation. Describe seasonal variations in water quality and variations with flow. Monitoring of ephemeral streams will primarily focus on all times of natural flow.

The water quality should be described, including seasonal variations or variations with flow where applicable, using existing data sets. Monitoring of ephemeral streams will primarily focus on all times of natural flow. Measure a range of physical, chemical and biological parameters relevant to the potential environmental harm on any affected creek or wetland system. This will include but not necessarily be limited to water quality indicators likely to be affected by the project such as electrical conductivity, dissolved metals, turbidity, suspended sediments and pH. Biological indicators will include macroinvertebrate surveys undertaken at appropriate locations according to best practice methods. All sampling will be performed in accordance with the Monitoring and Sampling Manual 2009 (DERM, 2009) or the most current edition.

Describe the quality, quantity and significance of groundwater in the project area and any surrounding area potentially affected by the project's activities.

Describe the nature and hydrology of the aquifers of the potentially affected area, including:

- geology and stratigraphy
- aquifer type – such as confined, unconfined, karst or perched
- depth to, and thickness of, the aquifers
- the significance of the resource at a local and regional scale
- depth to water level and seasonal changes in levels
- groundwater flow directions (defined from water level contours)
- groundwater yield
- groundwater quality
- interaction with surface water
- interaction with saline water
- possible sources of recharge

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- vulnerability to pollution.

The description will include a survey of existing groundwater supply facilities (bores, wells, or excavations) to the extent of any potential impacts. Include and analyse the following information:

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

Develop and describe a network of observation points and a monitoring program that would satisfactorily monitor groundwater resources both before and after commencement of operations. The data obtained from the groundwater survey will be sufficient to enable specification of the major ionic species, pH, electrical conductivity, total dissolved solids and any potentially toxic or harmful substances.

4.5.2 Potential impacts and mitigation measures

For all phases of the project, this section of the EIS will:

- assess potential impacts on the 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
- describe how the achievement of the objectives will be monitored, audited and managed.

Describe and illustrate with maps, plans and cross-sections any proposal to divert creeks or undertake other in-stream works. Assess the potential impacts of in-stream works on hydrology and water quality, and propose measures for avoiding or mitigating the impacts and stabilising and rehabilitating any works.

Assess the hydrological impacts of the project, particularly with regard to the various components of flow that may be impacted by the project. The EIS will address: changes to catchment size or characteristics; changes to the direction or quantity of runoff in the local catchment and to accumulated downstream flows; scouring and erosion; and the consequent impacts of any subsidence. Any consequential impacts of changes to water flow or groundwater recharge on ecosystems and wildlife will be addressed in the ecology section of the EIS. When flooding levels will be affected, model the afflux and illustrate the predictions with maps. Describe and illustrate how an operating pit would be protected from flooding, and address the flood protection level of any final void without the need to maintain levees.

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. Where a licence or permit will be required under the *Water Act 2000* to take water or interfere with the flow of water, provide sufficient information and assessment for the administering authority to consider the suitability of approving any necessary works under the *Water Act 2000*. Similarly, provide sufficient assessment to consider any approval for waterway barrier works under the *Fisheries Act 1994*.

Describe in detail the proposed water management controls, addressing surface and ground water quality and quantity, drainage patterns and sediment movements. Describe and illustrate: the locations, catchments, footprints, cross-sections and method of construction of any dams on the site; their flood immunity; the quality of water or waste water they would contain, and indicate their hazard category. Provide the design storage allowances for sediment dams and process or waste water dams, and demonstrate that the design has been produced by a suitably qualified and experienced engineer using current best practice. Propose measures to manage sediment dams and process or waste water dams and their discharge, and to decommission and rehabilitate the dams when their use ends.

Assess the potential impacts on local and downstream water quality due to any controlled discharges from the site. Describe the proposed quality, quantities and locations of waste water discharges. Use stream flow data in combination with proposed discharge rates to estimate in-stream dilution and water quality. Compare the predicted contaminant levels to the water quality objectives and provide an assessment of the assimilative capacity of the receiving waters. Assess options for controlled discharge under times of natural stream flow that would ensure that adequate flushing of waste water is achieved. Assess the acute and chronic potential impacts of discharges including the cumulative impacts with other discharges from other projects or industry.

Describe any proposed no-release water systems, assess the management and fate of contaminants, and propose mitigation measures for any potential impacts.

Describe and assess proposed measures to manage any leachate or seepage from tailings storages, either during

operations or following decommissioning of the mine and its rehabilitation. Describe monitoring programs that will assess the effectiveness of management strategies for protecting water quality during the construction, operation and decommissioning of the project.

Conduct a risk assessment, based on conservative water quality estimates and hydrology, for uncontrolled emissions to water due to system or catastrophic failure, assess the potential impacts of such emissions on human health and natural ecosystems, and provide detailed measures to avoid or minimise impacts.

Assess the potential impacts on local groundwater resources and quality, and define the extent of the area where groundwater resources are likely to be affected by the proposed operations. Assess the potential impacts of the operations on groundwater draw-down, depletion or recharge, and propose management options to monitor and mitigate these effects. Assess the likely response of the groundwater resource after operation of the project, including the impacts of groundwater inflow to any residual void. Assess the potential impacts on the local ground water regime due to altered porosity and permeability from any land disturbance, such as subsidence. Assess the potential for project operations or residual effects to contaminate groundwater resources. Propose measures to avoid, mitigate and remediate any impacts on groundwater resources or quality.

4.6—Coastal environment

4.6.1 Description of environmental values

Describe the existing coastal environment that may be affected by the project in the context of coastal resources and values identified in the State Coastal Management Plan and any applicable Regional Coastal Management Plans. When necessary to avoid duplication, cross-reference other sections of the EIS where coastal values, such as ecology or scenic amenity, are addressed.

Provide an assessment of physical and chemical characteristics of sediments within the littoral and marine zone potentially affected by the project.

Describe the physical processes of the littoral and marine environment, including currents, tides, freshwater flows and their interaction in relation to coastal morphology and the assimilation and transport of contaminants entering marine waters from, or adjacent to, the project area.

Develop and describe suitable indicators for measuring coastal values, and objectives that would protect the coastal resources and values.

—Potential impacts and mitigation measures

Identify actions associated with the project that are assessable development within the coastal zone and would require approval under the Coastal Protection and Management Act 1995.

Assess the potential impacts that may be caused by the project on coastal processes, resources and values.

Compare the magnitude of the potential impacts to the objectives, and develop management measures that would avoid or mitigate the impacts to meet the objectives. Describe how the mitigation measures are in accordance with applicable coastal management plans, state planning policies (such as State Planning Policy 2/02—Planning and Managing Development Involving Acid Sulfate Soils), and the Department of Employment, Economic Development and Innovation's series of fisheries guidelines.

Detail a monitoring program that would audit the success of mitigation measures, and describe corrective actions to be used if monitoring shows that objectives are not being met.

4.7.4.6 Air

4.7.4.6.1 Description of environmental values

Describe the existing air environment and airshed that may be affected by the project. Discuss the background levels and sources of contaminants including suspended particulates, oxides of sulfur or nitrogen, greenhouse gases, odorous compounds and any other relevant constituent, whether major or minor, of the air environment that may be affected by the project.

Provide sufficient data on local meteorology and ambient levels of contaminants to establish a baseline for later studies and for the modelling of air quality environmental impacts within the airshed. Parameters will include air temperature, wind speed and direction, atmospheric stability, mixing depth and other parameters necessary for input to the models.

Describe and illustrate the locations of existing residences, places of work, schools, etc, agricultural or ecologically significant areas that could be impacted by emissions from the project.

Describe the environmental values, appropriate indicators and air quality objectives for the potentially affected air environment according to the Environmental Protection (Air) Policy 2008 (EPP(Air)). Assess whether any air quality

objectives are needed in addition to those in the EPP(Air).

4.7.24.6.2 Potential impacts and mitigation measures

Describe all the project's potential sources of emissions to air and expected composition of the emissions. The description will include oxides of sulfur or nitrogen, volatile organic compounds, carbon monoxide and dioxide, particulates (including dust, PM10, and PM2.5), trace metals, odours and any toxic, persistent and/or hazardous substances that would be emitted by the project. Also, specify the oxygen content of the flue gases. Present the concentrations of all components of emissions at standard temperature and pressure, and provide the mass emission rate, exit velocity, volume flow rate and temperature at exit.

Provide a separate air emission inventory of any offsite activities directly associated with the project, including fugitive emissions such as from rail or road transport of product or waste.

Use a recognised atmospheric dispersion model to predict the fate of all significant emissions. Use estimates of emission rates based on actual measurements from samples taken from similar facilities, preferably full-scale facilities operating elsewhere or otherwise from 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. State all input parameters, data sets and assumptions used in the modelling in the main text of the EIS or an appendix. The model inputs will be as detailed as possible, reflecting any variation of emissions with time and including at least a full year of representative hourly meteorological data. Provide stack parameters such as stack height, diameter, temperature, exit velocity and volume flow rate.

If there is no single atmospheric dispersion model that is able to handle the different atmospheric dispersion characteristics exhibited in the project area (such as sea breezes, strong convection, terrain features, temperature inversions and contaminant re-circulation), apply a combination of acceptable models.

Provide contour maps of predicted ground level concentrations and frequency contour plots for typical and maximum emissions under the expected range of meteorological conditions including the worst case. The averaging period for ground-level concentrations of contaminants modelled will be consistent with the relevant averaging periods for air quality indicators and goals in the Environmental Protection (Air) Policy 2008 and the National Environmental Protection (Ambient Air Quality) Measure. For example, the modelling of sulfur dioxide must be conducted for 1-hour, 24-hours and annual averaging periods.

Compare the predicted ground level concentrations to the air quality objectives, and best practice national and international source emission standards. Consider the close proximity of the Dingo Township to the proposed project site and describe any situations where people, ecosystems or an agricultural use would experience concentrations above an objective. Assess the human health risk associated with emissions from the project for all contaminants whether or not they are covered by the National Environmental Protection Council (Ambient Air Quality) Measure or the Environmental Protection (Air) Policy 2008. Assess potential impacts of emissions on ecosystems or agricultural uses of the environment.

Assess the potential cumulative impacts or interaction between the emissions from the project and other emissions in the airshed. For example, it may be necessary to evaluate whether nitrogen oxides and volatile organic compounds emissions from the project and other sources within the region would contribute to the generation of photochemical smog, or whether sulfur dioxide emissions would acidify rain or dew.

Describe airshed management and the contribution of the project to airshed capacity in view of existing and future users of the airshed for assimilation and dispersion of emissions.

If odour could be an issue, conduct odour impact assessment according to the DERM guideline Odour Impact Assessment from Developments.

Identify worst case emissions that may occur at start-up, shut-down or during 'upset' operating conditions. 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 any planned buffer between the project and neighbouring sensitive receptors will be adequate.

Describe the pollution control equipment and pollution control processes to be employed on the premises and the features of the project designed to suppress or minimise emissions, including dusts and odours. Describe the backup measures to be incorporated that will act in the event of failure of primary measures to minimise the likelihood of plant upsets and adverse air impacts.

Assess how the proposed emission control processes accord with the management hierarchy for air emissions in the EPP(Air).

Describe how the air quality objectives would be achieved, monitored and audited, and how corrective action would be taken when needed.

The proponent should liaise with QR National's Queensland Rail Network Division to discuss coal rail transport

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related dust mitigation measures for new coal-loading facilities, load controls and spray-on coal dust suppressant systems as a result of the implementation of the Coal Dust Management Plan (CDMP).

4.7.2.14.6.2.1 Greenhouse gases

Provide an inventory of projected annual emissions for each relevant greenhouse gas, with total emissions expressed in 'CO2 equivalent' terms. Estimate emissions from upstream activities associated with the proposed project, including the fossil fuel based electricity to be used. Briefly describe the methods used to make the estimates. The Australian Department of Climate Change's National Greenhouse Accounts (NGA) factors (2009) can be used as a reference source for emission estimates and supplemented by other sources where practicable and appropriate. Coal mining projects will include estimates of coal seam methane to be released as well as emissions resulting from such activities as transportation of products and consumables, and energy use by the project.

Assess the potential impacts of the project on the state and national greenhouse gas inventories and propose greenhouse gas abatement measures, including:

- a description of the proposed measures (alternatives and preferred) to avoid and/or minimise greenhouse gas emissions directly resulting from activities of the project, including such activities as transportation of products and consumables, and energy use by the project
- an assessment of how the preferred measures minimise emissions and achieve energy efficiency
- a comparison of the preferred measures for emission controls and energy consumption with best practice environmental management in the relevant sector of industry
- a description of any opportunities for further offsetting greenhouse gas emissions through indirect means
- investigation of the feasibility of utilising natural gas (CSG or LNG) as a fuel alternative to diesel for mining equipment and on site coal transport.

Means of reducing greenhouse gas emissions could include such measures as:

- minimising clearing at the site (which also has imperatives besides reducing greenhouse gas emissions)
- using less carbon-emitting transport modes or fuels
- integrating transport for the project with other local industries such that greenhouse gas emissions from the construction and running of transport infrastructure are minimised
- maximising the use of renewable energy sources
- co-locating coal seam methane use for energy production with coal extraction
- carbon sequestration at nearby or remote locations.

Include a specific module to address greenhouse abatement in the draft environmental management plan. That module will include:

- commitments to the abatement of greenhouse gas emissions from the project with details of the intended objectives, measures and performance standards to avoid, minimise and control emissions
- periodic energy audits with a view to progressively improving energy efficiency
- a process for regularly reviewing 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 by renewable energy uses
- commitments to monitor, audit and report on greenhouse emissions from all relevant activities and the success of offset measures.

4.8.4.7 Noise and vibration

4.8.14.7.1 Description of environmental values

Describe the existing environmental values that may be affected by noise and vibration from the project. Environmental values and acoustic objectives for noise-sensitive receptors are defined in the Environmental Protection (Noise) Policy 2008 (EPP(Noise)).

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If the proposed activity could adversely impact on the noise environment, undertake baseline monitoring at a selection of sensitive receptors potentially affected by the project. Sensitive receptors are defined in the EPP(Noise). Illustrate the locations of sensitive receptors on a suitably-scaled map. Describe the results of any baseline monitoring of noise and vibration in the proposed vicinity of the project, including long-term measured background noise levels that take into account seasonal variations.

Report the daily variation of background noise levels at nearby sensitive receptors, with particular regard to detailing variations at different periods of the night. Monitoring methods will adhere to accepted best practice methodologies, relevant DERM guidelines and Australian Standards, and any relevant requirements of the Environmental Protection Regulation 2008 and the Environmental Protection (Noise) Policy 2008.

Describe and illustrate the locations of any existing residences, places of work, schools, etc. and agricultural or ecologically significant areas that could be impacted by noise and vibrations from the project. Describe any current activities near the project area that may cause a background level of ground vibration (for example major roads, quarrying activities, etc).

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Develop and describe suitable indicators for measuring noise, and objectives that would protect the environmental values from significant noise and vibration impacts.

4.8-24.7.2 Potential impacts and mitigation measures

Using a suitable acoustic model, predict the likely generation of noise for different times of day under a range of climatic conditions, including the expected worst case. Describe the predictions using suitable indicators, and illustrate the predicted noise contours on suitably-scaled maps showing the locations of noise sensitive receptors. Assess the potential impacts of noise and vibration at all potentially sensitive receptors in comparison to the objectives and standards to be achieved. Give particular consideration to emissions of low-frequency noise; that is, noise with components below 200Hz. The assessment of noise impacts will include matters raised in the document The Health Effects of Environmental Noise – Other Than Hearing Loss published by the enHealth Council, 2004 (or later editions), ISBN 0 642 82304 9. Assess the potential environmental impacts of noise and vibration on terrestrial and marine animals and birds, including migratory species. Assess potential noise impacts on any nearby protected areas addressing amenity as well as impacts on animals. Provide information on blasting that might cause ground vibration or fly rock on, or adjacent to, the site with particular attention given to places of work, residence, recreation, worship and general amenity. Discuss the magnitude, duration and frequency of any vibration and assess the potential impacts on sensitive receptors. Reference will be made to the DERM guideline: Noise and Vibration from Blasting.

Assess potential off-site noise and vibration impacts that could arise due to increased road or rail transportation directly resulting from the project and reference Queensland Rail's Code of Practice for Railway Noise Management, as relevant.

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Define and describe practical measures for protecting or enhancing environmental values from impacts by noise and vibration, including details and illustrations of any screening, lining, enclosing or bunding that may occur either on or off the MLA. Provide a discussion of timing schedules for construction and operations with respect to minimising environmental nuisance and harm from noise and vibration. Also, describe how the achievement of the objectives will be monitored, audited and corrective action taken when needed. Describe how any complaints about noise or vibration would be managed and reported.

4.9.4.8 Ecology

4.9.14.8.1 Description of environmental values

Describe the existing ecological values that may be affected by the project. Address those ecological values in terms of:

- terrestrial and aquatic ecosystems, and their interaction
- biological diversity
- the existing integrity of ecological processes, including habitats of threatened or near threatened species
- the integrity of landscapes and places, including wilderness and similar natural places.

The description of the ecological values of the areas likely to be affected by the project will be illustrated by maps, diagrams and photographs. The description will start by addressing the ecology of the regional area and progress to a detailed description of the project site and any localities that could be affected by project related activities, including downstream and down-wind areas that could be significantly impacted by emissions. The description of ecological values will account for seasonal changes.

For all locations that may be affected by any aspect of the project, provide suitably-scaled maps of terrestrial vegetation based primarily on field surveys with descriptions of the mapped ecosystems and any items of special

interest. Map adjacent areas to illustrate interconnectivity, including any larger scale interconnections between areas of remnant or regrowth vegetation where the project site includes vegetation that facilitates animal movement between those other areas. Field surveys will use the Queensland Herbarium methodology and proformas in the latest version of the publication Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (EPA, 2005), and survey a minimum of three sites, each at least 50 m by 10 m, within each defined (standard system) vegetation community.

The vegetation description and mapping, produced from aerial photographs and field surveys, and having a minimum scale of 1:10 000, will cover at least the following matters:

- location and extent of vegetation types using DERM's regional ecosystem type descriptions in accordance with the Regional Ecosystem Description Database
- category A or B environmentally sensitive areas under the Environmental Protection Regulation 2008
- any areas of state, regional or local significance identified in an approved Biodiversity Planning Assessment produced by DERM
- critical habitat within the meaning of the *Nature Conservation Act 1992*
- vegetation mapped as essential habitat
- remnant or regrowth vegetation, particularly essential regrowth habitat, high value regrowth, or a regrowth watercourse
- sensitive or important vegetation types, including riparian vegetation ~~and any marine littoral and subtidal zone~~
- in-land ~~or coastal~~ wetlands
- wildlife breeding or roosting areas
- sites in, or adjacent to, areas containing important resting, feeding or breeding sites, or flight paths for migratory species listed under the Convention of Migratory Species of Wild Animals, and/or bilateral agreements between Australia and Japan (JAMBA), Australia and China (CAMBA), or Australia and the Republic of Korea (ROKAMBA)
- ~~sites adjacent to nesting beaches, feeding, resting or calving areas of species of special interest, such as marine turtles and cetaceans~~
- sites containing common species that represent a distributional limit and are of scientific value or contain feeding, breeding, resting areas for populations of echidna, koala, platypus and other species of special cultural significance
- sites containing high biodiversity that may be dependent for their long-term survival or function on connectivity with other nearby areas of habitat
- a site containing other special ecological values, for example, high habitat diversity and areas of high endemism
- bat roosting and breeding caves, including existing structures such as adits and shafts
- habitat ~~of extinct in the wild, of~~ threatened or near threatened animals
- the condition of vegetation and its habitat value, particularly in relation to the conservation of any ~~extinct in the wild, endangered, vulnerable and/or threatened and~~ near threatened plant and animal species, assemblages or community types
- a complete list of species present at each site
- the relative abundance of plant species
- species of protected plants highlighting those listed as threatened or near threatened under the Nature Conservation (Wildlife) Regulation 2006
- any other plant communities or species of conservation, cultural, commercial or recreational significance
- areas that may have low resilience to environmental change
- location and abundance of any pest, weed or exotic species
- any areas that would be subject to the *Vegetation Management Act 1999*.

Plants that could not be identified during the survey will be submitted to the Queensland Herbarium for identification. Specimens of plant species of conservation significance, including those listed as protected plants under the Nature Conservation (Wildlife) Regulation 2006, other than common species, will be submitted to the

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Queensland Herbarium with sufficient information to enable their lodgement as voucher specimens.

The plant and animal surveys will address species structure, assemblage, diversity and abundance. Surveys will be sufficient to identify, or adequately extrapolate, the plant and animal values over the range of seasons, particularly during and following a wet season. In tropical areas, a major part of the survey effort will be undertaken between 1 February and 31 March, assuming the wet season follows a typical pattern. The survey will account for the ephemeral nature of watercourses traversing the project area, and seasonal variation in animal populations. Existing information on plants and animals may be used to supplement new survey work provided that the existing data are still current and have been derived from previous surveys at the site that were consistent with current best practice methodologies. Methodologies used for plant and animal surveys will be specified in the appendices to the EIS.

Undertake a comprehensive vertebrate animal survey of the project area at a sampling intensity that supports the scale of vegetation mapping (i.e. 1:10 000 or better). Surveys of terrestrial wildlife will be conducted in a manner that is sensitive to effects of seasonality and the different activity patterns and habitat use by species under different seasonal conditions.

Describe the terrestrial and riparian animals occurring in the areas affected by the project, noting the broad distribution patterns in relation to vegetation, topography and substrate. The description of the animals present or likely to be present in the area will address:

- a list of animal species, their diversity and abundance
- the existence of any threatened, near threatened or otherwise noteworthy species or communities in the study area, i.e. species of special cultural significance and any species listed by the DERM 'Back on Track' species prioritisation methodology in the study area, including discussion of range, habitat, breeding, recruitment, feeding and movement requirements, and current level of protection (such as any requirements of protected area management plans)
- any species that are poorly known but suspected of being extinct in the wild, endangered, vulnerable and/or near threatened species ~~threatened or near threatened~~
- habitat requirements and their sensitivity to changes
- movement corridors and barriers to movement
- the use of the area by migratory birds, nomadic birds, bats, and arboreal and ground-dwelling animals and colonial breeding species
- feral, pest or exotic animals.

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In addition to the species found in the field survey, provide an indicative list of all other known or likely species within a 100 km area around the project site and the local bioregion, highlighting any extinct in the wild, endangered, vulnerable and/or threatened or near threatened species. Correlate the occurrence of animals of conservation significance to mapped vegetation units or habitats to facilitate the development of measures for their protection. Indicate how well any affected communities are represented and protected elsewhere in the province where the site of the project occurs.

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Describe the aquatic plants and animals occurring in the areas affected by the project, noting the patterns and distribution in the waterways and any associated wetlands, ~~lacustrine and marine environments~~. The description of the plants and animals present or likely to be present in the area will at least include:

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

Provide a description to order or family taxonomic rank of the presence and nature of any stygofauna occurring in groundwater likely to be affected by the project. Sampling and survey methods should follow best practice, such as that published by the Western Australian Environmental Protection Authority – Guidance for the Assessment of Environmental Factors no.54 (December 2003) and No. 54a (August 2007), or any more recent publication that supersedes that guideline.

Develop and describe suitable indicators for measuring ecological values, and objectives that would protect the environmental values from significant adverse impacts.

4.9.24.8.2 Potential impacts and mitigation measures

Assess the potential impacts on the ecological values of the area arising from the construction, operation and decommissioning of the project including clearing, salvaging or removal of vegetation. Cover terrestrial and aquatic (marine and freshwater) environments, including any potentially impacted benthic and inter-tidal communities, seagrass beds and mangroves. Assess the potentially significant environmental impacts on any plants and animals, whether on or off the project site, due to any alterations to the local surface and ground-water environment.

Specifically assess any potential impacts on a category A or B environmentally sensitive area and propose measures to avoid impacts.

If available, provide electronic shapefiles in a format compatible with ArcGIS indicating the boundary of the project area and detailing the extent of proposed vegetation clearing in relation to surrounding vegetation both within the project area and in any off-site area to be used for project related infrastructure.

Assess the indirect impacts on remaining vegetation, such as those due to edge effects, reducing vegetation area below a viable size, or reductions in connectivity. Similarly, indirect impacts on animals should be assessed, such as the reduction of a habitat area below a viable size or increased predation due to reduced cover. Short-term and long-term effects should be considered with comment on whether the impacts are reversible or irreversible.

Describe the potential impacts on stygofauna of any changes in the quality, level or quantity of groundwater, and describe any mitigation measures that may be applied.

Assess the capacity of the environment to assimilate discharges or emissions. Assess the potential impacts due to chronic, low-level exposure to contaminants or the bio-accumulation of contaminants.

Assess the potential impacts on animals of wastes at the site, particularly those related to any form of cyanide or other toxicants in supernatant water of a tailings storage facility. Propose measures to prevent harm to wildlife.

Describe and assess the potential impacts of any actions of the project that require an authority under the *Nature Conservation Act 1992*, and/or would be assessable development for the purposes of the *Vegetation Management Act 1999*. The assessment and supporting information should be sufficient for the administering authority to decide whether an approval should be granted and developing recommended conditions. The EIS should indicate whether offsets will be required for clearing vegetation within or outside the mining lease area.

Propose practical measures for protecting or enhancing ecological values, and assess how nominated quantitative standards and indicators may be achieved for nature conservation management. In particular, address measures to protect or preserve any extinct in the wild, endangered, vulnerable threatened or near threatened species.

Describe measures that would adequately mitigate potential impacts on habitats that would inhibit animal movement, propagation or feeding patterns, or change food chains. Specifically address any obligations imposed by Queensland or Commonwealth legislation or policy or international treaty obligations, such as JAMBA, CAMBA or ROKAMBA. Assess the need for buffer zones and the retention, rehabilitation or planting of movement corridors, and propose measures that would avoid waterway barriers or mitigate their construction and operation. Assess works in a waterway considering Waterway Barrier Works Development Approvals, Queensland Primary Industries and Fisheries Fish Habitat Management Operational Policy FHMOP 008, 2009.

Identify and quantify any potential net loss of environmental values. Propose environmental offsets that would counterbalance the remaining loss of environmental values. Proposed environmental offsets will be consistent with the requirements set out in any applicable specific-issue offset policies under the framework of the Queensland Government's Environmental Offset Policy (2008). Specific-issue offset policies that will be considered are:

- Policy for Vegetation Management Offsets, DERM, 2009
- Mitigation and Compensation for Works or Activities Causing Marine Fish Habitat Loss: Departmental Procedures, Fish Habitat Management Operational Policy, Queensland Department of Primary Industries, FHMOP-005, 2002
- Offsets for Net Benefit to Koalas and Koala Habitat, EPA, 2006
- Biodiversity offset requirements of the Environmental Protection and Other Legislation Amendment Act 2011,
- the forthcoming Biodiversity Offsets Policy.

Propose detailed measures to remove and control the introduction or spread of weeds and feral or pest animals. This should include a risk assessment of high biosecurity risk species and their sites, and the development of threat mitigation plans for them, such as clean down and inspections at high risk sites. The biosecurity management strategies will include mitigation measures relevant to protecting any potentially affected primary production areas. When determining control strategies, reference will be made to the latest Biosecurity Queensland's Annual Pest Distribution Survey data, published biosecurity management strategies, local

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government pest management plans and any applicable model local laws dealing with locally declared pest plants and animals. ~~Develop management strategies to ensure no new marine pests are introduced as a result of the project's activities.~~ Include all management measures for pest plants and animals in a biosecurity management plan, which will form part of the project's draft EM plan.

Propose measures for the progressive rehabilitation of disturbed areas, including rehabilitation success criteria that would be used to measure the progress. Describe how the achievement of the objectives would be monitored and audited, and how corrective actions would be managed. Proposals for the rehabilitation of disturbed areas will incorporate, where appropriate, provision of nest hollows and ground litter and include any species proposed to be used in rehabilitation, including the source of the proposed species.

4.104.9 Cultural heritage

4.10.14.9.1 Description of environmental values

For non-Indigenous historical heritage, a study will be undertaken of the known and potential historical cultural and landscape heritage values of the area potentially affected by the project. The study will be undertaken by a suitably qualified or experienced person, and as a minimum, include the following elements:

- A desktop assessment reviewing all sources of information on non-Indigenous historical cultural and landscape heritage values within the region of the project site, including:
 - o the Queensland Heritage Register, for places already protected under the *Queensland Heritage Act 1992*
 - o local government heritage registers, lists or inventories
 - o results of previous cultural and landscape heritage studies conducted in the region
 - o appropriate national and international guidelines for the descriptions of sites, places and regions
- A physical archaeological investigation of the area potentially affected by the project (based on the results of the desktop assessment) that addresses:
 - o all types of historical heritage places located within the project area including built, archaeological and non-indigenous cultural landscape values
 - o the discovery and protection of any previously unidentified archaeological artefacts or archaeological places during the course of the archaeological investigation in accordance with Part 9 of the *Queensland Heritage Act 1992*
- An investigation of whether the area potentially affected by the project includes places and locales of possible State or local heritage significance, including
 - o an assessment of places of potential heritage significance against the criteria contained in Division 1 of the *Queensland Heritage Act 1992*
 - o documented consultation with appropriate historians and with local history organisations and property owners to ensure all known heritage values are identified
 - o notification to the Cultural Heritage Branch of DERM of any places or locales that are of potential State or local heritage significance not currently on the State or local Heritage register.

Describe the existing cultural heritage values that may be affected by the project. Unless an exemption applies under s86 of the *Aboriginal Cultural Heritage Act 2003*, an Indigenous cultural heritage study must be undertaken in accordance with the requirements of Part 6 of that Act.

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

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

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

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

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

4.10.14.9.2 Potential impacts and mitigation measures

Define and describe the objectives and practical measures for managing, protecting or enhancing cultural heritage values that may be affected by the project. Describes how practices may be implemented to appropriately manage those values, and how the achievement of the objectives will be monitored, audited and managed.

4.10.14.9.2.1 Indigenous cultural heritage

Unless an exemption applies under s86 of the *Aboriginal Cultural Heritage Act 2003*, the potential impacts on Indigenous cultural heritage values in the vicinity of the project must be managed under a cultural heritage management plan (CHMP) developed and approved under Part 7 of that Act. Development of the CHMP will follow the guidelines gazetted under section 85 of the *Aboriginal Cultural Heritage Act 2003*. DERM's EIS Coordinator must be made aware of the progress of the CHMP approval process and of any related issues that should be addressed in the EIS assessment report.

4.10.14.9.2.2 Non-Indigenous historical cultural heritage

The potential impacts on non-Indigenous historical cultural heritage values and their avoidance or mitigation will be addressed in a management plan. Mitigation and management measures should take into account the assessed significance of any items or places of heritage value identified by the study and should be appropriate to the assessed level of significance. The historical heritage management plan will specifically address identified values and provide a process for managing yet undiscovered values should they become apparent during development of the project.

The development of a historical heritage management plan will be negotiated with DERM and any other relevant stakeholders.

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

- processes for mitigating, managing and protecting identified historical cultural heritage values during excavations of the construction, operational, rehabilitation and decommissioning phases of the project
- processes for reporting, as required by section 89 of the *Queensland Heritage Act 1992*, the discovery of any archaeological artefact not previously identified in the historical cultural heritage study
- procedures for collecting any artefact material, including appropriate storage and conservation
- historical cultural heritage awareness training or programs for project staff.

The training will be provided during the site induction, and will address the legislative requirements and practical measures for the recognition, reporting and preservation of cultural heritage material. A plain English manual summarising the training will be given to all site workers for their future reference.

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

4.14.10 Social values

The description of social and cultural values potentially impacted by the project, and the assessment of the impacts on those values, will be conducted in consultation, through the EIS Coordinator, with the Social Impact Assessment Unit of the Department of *Employment, Economic Development and Innovation-Infrastructure and Planning*. The proponent will engage at the earliest practical stage with stakeholders and potentially affected parties to discuss and explain the project, and to identify and respond to issues and concerns regarding social impacts. The stakeholder engagement processes will continue throughout the EIS and contribute to the identification of social and cultural values and to the assessment of impacts.

4.14.10.1 Description of existing social values

Define the social and cultural values within the project's area of influence, including the local, district, regional and state level as appropriate, 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, including integrity of social conditions, liveability, social harmony and wellbeing, and sense of community
- Indigenous social and cultural characteristics, such as areas under native title rights or application.

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Undertake a targeted baseline study of the people in the project's social and cultural area to identify social values that may be impacted by the project. The social baseline study will be based on qualitative, quantitative, and participatory methods supported by stakeholder engagement processes. It will reference relevant data contained in local and state government publications, reports, plans, guidelines and documentation, including regional plans and any 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:

- total enumerated population and the full time equivalent transient population
- existing or anticipated major population trends and changes irrespective of the project
- family structures
- age and gender distributions
- education, including schooling levels
- measures of community safety, health and wellbeing
- cultural and ethnic characteristics
- Indigenous population including age and gender
- personal and household income
- labour force by occupation and industry
- housing tenure type and landlord type for rental properties
- housing availability:
 - o private ownership: number and percentage of houses for sale
 - o rental market: size, vacancy rate and seasonal variations
 - o availability of social housing
- housing costs:
 - o private ownership: typical costs of houses for sale in project area and monthly housing repayments with percent of dwellings in each category published by the Australian Bureau of Statistics (ABS)
 - o rental: weekly rent with percent dwellings in each category published by the ABS
- housing affordability separately for private ownership and rent
- household and family type
- disability prevalence
- the social and economic index for areas, index of disadvantage—score and relative ranking
- types and prevalence of crime, including domestic violence
- any other indicators determined through the community engagement process as relevant.

The social baseline study should also take account of and address issues such as:

- the social infrastructure including community and civic facilities, services and networks (for definition see South East Queensland Plan 2005–2026 Implementation Guideline No.5, <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
- 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:
 - o the number of properties potentially directly or indirectly affected by the project
 - o rural properties, farms, croplands and grazing areas including on-farm activities near the proposed activities
 - o properties used for other primary, secondary or tertiary industries

- o residential acreage properties
- o townships or other relatively small block residential areas
- the number of families potentially directly or 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 or tourism
- Indigenous cultural use of plants and animals.

4.11.24.10.2 Potential impacts and mitigation measures

Describe the stakeholder engagement processes and summarise their outcomes, including the response of Indigenous and non-Indigenous communities to the project.

Assess and describe the type, level and significance of the project's beneficial and adverse impacts on social and cultural values identified in the social baseline study and address issues raised in the stakeholder engagement processes. Assess the cumulative potential beneficial and adverse impacts of the project in relation to other major projects or known proposals in the social and cultural area. Discuss whether impacts would be felt at a local, regional or national level.

Assess the impacts in sufficient detail for local and state authorities to make informed decisions about the project's potential effect on their business and social infrastructure. If the project is likely to result in a significant increase in the population of the area, then the proponent should consult the relevant state authorities and summarise the results of the consultations in the EIS.

Provide separate profiles of the expected workforce for the construction, operational and decommissioning phases of the project that describe the:

- numbers and variations of personnel to be employed
- skills base of the required workforce
- likely sources of personnel, such as local, regional, national or overseas.

Provide an outline of the proponent's and contractors' recruitment schedules and their policies for recruitment of workers; describe initiatives for local employment business opportunities; and address the recruitment of Indigenous workers, people from culturally and linguistically diverse backgrounds and people with a disability. Outline training that would be provided to increase the skills levels of workers.

Assess the social and cultural impacts of recruiting and training the construction or operational workforces from within the host community and of bringing in workers from outside. Outline the workforce roster assumptions for the purpose of the EIS and the impacts on the social environment of the camps

Estimate the population growth due to the proposal, directly, indirectly (such as due to service industry growth) and cumulatively with other projects, providing detail on gender, age and any other relevant cohorts. Assess the potential impacts on:

- demographic patterns
- local, regional and state labour markets for separate occupational groupings of the workforce, particularly highlighting any potential skill shortages
- disruptions to existing lifestyles
- health and social wellbeing of families and communities
- social dysfunction, including use of alcohol and drugs
- crime and violence.

Assess the potential impacts of the project on vulnerable groups including women, children and young people, the aged and people with a disability.

Describe the social impacts of changes in land use, the alienation of property and loss of connection with the land, including the impacts and stresses associated with relocations.

Assess the impacts of construction and operational workforces, their families, and associated contractors on land, housing and accommodation availability and affordability. Assess the capability of existing housing and rental accommodation, including public housing, to meet any additional demands created by the project including direct impacts on disadvantaged groups and Indigenous people.

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Estimate how much service revenue and wages from the project would be likely to flow to the project's social and cultural area, and assess the beneficial and adverse impacts of that financial inflow.

Describe the transport operations that would be used to move staff between their residences, dormitory camps and work sites. Modes of transport should be described in section 4.3, but this description should address the mix of privately-owned, public or chartered transport operators. Assess the potential social impacts of transport operations on the local and regional communities, including any road safety issues.

Propose measures, developed in consultation with relevant local authorities, state government agencies and stakeholders and having regard to the Department of Local Government and Planning's Major Projects Housing Policy, that would avoid, mitigate or offset any short, medium or long-term adverse impacts, particularly those on:

- housing affordability and availability, including the rental market, in the social and cultural area
- demographic changes in the profile of the region
- the capacity of social infrastructure to meet community needs, particularly in the areas of health, welfare, early childhood education and care, other education and training, policing and emergency services
- provision of education, training and employment opportunities for women, people with a disability, and Indigenous peoples.

Describe consultation with local and state authorities and stakeholders about their acceptance of proposed mitigation strategies and how practical management and monitoring regimes are proposed to be implemented.

Provide a draft social impact management plan that promotes an active and ongoing role for impacted communities and local authorities through the project life cycle. The draft plan should cover:

- an overview of the project
- all proposed mitigation measures and benefit strategies
- action plans to implement mitigation measures and benefit strategies
- assignment of accountability and resources for mitigation measures and project benefits
- practical mechanisms to monitor and adjust mitigation measures and action plans
- ongoing updates to stakeholders on activities and commitments
- mechanisms to respond to public enquiries and complaints
- mechanisms to resolve disputes with stakeholders
- stakeholder engagement processes including periodic review mechanisms.

4.124.11 Health and safety

4.12.14.11.1 Description of values

Describe the existing community values for public health and safety that may be affected by the project. Provide maps showing the proximity of the project to any potentially affected places of human residence, work or recreation including, but not necessarily limited to, kindergartens, schools, hospitals, aged care facilities, office buildings, factories and workshops. Projects that could discharge contaminants, even accidentally, into water bodies should identify and describe any downstream extraction for potable use. For projects proposing air emissions, and/or those with the potential to emit odours, identify and describe nearby and other potentially affected populations. Pay particular attention to those sections of the population, such as children and the elderly who are especially sensitive to environmental health factors.

4.12.24.11.2 Potential impacts and mitigation measures

Assess the potential impacts on the community in terms of health, safety, and quality of life from project operations and emissions, including odour, dust and noise. Assess potential impacts on public health in the short and long term, and the cumulative impacts on public health either in isolation or by combination with other known existing or planned sources of contamination. The assessment should address the potential contamination not only of public water supplies but also of private water sources such as rainwater tanks with roof collection.

Assess the potential extent of contamination and public health risk should an extreme meteorological event, flood or catastrophic failure cause the release of toxic material from such infrastructure as tailings dams or chemical store. Describe strategies to notify relevant stakeholders during such an event.

Assess the project's potential for providing disease vectors. Propose measures to control mosquito and biting midge breeding, including measures to be used for any residual ponding after mining ceases, such as due to

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subsidence. Assess any proposed use of recycled water for its potential to cause infection by transmitting bacteria and/or viruses by contact, dispersion of aerosols, and ingestion (including via use on food crops). Similarly, the use of recycled water should be assessed for its potential to cause harm to human health via water supply or the food chain due to contaminants such as heavy metals and persistent organic chemicals.

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, and how the achievement of the objectives will be monitored, audited and managed.

4.134.12 Economy

4.13.14.12.1 Description of potentially affected economies

Describe the existing local, regional or national economies that may be affected by the project, including:

- appropriate statistics of economic activity, such as gross regional product and aggregate regional income
- trends in relevant economic indicators
- industries and businesses that could be beneficially or adversely affected by the project, their current and historical contribution to local, regional or national economies, and their current input costs
- the economic value of existing resources that could be impacted or sterilised by the project
- local, regional and national governments' aspirations, objectives, strategies and policies for the economic and industrial sectors that may be affected
- economic viability
- historical descriptions of large-scale resource developments and their effects in the region.

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

4.13.24.12.2 Potential impacts and mitigation measures

Provide an assessment from national, state, regional and local perspectives of the direct and indirect economic benefits and impacts of the project. Describe the methods used, assumptions and sensitivity of the assessment.

At a level of detail appropriate to the scale of the project, the assessment will consider:

- the separate phases of the project, such as construction, operation and after ceasing operations
- the effects of this project on the local and regional economies, including goods and services supplied to, or received from, local or regional markets
- the long and short-term beneficial (such as job creation) and adverse impacts (such as increased labour costs, or competition with local small business) that are likely to result from the development
- impacts on the economic value of existing resources
- stimulus, catalytic or second-order effects
- cumulative effects of the project in relation to other economic development opportunities
- a benefit-impact table that disaggregates the benefits and impacts or costs
- the potential, if any, for direct equity investment in the project by local businesses or communities
- the cost to all levels of government of any additional regulatory function or infrastructure provision
- implications for future economic development in the locality (including constraints on surrounding land uses and existing industry)
- the potential economic impact of any major hazard identified in section 4.14
- the distributional effects of the project including proposals to mitigate any negative impact on disadvantaged groups
- the value of lost opportunities or gained opportunities for other economic activities anticipated in the future
- economic impacts on local property values.

The assessment must consider the Local Industry Policy – A Fair Go for Local Industry (Qld Gov., 2008).

Consider the impacts of the project in relation to energy self-sufficiency, security of supply and balance of payments benefits.

Define and describe the objectives and practical measures for avoiding or mitigating impacts or enhancing economic benefits. Development of these measures should be done in consultation with local and state governments. Describe how nominated quantitative standards and indicators may be achieved for economic management, and how the achievement of the objectives will be monitored, audited and managed.

4.144.13 Hazard and risk

Describe the potential hazards and risk to people and property that may be associated with the project as distinct from hazards and risk to the natural environment, which should be addressed in other sections of the TOR. When addressing natural hazards, particularly in regard to places where people work and live (such as a mine's accommodation camp), the EIS should consider the principles of natural hazard management in State Planning Policy 1/03 (SPP1/03), Mitigating the Adverse Impacts of Flood, Bushfire and Landslide, even if the development is exempt development under the Sustainable Planning Act 2009. SPP1/03 may not be applicable as a statutory instrument for exempt development, but it contains information that guides best practice for all development.

4.14.14.13.1 Description of values

Detail the values related to people and property that could be affected by any hazardous materials and actions associated with the project.

4.14.24.13.2 Potential impacts and mitigation measures

Describe the potential hazards and risk that may be associated with the project, including consideration of both natural and man-made hazards. The assessment of risk should be in accordance with relevant standards.

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

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

Details should be provided of:

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

Assess the potential impacts and risks of both natural and induced emergency situations and counter disaster and rescue procedures as a result of the project on resources such as forests, water reserves, state and local government-controlled roads, places of residence and work, and recreational areas. The assessment should outline the implications for and the impact on the surrounding land uses, and should involve consultation with Department of Emergency Services, Queensland Fire and Rescue Authority, and Queensland Ambulance Service. Undertake a preliminary hazard analysis, conducted in accordance with appropriate guidelines for hazard analysis, (e.g. AS/NZS ISO 31000:2009 Risk Management – Principles and guidelines and HB203:2006 Environmental Risk Management Principles and Processes), and addressing:

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

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

Develop an integrated risk management plan for the whole of the life of the project including construction, operation and decommissioning phases. The integrated risk management plan should include the following components:

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

The EIS will address the development of a training plan for Emergency Management and Mass Casualty Incident Management.

4.154.14 Cross-reference with the terms of reference

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

5. Environmental management plan

Provide an environmental management plan (EM plan) that includes the mitigation measures detailed in section 4 of the EIS. Its purpose is to state the proponents' environmental protection commitments in a way that allows them to be measured and audited.

The EM plan is an integral part of the EIS, but will be capable of being read as a stand-alone document without reference to other parts of the EIS. For a mining project the EM plan must meet the content requirements of section 203 of the *Environmental Protection Act 1994*, whereas the EM plan for a petroleum project must meet the content requirements of section 310D of that Act.

The EM plan will be used by the administering authority to develop conditions to apply to project approvals. Therefore, the EM plan is a relevant document for project approvals, environmental authorities and permits, and may be referenced by them. The EM plan may suggest conditions that will form the basis for developing the draft environmental authority.

6. Commitments not included in the EM plan

Summarise any commitments made by the proponent that are not included in the EM plan (such as a commitments to assist a local community group). It should be clear how and when the commitments will be fulfilled.

7. References

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

8. Recommended appendices

A1. Final terms of reference for this EIS

Provide a copy of the final TOR bound with the main body of the EIS. Other appendices can be provided in separate volumes.

A2. Regulatory approvals

List the regulatory approvals required by the project.

A3. Study team

Describe the qualifications and experience of the study team, specialist sub-consultants and expert reviewers.

A4. The standard criteria

Provide a brief summary of the project's compatibility with the standard criteria as defined by the *Environmental Protection Act 1994*, which include the principles of ESD and other relevant policy instruments. With regard to the principles of ESD, as listed in the National Strategy for Ecologically Sustainable Development, published by the Australian Government in December 1992 (available from the Australian Government Publishing Service), discuss how the project conforms with each principle from inception to decommissioning.

A6. Specialist studies

Include all specialist study reports undertaken for the EIS as appendices.

A7. Research

Outline in an appendix any proposals for researching alternative environmental management strategies or for obtaining any further necessary information.

Terms of Reference for the Dingo West Coal Mine Project Environmental Impact Statement (EIS)

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Background

The Dingo West Coal Mine Project (the Project) will be developed and operated by Dingo West Coal Pty Ltd, a wholly owned subsidiary of Bandanna Energy. Bandanna Energy is an Australian owned public company which listed on the Australian Securities Exchange's in 2008. Bandanna Energy has been in operation since 2008 and has over 1,400 million tonnes of JORC compliant Resources and Reserves.

The Project involves the development of a greenfield open cut coal mine, including supporting rail loading and rail infrastructure. The project will have a run-of-mine (ROM) production rate of up to 1.4 million tonnes per annum (Mtpa) yielding up to 1 Mtpa of product coal for the export market. The project will have a mine life of at least 30 years; however, future expansion may occur dependent on favourable exploration results.

The project site, detailed in the mining lease application (MLA 80180), is located immediately southwest of the township of Dingo in Central Queensland. The project site covers an area of approximately 4,650 ha and is located within the Central Highlands Regional Council area.

The mine infrastructure will be located to the immediate south of the Capricorn Highway at the western edge of the project site and will include:

- three open cut mine pits
- a coal handling and preparation plant
- a co-disposal area for rejects and tailings
- ROM and product coal stockpiles
- an enclosed conveyor located over the Capricorn Highway
- a rail loop and train loading facilities
- various sediment, raw and mine water dams
- an administration building and bath house; and
- workshop, warehouse and vehicle servicing facilities.

The mining method will be truck and shovel operation for removal of overburden with a coaling fleet of loader and trucks for removal and delivery of ROM coal to the stockpile at the CHPP. Consideration will also be given to in-pit crushing to produce PCI during the initial operational stages of the mine. Product coal will be transferred to the rail load out facility on the northern side of the Capricorn Highway via an enclosed conveyor.

Product coal from the project will be transported by train on the existing Blackwater line to the new Wiggins Island Coal Export Terminal (WICET) for export. Bandanna Energy is an owner / shareholder of the WICET and has a 4 Mtpa allocation in the initial 27 Mtpa capacity of Stage 1.

This project was referred to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPac) for assessment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The DSEWPac declared the project not a Controlled Action under the EPBC Act on 11 July and consequently no further assessment of the project under the EPBC Act is required.

CONTENT OF THE ENVIRONMENTAL IMPACT STATEMENT (EIS)

Executive summary

The executive summary conveys the project's most important aspects and options to the reader in a concise and readable form. Use plain English and avoid the use of jargon and obscure terms. The structure of the executive summary should follow that of the EIS, and focus strongly on the key issues and conclusions.

Glossary of terms

Provide a glossary of technical terms, acronyms and abbreviations before the main text of the EIS.

1. Introduction

Explain why the EIS has been prepared and what it sets out to achieve—in particular, the level of detail required to satisfy assessment of the approvals being sought. Define the audience of the EIS.

1.1 Project proponent

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

1.2 Project description

Provide and illustrate a brief description of the key elements of the project. Summarise any major associated infrastructure requirements. Detailed descriptions of the project should follow in section 3.

1.3 Project objectives and scope

State the objectives that have led to the development of the project and briefly outline the events leading up to the project's formulation, including alternatives, envisaged time scale for implementation and project life, anticipated establishment costs and actions already undertaken within the project area.

Describe the current status of the project and outline the relationship of the project to other developments or actions that may relate, whether or not they have been approved. The consequences of not proceeding with the project will also be discussed.

1.4 The EIS process

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

1.4.1 Methodology of the EIS

Describe the EIS process steps, timing and decisions to be made for relevant stages of the project. Provide a brief description of studies or surveys that have been undertaken to help develop the project and prepare the EIS. Describe any baseline studies or investigations used in the EIS that were undertaken before the EIS process started. Outline how the consultation process (which will be described in detail in section 1.5) integrated with the other components of the impact assessment, including the stages, timing and mechanisms for public input and participation.

The information in this section is required to ensure:

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

1.4.2 Objectives of the EIS

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

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

If it transpires while preparing the EIS that previously unforeseen matters not addressed in the terms of reference are found to be relevant to assessing potential impacts of the project, those matters will be included in the EIS.

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

The EIS assessment's depth and scope will be proportional to the values impacted and the scale of the impacts. When considering whether an impact is or is not significant, the proponent will take account of both the intensity of the impact and the context in which it would occur.

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

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

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

1.4.3 Submissions

The reader will be informed about how and when public submissions on the draft EIS can be made, and how they will be addressed and taken into account in the decision-making process.

1.5 Public consultation process

An appropriate public consultation program is essential to the impact assessment. This section will outline the methodology that will be adopted to identify and mitigate social and economic impacts of the project. Provide information about consultation that has already taken place and its results.

Submitting a list of affected persons and interested persons, as well as a statement of how the proponent proposes to consult with those persons, is a statutory requirement of the EIS process under section 41 of the *Environmental Protection Act 1994*. Similar requirements, though non-statutory, are usually applied to EIS processes under other Queensland legislation.

The public consultation program should provide opportunities to educate and involve the community. It may include interviews with individuals, public meetings, interest group meetings, producing regular summary information and updates, and other means to encourage and facilitate active public consultation.

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

1.6 Project approvals

1.6.1 Relevant legislation and policy requirements

Explain the legislation and policies controlling the approvals process. Make reference to the Queensland *Environmental Protection Act 1994*, *Sustainable Planning Act 2009* and other potentially relevant Queensland laws. Include any requirements of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Identify all environmentally relevant activities that would be undertaken at the project site, including those that would otherwise require a development approval if the project was not covered by an environmental authority for a mining or petroleum activity.

If any potentially relevant legislation (such as the *Water Act 2000* for taking water, the *Nature Conservation Act 1992* for protected wildlife, or the *Vegetation Management Act 1999* for land clearing) is not applicable, this section of the EIS will explain why.

Describe local government planning controls, local laws and policies applying to the development, and provide a list of the approvals required for the project and the expected program for approval of applications. The description should include any requirements for workers' camps or villages.

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

1.6.2 Planning processes and standards

Discuss the project's consistency with existing land uses or long-term policy framework for the area (for instance, as reflected in local and regional plans [such as the Central Queensland Strategy for Sustainability – 2004 and beyond](#)), and with legislation, standards, codes or guidelines available to monitor and control operations on site. Refer to all relevant state and regional planning policies. This information is required to demonstrate how the proposal conforms to state, regional and local plans for the area.

4.7 Accredited process for controlled actions under Commonwealth legislation

Projects that are undergoing an EIS under a State statutory process may also be controlled actions under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In which case, the Commonwealth may accredit Queensland's EIS process for the purposes of the Commonwealth's assessment under Part 8 of the EPBC Act. When a state EIS process has been accredited, it will be necessary for the TOR to address potential impacts on the matters of national environmental significance identified in the 'controlling provisions' when the project was declared a controlled action.

The matters to be addressed in the EIS are set out in Schedule 4 of the Commonwealth's *Environment Protection and Biodiversity Conservation Regulations 2000*. Provide a stand-alone report as a separate chapter of the EIS that fully addresses the matters relevant to the controlling provisions.

2. Project need and alternatives

2.1 Project justification

Describe the justification for the project, with particular reference to the economic and social benefits, including employment and spin-off business development that the project may provide. Discuss the status of the project in a regional, state and national context.

2.2 Alternatives to the project

Describe feasible alternatives, including conceptual, technological and locality alternatives to the project, and discuss the consequences of not proceeding with the project. Summarise the comparative environmental, social and economic impacts of each alternative, with particular regard to the principles of ecologically sustainable development (ESD). Discuss alternatives in sufficient detail to enable an understanding of the reasons for preferring certain options and courses of action and rejecting others.

Explain the interdependencies of the project's components, particularly how each of any industrial developments, or various combinations of industrial developments, and any infrastructure requirements relate to the viability of the proposal. Should water supply, power, transport and/or storage infrastructure be included as part of the project, describe and provide a rationale for such infrastructure.

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

3. Description of the project

Describe the project through its various stages, such as construction, operation and decommissioning. This information is required to allow complete assessment of a project from planning to its end-of-life. It also allows identification of approvals that may be required and how they may be managed through the life of the project. Maps or figures showing the position of features or boundaries will use latitudes and longitudes on the GDA94 datum. These latitudes and longitudes will also be used in the text to describe the locations of any features (such as discharge points) or boundaries that may be relevant to subsequent approvals.

3.1 Location

3.1.1 Regional context

Describe the regional context of the project, including the location of the Fitzroy Basin, and illustrate it on maps at suitable scales. The maps should include:

- existing local and state-controlled road networks systems complete with road names
- location of existing towns, places and property homestead
- location of construction activities
- surrounding land uses within the region including other major developments, possible commercial and industrial development areas.

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3.1.2 Local context

Describe the local context of the project and include real property descriptions of the project site and adjacent properties. Provide maps at suitable scales that show the precise location of the project area, and in particular:

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

Include a rectified aerial photo enlargement (preferably A3 size) to illustrate components of the project in relation to the land and mining tenures, and natural and built features of the area.

The EIS should identify the following additional information:

- proposed location of construction activities and compounds and accommodation camps
- access locations existing and proposed to the state-controlled roads
- locations and names of transport infrastructure including state and local road networks
- locations of any proposed road crossing points of existing and proposed rail infrastructure associated with the project
- pedestrian access consideration
- location of any proposed mining activities under the state-controlled road reserves to service the project
- any proposed realignment if any existing roads / rails is to be described so that potential impacts and likely costs of any infrastructure treatments can be determined.

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3.2 Construction

Describe the extent and nature of the project's construction phase. Describe the type and methods of construction, the construction equipment to be used and the items of plant to be transported onto the construction site. Describe any staging of the project and illustrate site boundaries, development sequencing and timeframes. Indicate the likely sources of the construction materials and their associated haulage routes for the assessment purposes.

3.3 Operations

Describe the location and nature of the project's operational phase, and illustrate the description as required with maps, diagrams and artist's impressions. Operational issues to be addressed will include, but not necessarily be

limited to:

- a description of plant and equipment to be employed
- the capacity of plant and equipment
- chemical and physical processes
- chemicals to be used [and associated mode of transport to and from the project site](#).

Provide concept and layout plans highlighting proposed buildings, structures, plant and equipment associated with the processing operation. Describe the nature, sources, location and quantities of all materials to be handled, including the storage and stockpiling of raw materials.

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

3.3.1 Tenements and tenures

Describe and illustrate any existing mining tenements, petroleum, geothermal and greenhouse gas tenures and licences overlying and adjacent to the project site, and any proposed applications required for this project.

3.3.2 Resource base and mine life

Summarise the results of studies and surveys undertaken to identify the mineral and natural resources required to implement the proposal (further detail will be provided in section 4.2.1.2 Geology). Describe the required location, volume, tonnage and quality of natural resources (such as land, water, timber, energy, etc). Provide specific details of the following:

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

3.3.3 Mining methods and equipment

Provide specific details of the following:

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

The description will refer to, and be complemented by, the figures previously presented in section 3.3.1 showing the locations of key aspects of the project. Additional figures will be provided if required.

3.3.4 Mine sequencing

Provide specific details of the following:

- the proposed sequence and timing of mining of each seam/ore body within the mining lease;
- the physical extent of excavations, location of stockpiles of overburden and/or coal/mineral reject to be handled during the project's operation or left after mining ceases, including the rate of throughput of stockpiles of product, reject and overburden
- typical cross sections of the mine workings showing voids, surface profiles and geological strata
- the proposed progressive backfilling of excavations
- the area disturbed at each major stage of the project.

3.3.5 Workforce

Outline the workforce numbers to be employed by the project during its various phases, such as construction, commissioning, operation and decommissioning. Make comment on the anticipated basis of employment, such as permanent, contract, etc. A detailed profile of the workforce will be provided in the society section of the EIS.

3.3.6 Workforce accommodation

Describe where personnel will be accommodated. In particular, describe and illustrate the number, size, locations and management of any workers camps or villages. The consequent impacts of constructing new or expanded accommodation will be addressed in the appropriate sections of the EIS even if the accommodation will be operated by a contractor. Identify if first-aid facilities and medical facilities will be provided within any work camp facility and include possible landing sites for both the rescue helicopter and fixed wing aircraft services, if required.

3.3.7 Processing and products

Describe the quantities and characteristics of the products that would be produced on an annual basis. Provide indicative process flow-sheets showing material balances for the processing plant, and the anticipated rates of inputs, along with similar data on products, wastes and recycle streams.

3.3.8 Ongoing evaluation and exploration activities

Describe the extent and nature of any proposed ongoing exploration or geological or geo technical evaluation within the project area that may be required over the life of the project.

3.4 Product handling

Describe and show on plans at an appropriate scale the proposed methods and facilities to be used for product storage and for transferring product from the processing plant to the storage facilities and from the storage facilities to the transport facilities. Discuss any environmental design features of these facilities including bunding of storage facilities.

3.5 Infrastructure requirements

Describe with concept and layout plans, requirements for constructing, upgrading or relocating all infrastructure associated with the project. Show the locations of any necessary infrastructure easements on the plans, including infrastructure such as roads, rail (and the rail corridor), level crossings, conveyors, bridges, ~~jetties, ferries~~, tracks and pathways, dams and weirs, bore fields, power lines and other cables, wireless technology (such as microwave telecommunications), and pipelines for any services, whether underground or above.

3.5.1 Transport—road/rail/air/ship

Provide an overview of the arrangements for the transportation, importation or exportation of plant, equipment, materials, products, wastes and personnel during both the construction, ~~commissioning, and~~ operational ~~and decommissioning~~ phases of the project. Describe the use of existing facilities, including common user transport infrastructure, and all requirements for the construction, upgrading or relocation of any transport-related infrastructure.

The description will also include detailed descriptions and diagrams of

- the main Western Rail Line
- the proposed balloon loop
- details of the interface of the proposed rail loop with the existing railway
- the proposed rail load-out facility
- the proposed on-lease haul roads

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3.5.2 Energy

Describe all energy requirements (including emergency energy provisions), including electricity, natural gas, and/or solid and liquid fuel requirements for the construction and operation of the project. Describe the likely source of the energy requirements and any associated consultation with energy providers. Show the locations of any easements on the infrastructure plan. Energy conservation will be briefly described in the context of any Commonwealth, Queensland and local government policies.

3.5.3 Water supply and storage

Provide information on proposed water usage and storage by the project, including the quality and quantity of all water supplied to, or captured at, the site. In particular, describe the proposed and optional sources of water supply such as mine dewatering, capture of overland flow, taking from a watercourse, bores, coal seam gas water and associated pipelines, and any surface storages such as dams and weirs, municipal water supply pipelines.

Estimate the average and maximum rates of supply from each source for each phase of the project's life. Any proposed water conservation and management measures should be described.

Describe any approvals and water allocations the project may need under the *Water Act 2000* for water supply and storage.

Estimate potable water demand for the project, including the temporary demands during the construction period. Provide details of any existing water supply, including town water, which would meet the requirements. If water storage and treatment is proposed on site for use by the site workforce, describe the method of treatment and storage. Describe any waste streams from water treatment, and assess the potential impacts of disposal in the appropriate sections of the EIS.

3.5.4 Stormwater drainage

Provide a description of the proposed stormwater drainage system and the proposed disposal arrangements, including any off-site services. Illustrate the description with figures with 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.

3.5.5 Sewerage

Describe, in general terms, the sewerage infrastructure required by the project. If it is intended that industrial effluent or relatively large amounts of domestic effluent are to be discharged into an existing sewerage system, provide in section 4.4 Waste an assessment of the capacity of the existing system to accept the effluent. For industrial effluent, this should detail the physical and chemical characteristics of the effluent.

3.5.6 Telecommunications

Describe any impacts on existing telecommunications infrastructure, such as optical cables and microwave towers, and identify the owners of that infrastructure.

3.5.7 Accommodation and other infrastructure

Describe any other developments directly related to the project not described in other sections, such as:

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

3.6 Waste management

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, which for the operational phase may be simplified versions of those provided in section 3.3, for each distinct stage of the project. These should indicate the processes to be used and highlight their associated waste streams. This applies to all waste outputs—solid, liquid and gaseous—including recycling efforts such as stockpiling and reusing topsoil. The schematic diagrams, or an associated table, will cross-reference the relevant sections of the EIS where the potential impacts and mitigation measures associated with each waste stream are described. Describe the physical and chemical characteristics, and the variability of composition and generation rates of each waste material.

Each subsection on waste management will 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 reuse 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.

3.6.1 Air emissions

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

3.6.2 Excavated waste

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

Estimate the tonnage and volume of waste rock and subsoil to be excavated during the various stages of operation. Estimates will be made for each separate rock and soil type. Describe the expected proportion and source of waste rock that is mineralised but currently uneconomical for processing.

Describe the chemical and physical properties of the waste rock and subsoil, and assess 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 (DME, 1995), and any other applicable best practice guidelines. 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.

Discuss the potential for acid, 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. Provide cross-references in this section to those sections of 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.

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

3.6.3 Tailings or fine rejects

Describe the methods and materials that would be used to produce tailings waste (tailings should be understood to include any fine reject material). 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, (DME, 1995).

Describe in detail the likely physical and chemical characteristics of the tailings waste and the likely chemical characteristics of waste water 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 the disposal 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 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.

3.6.4 Solid waste disposal

Describe the quantity and quality of solid wastes (other than waste rock, subsoil and tailings addressed in other sections) and the proposed methods of their disposal. Describe the proposed location, capacity and suitability of any landfill that would receive solid waste from the project. Describe and illustrate any proposed on-site landfill, including its dimensions, volume and method of construction.

3.6.5 Liquid waste

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

The EIS will consider the following effects:

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

3.7 Rehabilitation and decommissioning

Describe the options, strategic approaches and methods for progressive and final rehabilitation of the environment disturbed by the project. [Include the proposed timeframe associated with decommissioning.](#) Develop a preferred rehabilitation strategy that would minimise the amount of land disturbed at any one time, and minimise the residual loss of land with ecological or productive value. Show the final topography of any excavations, waste areas and dam sites on suitably scaled maps.

Evaluate the compliance of the strategies and methods for progressive and final rehabilitation of disturbed areas with the objectives of the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (DME, 1995) and DERM's guideline Rehabilitation Requirements for Mining Projects. In particular, the strategies and methods will have the following objectives:

- Mining and rehabilitation should aim to create a landform with the same or similar land use capabilities and/or suitability it had prior to the disturbance, unless other beneficial land uses are pre-determined and agreed.
- Mine wastes and disturbed land should be rehabilitated so that it is self-sustaining or to a condition where the maintenance requirements are consistent with an agreed post-mining land use.
- Surface and ground waters that leave the lease should not be degraded compared to their condition prior to the commencement of mining operations. Current and future water quality should be maintained at levels that are acceptable for users downstream of the site.

Describe the means of decommissioning the project by removing or reusing plant, equipment, structures, buildings, concrete footings and foundations, hardstand areas, storage tanks and wharfage. Describe the proposed methods for stabilising the affected sites. Discuss options and methods for the disposal of wastes from the demolition of plant and buildings in sufficient detail for their feasibility and suitability to be assessed.

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.

The description of topsoil management will address minimising topsoil storage times (to reduce fertility degradation) and the transportation, storage and replacement of topsoil to disturbed areas.

Detail of the impacts of the preferred rehabilitation strategy will be discussed in the appropriate subsections of section 4 (Environmental values and management of impacts) particularly with regard to 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.

4. Environmental values and management of impacts

The functions of this section are to:

- Describe the existing environmental values of the area that may be affected by the project. Environmental values are defined in section 9 of the *Environmental Protection Act 1994*, environmental protection policies and other documents such as the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC & ARMCANZ, 2000). Environmental values may also be derived following recognised procedures, such as described in the ANZECC & ARMCANZ 2000 guidelines. Environmental values will be described referring to background information and studies, which will be included as appendices to the EIS.
- Describe the potential adverse and beneficial impacts of the project on the identified environmental values.
- Describe any cumulative impacts on environmental values caused by the project, either in isolation or by combination with other known existing or planned development or sources of contamination.
- Propose environmental protection objectives and commitments. All environmental protection commitments must be measurable and auditable.
- Examine viable alternative strategies for managing impacts. These alternatives will be presented and compared in view of the stated objectives and standards to be achieved. Discuss available techniques, including best practice, to control and manage impacts to the nominated objectives. This section will detail the environmental protection measures to be used in the planning, construction, operations, rehabilitation and decommissioning stages of the project and any associated works. Measures will prevent, or where prevention is not possible, minimise environmental harm and maximise social, economic and environmental benefits of the project. Preferred measures will be identified and described in more detail than other alternatives.
- Describe any computational model used to make predictions of impacts and/or outcomes of mitigation measures. The description will address the inputs, assumptions, limitations, sensitivities, accuracy and precision of the model.

Any maps or figures showing the position of features or boundaries will use latitudes and longitudes on the GDA94 datum. Latitudes and longitudes on the GDA94 datum will also be used in the text to describe the locations of any features (such as discharge points) or boundaries that may be relevant to subsequent approvals.

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

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

- Environmental values affected: describe the existing environmental values of the area to be affected including values and areas that may be affected by any cumulative impacts (refer to background studies in appendices – note: such studies may be required over several seasons). Explain how the environmental values were derived, such as by citing published documents or by following a recognised procedure to derive the values.
- Impact on environmental values: describe quantitatively the likely impact of the project on the identified environmental values of the area. The cumulative impacts of the project must be considered over time or in combination with other (all) impacts in the dimensions of scale, intensity, duration or frequency of the impacts. In particular, address any requirements and recommendations of [of the Great Barrier Reef Marine Park Authority](#), relevant state planning policies, environmental protection policies, national environmental protection measures and integrated catchment management plans.
- Cumulative impacts on the environmental values of land, air and water and cumulative impacts on public health and the health of terrestrial, ~~aquatic and marine~~ [aquatic](#) ecosystems must be discussed in the relevant sections. This assessment may include air and watersheds affected by the project and other proposals competing for use of the local air and water sheds.
- Where impacts from the project will not be felt in isolation to other sources of impact, it is recommended that the proponent develop consultative arrangements with other industries in the project's area to undertake cooperative monitoring and/or management of environmental parameters. Describe such arrangements in the EIS.

- Environmental protection objectives: describe qualitatively and quantitatively the proposed objectives for enhancing or protecting each environmental value. Include proposed indicators to be monitored to demonstrate the extent of achievement of the objective as well as the numerical standard that defines the achievement of the objective (this standard must be auditable). The measurable indicators and standards can be determined from legislation, support policies and government policies as well as the expected performance of control strategies. Include objectives for progressive and final rehabilitation and managing contaminated land.
- Control strategies to achieve the objectives: describe the control principals, proposed actions and technologies to be implemented that are likely to achieve the environmental protection objectives; include designs, relevant performance specifications of plant. Details are required to show that the expected performance is achievable and realistic.
- Environmental offsets: Information is required to show that measures have been taken to avoid and minimise potential adverse impacts of the project. Environmental offsets may be proposed to counterbalance any remaining loss of environmental values, consistent with the specific-issue offset policies under the framework of the Queensland Government Environmental Offset Policy 2008 [and the draft Environment Protection and Biodiversity Conservation Act 1999 \(EPBC Act\) offsets policy](#).
- Monitoring programs: describe the monitoring parameters, monitoring points, frequency, data interpretation and reporting proposals.
- Auditing programs: describe how progress towards achieving the objectives will be measured, reported and whether external auditors will be employed. Include scope, methods and frequency of auditing proposed.
- Management strategies: describe the strategies to be used to ensure the environmental protection objectives are achieved and control strategies implemented, such as by a continuous improvement framework, including details of corrective action options, reporting (including any public reporting), monitoring, staff training, management responsibility pathway, and any environmental management systems and how they are relevant to each element of the environment.
- Information quality: information given under each element will also state the sources of the information, how recent the information is, how any background studies were undertaken (e.g. intensity of field work sampling), how the reliability of the information was tested, and what uncertainties (if any) are in the information.

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

4.1 Climate

Describe the rainfall patterns (including magnitude and seasonal variability of rainfall), air temperatures, humidity, wind (direction and speed) and any other special factors (e.g. temperature inversions) that may affect management of the project including air quality within the region of the project. Discuss extremes of climate (droughts, floods, cyclones, etc) with particular reference to water management at the project site. Address the vulnerability of the area to natural or induced hazards, such as floods and bushfires. Consider the relative frequency and magnitude of these events together with the risk they pose to management of the project.

The potential impacts due to climatic factors will be addressed in the relevant sections of the EIS. The impacts of rainfall on soil erosion will be addressed in section 4.2. The impacts of storm events on the capacity of waste containment systems, such as site bunding, stormwater management and tailings dams, will be addressed in section 4.5 with regard to contamination of waterways and in section 4.4 with regard to the design of the waste containment systems. The impacts of winds, rain, humidity, and temperature inversions on air quality will be addressed in section 4.7.

4.1.1 Climate change adaptation

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

- a risk assessment of how changing patterns of rainfall and hydrology, temperature, extreme weather and sea level (where appropriate) may affect the viability and environmental management of the project
- the preferred and alternative adaptation strategies to be implemented

- a commitment to undertake, where practicable, a cooperative approach with government, other industry and sectors to address adaptation to climate change.

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

4.2 Land

4.2.1 Description of environmental values

Describe the existing environment values of the land area that may be affected by the project. Define and describe the objectives and practical measures for protecting or enhancing land-based environmental values, describe how nominated quantitative standards and indicators may be achieved, and how achieving the objectives will be monitored, audited and managed.

4.2.1.1 Topography

Describe and illustrate the topography of the project site and the surrounding area, and highlight any significant features shown on the maps. Such features would include any locations subsequently referred to in the EIS (such as noise sensitive locations) that are not included on other maps in section 4.2. Maps will have contours at suitable increments (at least every metre in areas of low relief), shown with respect to Australian Height Datum (AHD) and drafted to the GDA 94 datum.

4.2.1.2 Land use

Describe and illustrate land uses in and around the project area in relation to current land tenures, show the location of existing dwellings, and make particular mention of any land with special attributes. Include any surrounding land or marine areas that could be affected by the project. Show the location of any native title applications or determinations. Describe and illustrate the zoning of land in and around the project area according to any existing town or strategic plan.

4.2.1.3 Geology and geomorphology

Provide a description, map and a series of cross-sections of the geology of the project area. Describe the geomorphology of the project site and the surrounding area. Make particular reference to the physical and chemical properties of surface and sub-surface materials and geological structures that could have an influence on, or be influenced by, the project's activities. Describe geological properties that may influence ground stability (including seismic activity, if relevant), occupational health and safety, rehabilitation programs, or the quality of wastewater leaving any area disturbed by the project. Describe known sites of palaeontologic significance and address the potential for significant fossil finds in locations where the age and type of geology is such that significant specimens may be uncovered during construction or operations. Describe any sites of geomorphological significance, such as lava tubes or karst.

4.2.1.4 Mineral resources and ore reserves

Provide a summary of the results of studies and surveys undertaken to identify and delineate the mineral resources and ore reserves within the project area (including any areas underlying related infrastructure).

Report the mineral resources (measured, indicated or inferred) and ore reserves (proved or probable) in accordance with the Australasian Code for Reporting of Mineral Resources and Ore Reserves (the JORC Code – available at <www.jorc.org/main.php>) and the principles outlined in the Australian Guidelines for the Estimating and Reporting of Inventory Coal, Coal Resources and Coal Reserves (available at <www.jorc.org/pdf/coalguidelines.pdf>) and include the modifying factors and assumptions made in arriving at the estimates. Describe in detail the location, tonnage and quality of the mineral resources and ore reserves within the project area. For coal projects, the description it should be presented on a 'seam by seam' basis.

In addition, provide appropriately-scaled maps showing the general location of the project area, and in particular:

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

- any part of the resource not intended to be mined and any part of the resource that may be sterilised by the proposed mining operations or infrastructure.

4.2.1.5 Soils

Conduct a soil survey of the area that would be affected by the project in accordance with section 6.1 Compilation of Land Resources Inventory (LRI) – Pre Mining Studies, of the Land Suitability Assessment Techniques in the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (DME, 1995). Undertake soil tests and laboratory analyses of representative samples down the soil profile, with particular reference to the physical and chemical properties of the materials that will influence erosion potential, storm water run-off quality, rehabilitation and agricultural productivity of the land. For pipeline routes, undertake the analysis and classification at least to the depth of excavation. Provide geotechnical information on the soils' stability and suitability for construction of project facilities.

Describe, map and illustrate soil types and profiles according to the Australian Soil and Land Survey Field Handbook (National Committee on Soil and Terrain, 2009), Guidelines for Survey Soil and Land Resources (McKenzie et al, 2nd Ed., 2008) and Australian Soil Classification (Isbell, 2002).

Describe the depth and quality of usable topsoil and subsoil to be stripped and stockpiled for rehabilitation.

For land where acid sulfate soils (ASS) may be present, undertake an investigation in accordance with the guidelines and methods published by the Queensland Acid Sulfate Soils Investigation Team (QASSIT) and the Queensland Acid Sulfate Soils Management Advisory Committee (QASSMAC). The management of ASS will address the State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils.

4.2.1.6 Land suitabilities

Provide an Agricultural Land Class map of the project site and the surrounding area according to the Planning Guideline: the Identification of Good Quality Agricultural Land (DPI/DHLGP, 1993). Highlight any good cropping land.

Describe and map the land use suitabilities, and their classes, of the potentially affected area in accordance with the rain-fed broadacre cropping and beef cattle grazing land suitability classification system in Attachment 2 of Land Suitability Assessment Techniques in the Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (DME, 1995).

Provide an Agricultural Land Class map of the project site and the surrounding area according to the Planning Guideline: the Identification of Good Quality Agricultural Land (DPI/DHLGP, 1993).

Discuss the good quality agricultural land status and explain any variation with the good quality agricultural land mapping shown in the relevant regional council planning scheme.

Describe and illustrate the usual agricultural use of the land of the project site and the surrounding area, including any crop rotations.

Include an assessment of Strategic Cropping Land in accordance with the most recent DERM information based on the document Protection Queensland's Strategic Cropping Land: A Policy Framework.

Show the location of any cropping land in the vicinity of the site, highlighting any strategic cropping land, and describe the crops commonly grown on the land, including any rotations.

4.2.1.7 Contaminated land

Describe and illustrate the nature and extent of any areas listed on the Environmental Management Register (EMR) or the Contaminated Land Register (CLR) under the *Environmental Protection Act 1994*, and any existing potentially contaminated sites that are not on the registers but the history of the site suggests may be present.

Conduct a preliminary site investigation consistent with DERM's Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland. If the results of the preliminary site investigation indicate potential or actual contamination, conduct a detailed site investigation progressively managed in accordance with the stages outlined in Appendix 5 of the Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland. The results of the site investigations should be summarised in the EIS and provided in detail in an appendix.

4.2.1.8 Infrastructure

Describe and show on suitably-scaled maps the location and owners or custodians of all infrastructure and easements on the potentially affected land, including roads and road reserves, railways and rail reserves, stock routes, and power lines. Indicate the locations of any buried gas or water pipelines, power lines, or telecommunication cables. Describe the environmental values affected by the existing infrastructure.

4.2.1.9 Environmentally sensitive areas

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Describe and show on suitably-scaled maps the proximity of the project to any category A or B environmentally sensitive areas under the Environmental Protection Regulation 2008. In particular, indicate if the land affected by the project is, or is likely, to become part of the protected area estate, or is subject to any treaty.

4.2.1.10 Landscape character

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

4.2.1.11 Visual amenity

Describe existing landscape features, panoramas and views that have, or could be expected to have, value to the community whether of local, regional, state-wide, national or international significance. Information in the form of maps, sections, elevations and photographs is to be used ([and photo montages prepared, where necessary](#)), particularly where addressing the following issues:

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

4.2.2 Potential impacts and mitigation measures

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

4.2.2.1 Resource utilisation

With regard to resource stewardship, analyse the effectiveness of the mining proposal in achieving the optimum utilisation of the 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.

Describe how the company plans to manage low grade or currently uneconomic deposits or excavated material to ensure that this potential future resource is not sterilised. Also describe measures to ensure the minimal dilution of mineralised but currently sub-economic waste rock by non-mineralised waste rock. Provide details and maps of expected residual or remnant resources within the project area including any low grade stockpiles, tailings and currently uneconomic material.

4.2.2.2 Land use and suitability

Assess the potential for the project's construction and operation to change existing and potential land uses of the project site and adjacent areas. Detail the proposed land use options after mining ceases, including the suitability of the area to be used for primary production, industry, or nature conservation. Assess the factors favouring or limiting the establishment of those options compared to land use and suitability prior to construction of the project and assess the potential liabilities for long-term management.

Assess the potential environmental harm caused by the project on the adjacent areas currently used for agriculture, urban development, recreation, tourism, other business. Assess the implications of the project for future

developments in the impact area, including constraints on surrounding land uses. Propose mitigation measures for any potentially adverse impacts on stock route operations during the construction and operational phases of the development. If the development adjoins or potentially impacts on good quality agricultural land, assess the potential for land use conflict. Investigations will follow the procedures set out in the planning guideline The Identification of Good Quality Agricultural Land (DPI & DHLGP, 1993), which supports State Planning Policy 1/92: Development and the Conservation of Agricultural Land.

Assess incompatible land uses, whether existing or potential, adjacent to all aspects of the project, including essential and proposed ancillary developments or activities and areas directly or indirectly affected by the construction and operation of these activities. Propose measures to avoid or mitigate adverse impacts.

4.2.2.3—Subsidence [UNDERGROUND MINING ONLY]

~~Provide comprehensive surface subsidence predictions taking into account factors such as topographic variations and geological complexities, with a full description of the methodology and including an assessment of the accuracy and precision of the predictions. Show the results of the predictions on maps with one metre contour increments and a scale appropriate for assessment of surface subsidence impacts. Propose detailed mitigation measures for any significant impacts that would result from subsidence.~~

4.2.2.4.2.2.3 Land disturbance

Develop and detail a strategy that will minimise the amount of land disturbed at any one time. The strategy will address progressive rehabilitation and final decommissioning with particular regard to the impacts in the short, medium and long-term timeframes. Describe the methods to be used for managing disturbed land, including backfilling, covering, re-contouring, topsoil handling and revegetation. However, a description of erosion and sediment control could be deferred to section 4.2.2.6. Any proposals to disturb land that would impede or divert overland flow or waterways, and any subsequent reinstatement, during construction or operations will be first described in this section. However, the potential impacts of interfering with flow on the quantity and quality of water resources, the final drainage and seepage control systems, and any long-term monitoring plans will be assessed and described in section 4.5.

In addition to assessing the operational phase of land disturbance, address the ultimate changes following implementation of the decommissioning and rehabilitation plan described in section 3.7. Detail the proposed long-term changes that will occur to the land after mining ceases compared to the situation before mining commences. Those changes will be illustrated on suitably scaled maps with contours at intervals sufficient to assess the likely drainage pattern for ground and surface waters (however, the assessment of the impacts on drainage and water quality will be provided in the water resources section of the EIS). Assess the proposed mitigation measures for land disturbance to be used on decommissioning the site in sufficient detail to decide their feasibility. In particular, address the long-term stability of final voids and spoil dumps, safety of access to the site after surrender of the lease, and the residual risks that will be transferred to the subsequent landholder.

Rehabilitation success criteria for land disturbance will be proposed in this section while rehabilitation success criteria for revegetation will be proposed in the section on ecology.

If geological conditions are conducive, the proponent should consider the possibility that significant fossil specimens may be uncovered during construction or operations and propose strategies to protect the specimens and alert the Queensland Museum to the find.

4.2.2.54.2.2.4 Land degradation or contamination

Assess the possible degradation or contamination of land that could result from any aspects of the project. The assessment should not be limited to activities that would result in the land being entered on the EMR or the CLR. Rather, it should include any activity that could have a detrimental impact on land. Matters to be considered include:

- the long-term use for dust-suppression of water with sufficient dissolved salts to affect soil condition
- disposal to land of any waste water
- waste rock disposal;
- tailings disposal
- disturbance of acid sulfate soils
- spills at chemical and fuel storage areas.

Propose measures that would prevent or remediate any degradation or contamination of land due to the proposed activities. Also, propose any measures required for the management and possible remediation of any existing contamination on the site.

For activities that may disturb acid sulfate soils, also propose management measures that would prevent the contamination of groundwater or surface water. The proposed management measures will be in accordance with the State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soils and the guidelines published by the Queensland Acid Sulfate Soils Investigation Team (QASSIT) and the Queensland Acid Sulfate Soils Management Advisory Committee (QASSMAC).

Assess any activities or proposed contamination that would result in the land being newly entered on the EMR or the CLR. Also assess the consequences, particularly for the subsequent landholder, of any intention to leave the site on either register when mining ceases. Prepare a site management plan for any land remaining on the EMR or the CLR, and describe when, how and by whom it will be implemented.

4.2.2.64.2.2.5 Erosion and stability

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

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

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

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

4.2.2.74.2.2.6 Landscape character

Describe the potential impacts of the project on the landscape character of the site and the surrounding area. Make particular mention of any changes to the broad-scale topography and vegetation character of the area, such as due to spoil dumps, excavated voids and broad-scale clearing.

Provide details of measures to be undertaken to mitigate or avoid the identified impacts.

4.2.2.84.2.2.7 Visual amenity

Assess and discuss the visual impact of the project on particular panoramas and outlooks. Assess the extent and significance of the changed skyline including views from places of residence, work, and recreation, from road, cycle and walkways, from the air and other known vantage points day and night, and during all stages of the project. Illustrate the visual impacts of the project structures and associated infrastructure using appropriate simulation. Use sketches, diagrams, computer imaging and photos to portray the near views and far views of the completed structures and their surroundings from visually sensitive locations.

Provide detail of how impacts on visual amenity would be mitigated or avoided.

4.2.2.94.2.2.8 Lighting

Assess the potential impacts of lighting during all stages of the project particularly regarding:

- the effects of night operations, maintenance or increased vehicular traffic on residents
- changed habitat conditions for nocturnal animals
- the attraction of animals to lights at night.

Propose measures to mitigate or avoid all potential impacts due to lighting.

4.3 Transport

The transport section of the EIS will have separate subsections describing infrastructure associated with the various modes of transport, such as road, rail, pipeline, conveyor, air and sea.

4.3.1 Description of existing infrastructure and values

Provide details of the proposed use of existing infrastructure to transport materials, products or wastes to and from the project site. Provide details of any assets within the jurisdiction of any transport authority that could be impacted by the project ([including the state-controlled network and local council roads](#)). Also provide details, either in the transport section of the EIS or by cross-reference to other sections, of the environmental values that would be affected by the altered use of existing transport infrastructure or the construction of new or altered infrastructure.

For road, rail or conveyor transport, separately describe in detail and illustrate the existing networks that would be used by the project [including information on the transportation modes between the accommodation facilities and the project site and including the projected background traffic growth](#). Describe and illustrate any stock routes potentially affected by the project.

In relation to air transport, describe the existing air fields and associated infrastructure that would be used by the project.

In relation to importing or exporting materials and products, identify any port that would be used by the project. Provide details of those ports, including: the berths to be used; the size and types of vessels that the berths can accommodate; the typical turnaround time for vessels; and the associated infrastructure that moves and stores material between the ships and the rail and/or road networks.

4.3.2 Potential impacts and mitigation measures

For each mode of transport and each phase of the project, the EIS will describe the:

- proposed construction, realignment, structural alteration, or changed use of any access and haul roads ([including conceptual designs of any necessary new intersections or intersection upgrades](#)), conveyor easements, rail loops and load-out facilities, and rail crossings (over or under the track) used by any transport associated with the project [including the location of relevant services and utilities in the road reserves and locations and standards of existing access points and other relevant issues](#)
- expected volumes and weights of materials ([including a description of excess mass and excess dimension load impacts](#)), products, hazardous goods or wastes
- types of vehicles, rolling stock, vessels and craft to be used
- likely number and timing of trips ([including movements at shift changes](#))
- a detailed description and plans of the interface of the proposed rail balloon loop rail system
- a detailed description and plans of the rail load-out facility.

Provide sufficient information to make an independent assessment of how transport infrastructure will be affected by each phase of the project at a local and regional ([including the state-controlled road network](#)) level, [including short-term haulage by road in the event of delays in commencement of rail operations](#). Similarly, provide sufficient information to make an independent assessment of how transport used by the project will impact on environmental values. In both cases, the impacts along the whole length of each affected route will be discussed and measures proposed to avoid or mitigate the impacts.

Details will be provided of the:

- results of any modelling of transport impacts ([including any impacts and mitigation measures from subsidence](#)) [on safety and efficiency in accordance with the Department of Transport and Main Roads' Guideline for Assessment of Road Impacts and Development](#)
- assessment methodology used, including a summary of consultation undertaken with transport authorities regarding the scope of the impact assessment and methodology to be used
- base data assumptions, including an assessment of the current condition of the affected network and its performance ([e.g. the current pavement \(width, condition, age, levels of service and speed environments\)](#))
- possible interruptions to transport operations
- [possible interference with, or risk to, school bus services and the safety of school children assembling, travelling and disembarking from buses, and proposed mitigation measures](#)
- risks of spills of products or hazardous materials during transport, prevention measures to be used, and the

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requirements for dealing with any spills.

Assess any impacts on stock routes due to the project's activities. Propose mitigation measures for any disruptions to movement of travelling stock on stock routes. Outline, and cross-reference to more detailed descriptions with the EIS, the impacts of transport associated with the project on amenity, human health and ecological values as a result of dust, noise, vibration, and any other environmental effects. [Also consider cumulative impacts with particular reference to public safety and the state-controlled networks.](#)

The assessment of road impacts will be in accordance with the latest version of the Department of Transport and Main Road's Guidelines for Assessment of Road Impacts of Development, available from the website: <www.mainroads.qld.gov.au>. Provide details of any heavy or oversized loads, including the number and type of vehicles, with a description of the likely timing and routes of those loads highlighting any vulnerable bridges or other structures along the proposed routes.

Also provide details of the likely traffic to be generated by workforce personnel and service providers [including information on the transportation arrangements for the permanent and temporary workforces and centres such as Blackwater, Emerald and Rockhampton.](#)

In relation to road impacts, the EIS will include an assessment of impacts on:

- [the safety, efficiency and condition of road operations and assets, including driver fatigue accommodation and work cycles and will confirm whether a Road Use Management Plan is required for the project](#)
- [heavy vehicle swept paths at state-controlled intersections](#)
- [sensitivity checks on the worst case scenario for traffic on state-controlled roads and intersections](#)
- any existing or proposed pedestrian cycle networks
- any existing public transport networks (assets and services) [including a pavement assessment for the state controlled roads in accordance with the Department of Transport and Main Roads' Guideline for Assessment of Road Impacts of Development and any associated cost implications and the structural integrity of the state controlled road and road reserves](#)
- watercourses and overland flows, and their interaction with the current and future road network (note: impacts on water values due to transport infrastructure will be outlined in the transport section of the EIS and cross-referenced to a detailed assessment in the water resources section).

The assessment of impacts on the rail network itself, or on environmental values affected by changes in rail traffic, such as due to dust, noise or vibration, will also consider the following matters:

- the likely size of trains and the number of train paths needed to move materials, products or wastes to or from the project site
- new or altered rail transport infrastructure to meet demand from the project
- impacts on rail freight and other transport services (e.g. variability on existing train path availability)
- impacts on passenger transport and services
- impacts at interface points with other private and public transport pathways such as roadway level crossings or occupational crossings (i.e. those crossings which form part of private access pathways to and from residential or business sites). [Any impact to level crossings should be assessed using the Australian Level Crossing Assessment Model \(ALCAM\)](#)
- the requirements for any approvals needed for rail crossings by roads or other infrastructure.

Assess the impacts of the construction and operation of any conveyors. The direct impacts on any other transport infrastructure, such as those due to road or rail crossings, will be addressed in the transport section of the EIS, while the impacts on other matters (such as ecology, noise, etc) will be addressed in the appropriate sections of the EIS, but cross-referenced in the transport section.

In relation to the importation or export of materials and products, identify any aspects of the project that will increase the shipment of materials through any port. Provide details of the likely size and number of additional vessels that would use the port.

Assess any impacts on any port due to the import or export of materials or products, including the need for:

- [new coastal works, such as berth construction or alteration, land reclamation, etc](#)
- [any dredging for shipping channels and swing basins](#)
- [new or altered stockpile areas](#)

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- new, altered, or increased use of existing, infrastructure to handle materials between ships and road or rail transport.

~~Also assess any impacts on nearby areas due to the handling or storage of materials at ports, including dust, noise or lighting.~~

Assess any potential impacts of the project on water traffic in rivers and dams.

In relation to air transport, describe the new, and/or altered air fields and associated infrastructure that would be needed for the project. Describe the likely additional number of flights, frequency, timing (particularly any increase in night arrivals or take-offs), and size of aircraft. Describe any features of the project that could impact on air transport, such as the placement of waste dumps, stacks or flares beneath flight paths.

Assess any impacts on environmental values due to the need to redevelop or construct new airfields; and any impacts on amenity due to increased air traffic. The proposal and assessment should have regard to State Planning Policy 1/02: Development in the Vicinity of Certain Airports and Aviation Facilities. Assess any potential impacts on air safety, including the raising of landforms or the construction of stacks, flares or lighting within flight paths.

If the works that could result in impacts, or the associated mitigation works for identified impacts, are the responsibility of the proponent then the EIS will fully assess those impacts, detail the mitigation works and carry the environmental protection commitments forward into the project's EM plan.

If the proponent will not be responsible for the works associated with the impacts (for example, dredging at a port), the EIS will clearly identify the entity that will be responsible and what approvals would be needed. Nevertheless, in this case, the EIS will provide enough assessment of the likely impacts of all associated activities for the regulatory authorities to have confidence that approval of the project, subject to this EIS process, would not have unacceptable flow-on impacts due to necessary works farther down the transport chain.

Describe detailed measures to avoid or mitigate impacts on each transport mode. The mitigation measures will ensure the safety, efficiency and condition of each mode is maintained. These mitigation measures are to be prepared by the proponent in close consultation with the relevant transport authorities. Any residual impacts that cannot be avoided will be identified and quantified.

Mitigation strategies must include:

- consideration of any transport authority's works program and forward planning
- ~~proposed construction plans of all required transport infrastructure works, including upgrades to roads, in accordance with relevant and accepted authority standards and practices (including where relevant the Department of Transport and Main Roads' Road Planning and Design Manual and the Interim Guide to Road Planning and Design Practice proposed construction plans of all required transport infrastructure works in accordance with relevant and accepted authority standards and practices~~
- the responsible parties for any works
- estimates of costs
- details on the timing of the works
- a summary of relevant approvals and legislative requirements needed to implement mitigation strategies and transport infrastructure works required by the project.

Also consider public transport requirements and links to, or development of pedestrian and cycle networks.

4.4 Waste

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

4.4.1 Description of environmental values

Briefly describe the existing environment values that may be affected by the project's wastes. Refer to each of the waste streams described in section 3.6 and provide references to more detailed descriptions of the relevant environmental values in other sections of part 4 of the EIS.

4.4.2 Potential impacts and mitigation measures

The purpose of this section is to bring together a description of the preferred methods (and discuss any

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alternatives) to be used to deal with waste streams and outline their impacts. The full description of the magnitude and nature of impacts on particular environmental values due to managing waste will be provided in the relevant sections of part 4 of the EIS.

Define and describe the objectives and practical measures for protecting or enhancing environmental values from impacts by wastes. Assess the management measures against the waste hierarchy, describe how nominated quantitative standards and indicators may be achieved for waste management, and how the achievement of the objectives will be monitored, audited and managed.

As part of the description, and except where issues related to waste have been addressed in section 3.6 (in which case reference will be made to the appropriate subsection), provide details of each waste with regard to:

- operational handling, storage, treatment, disposal and fate of all wastes
- any methods and locations to be used to transport and dispose of wastes off the project site
- hazards associated with the handling and storage of wastes
- the potential level of impact on environmental values
- proposed discharge/disposal criteria for liquid and solid wastes
- measures to ensure stability of the dumps and impoundments
- methods to prevent seepage and contamination of surface water or groundwater from stockpiles and/or dumps
- design criteria to be used to ensure that waste containment and/or storage facilities perform satisfactorily
- market demand for recyclable waste
- waste minimisation processes
- measures to ensure wastes does not attract or propagate pests, disease vectors or vermin, and do not impact on public health
- decommissioning of the site.

Consider 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. 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.

~~[This paragraph for gold mineral processing only] Describe options for removing or reducing cyanide from the waste streams entering tailings storage, and develop a preferred option. Provide predictions of the concentrations of cyanide, in total and in relevant chemical species, resulting from the preferred option for all components of the waste streams, including settled solids and supernatant effluent in tailings storage facilities.~~

Having regard to the Environmental Protection (Waste Management) Policy 2000 (EPP(Waste)), indicate the results of investigating the feasibility of using waste minimisation and cleaner technology options during all phases of the project. Apply waste minimisation and treatment, and cleaner production techniques, to gaseous wastes, particularly methane, nitrogen oxides, sulfur oxides, particulates and carbon dioxide. Pay particular attention to measures that will maximise energy efficiency and minimise internal energy consumption in the project.

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

4.5 Water

4.5.1 Description of environmental values

Describe the existing resources and environmental values of water that may be affected by the project. Environmental values will be defined according to the *Environmental Protection Act 1994*, Environmental Protection (Water) Policy 2009 (EPP(Water)), the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC & ARMCANZ, 2000), the Queensland Water Quality Guidelines 2009 (DERM, 2009) and the guideline Establishing Draft Environmental Values and Water Quality Objectives (EPA, 2002). Make reference to Queensland Wetland Mapping and any available Aquatic Conservation Assessments produced by DERM. ~~Include estuarine and marine waters if they could be impacted by the project.~~ The definition of waters in the EPP(Water) includes the bed and banks of waters, so this section will address benthic sediments as well as the water column.

Develop and describe suitable water quality and resource indicators for measuring environmental values, and objectives that would protect the identified values.

Describe and illustrate the surface watercourses, overland flow, palustrine and lacustrine wetlands, ~~estuaries and marine waters~~. The description will include suitably scaled maps of catchments, watercourses, drainage pathways, wetlands, or sources of water supply (such as farm dams) potentially affected by the project, whether on or off the project site. Describe, with supporting photographs, the geomorphic condition of any watercourses likely to be affected by disturbance or stream diversion. The results of this description will form the basis for the planning and subsequent monitoring of rehabilitation of the watercourses during or after the operation of the project.

Describe the hydrology of watercourses and overland flow in the project area and any downstream locations potentially affected by the project.

Provide details of the likelihood and history of flooding, including the extent, levels and frequency of floods in and around the project site. Flood studies will include a range of annual exceedance probabilities for potentially affected waterways, based on observed data if available or use appropriate modelling techniques and conservative assumptions if there are no suitable observations. The flood modelling assessment will include local flooding due to short duration events from contributing catchments on site, as well as larger scale regional flooding including waterways downstream.

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.

Describe the quality of surface waters in the area potentially affected by the project with an outline of the significance of these waters to the river catchment system in which they occur. The description of water quality should include medians, ranges and percentiles for available data appropriate for comparisons with guidelines, as recommended in the ANZECC and ARMCANZ water quality monitoring and reporting (2000). ~~(note: impacts on coastal water quality will be discussed in section 4.6 (Coastal environment)).~~ The description will be based on a monitoring program, with sampling stations located upstream at reference sites that would not be impacted and downstream of the project. Monitoring will include sites closest to the proposed discharge points and at downstream locations that would be below any mixing zone. Sites will include permanent and semi-permanent water holes, known aquatic habitat, weirs or reservoirs. Available complementary stream-flow data will also be obtained from historical records to help interpretation. Describe seasonal variations in water quality and variations with flow. Monitoring of ephemeral streams will primarily focus on all times of natural flow.

The water quality should be described, including seasonal variations or variations with flow where applicable, using existing data sets. Monitoring of ephemeral streams will primarily focus on all times of natural flow. Measure a range of physical, chemical and biological parameters relevant to the potential environmental harm on any affected creek or wetland system. This will include but not necessarily be limited to water quality indicators likely to be affected by the project such as electrical conductivity, dissolved metals, turbidity, suspended sediments and pH. Biological indicators will include macroinvertebrate surveys undertaken at appropriate locations according to best practice methods. All sampling will be performed in accordance with the Monitoring and Sampling Manual 2009 (DERM, 2009) or the most current edition.

Describe the quality, quantity and significance of groundwater in the project area and any surrounding area potentially affected by the project's activities.

Describe the nature and hydrology of the aquifers of the potentially affected area, including:

- geology and stratigraphy
- aquifer type – such as confined, unconfined, karst or perched
- depth to, and thickness of, the aquifers
- the significance of the resource at a local and regional scale
- depth to water level and seasonal changes in levels
- groundwater flow directions (defined from water level contours)
- groundwater yield
- groundwater quality
- interaction with surface water
- interaction with saline water
- possible sources of recharge

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- vulnerability to pollution.

The description will include a survey of existing groundwater supply facilities (bores, wells, or excavations) to the extent of any potential impacts. Include and analyse the following information:

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

Develop and describe a network of observation points and a monitoring program that would satisfactorily monitor groundwater resources both before and after commencement of operations. The data obtained from the groundwater survey will be sufficient to enable specification of the major ionic species, pH, electrical conductivity, total dissolved solids and any potentially toxic or harmful substances.

4.5.2 Potential impacts and mitigation measures

For all phases of the project, this section of the EIS will:

- assess potential impacts on the 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
- describe how the achievement of the objectives will be monitored, audited and managed.

Describe and illustrate with maps, plans and cross-sections any proposal to divert creeks or undertake other in-stream works. Assess the potential impacts of in-stream works on hydrology and water quality, and propose measures for avoiding or mitigating the impacts and stabilising and rehabilitating any works.

Assess the hydrological impacts of the project, particularly with regard to the various components of flow that may be impacted by the project. The EIS will address: changes to catchment size or characteristics; changes to the direction or quantity of runoff in the local catchment and to accumulated downstream flows; scouring and erosion; and the consequent impacts of any subsidence. Any consequential impacts of changes to water flow or groundwater recharge on ecosystems and wildlife will be addressed in the ecology section of the EIS. When flooding levels will be affected, model the afflux and illustrate the predictions with maps. Describe and illustrate how an operating pit would be protected from flooding, and address the flood protection level of any final void without the need to maintain levees.

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. Where a licence or permit will be required under the *Water Act 2000* to take water or interfere with the flow of water, provide sufficient information and assessment for the administering authority to consider the suitability of approving any necessary works under the *Water Act 2000*. Similarly, provide sufficient assessment to consider any approval for waterway barrier works under the *Fisheries Act 1994*.

Describe in detail the proposed water management controls, addressing surface and ground water quality and quantity, drainage patterns and sediment movements. Describe and illustrate: the locations, catchments, footprints, cross-sections and method of construction of any dams on the site; their flood immunity; the quality of water or waste water they would contain, and indicate their hazard category. Provide the design storage allowances for sediment dams and process or waste water dams, and demonstrate that the design has been produced by a suitably qualified and experienced engineer using current best practice. Propose measures to manage sediment dams and process or waste water dams and their discharge, and to decommission and rehabilitate the dams when their use ends.

Assess the potential impacts on local and downstream water quality due to any controlled discharges from the site. Describe the proposed quality, quantities and locations of waste water discharges. Use stream flow data in combination with proposed discharge rates to estimate in-stream dilution and water quality. Compare the predicted contaminant levels to the water quality objectives and provide an assessment of the assimilative capacity of the receiving waters. Assess options for controlled discharge under times of natural stream flow that would ensure that adequate flushing of waste water is achieved. Assess the acute and chronic potential impacts of discharges including the cumulative impacts with other discharges from other projects or industry.

Describe any proposed no-release water systems, assess the management and fate of contaminants, and propose mitigation measures for any potential impacts.

Describe and assess proposed measures to manage any leachate or seepage from tailings storages, either during

operations or following decommissioning of the mine and its rehabilitation. Describe monitoring programs that will assess the effectiveness of management strategies for protecting water quality during the construction, operation and decommissioning of the project.

Conduct a risk assessment, based on conservative water quality estimates and hydrology, for uncontrolled emissions to water due to system or catastrophic failure, assess the potential impacts of such emissions on human health and natural ecosystems, and provide detailed measures to avoid or minimise impacts.

Assess the potential impacts on local groundwater resources and quality, and define the extent of the area where groundwater resources are likely to be affected by the proposed operations. Assess the potential impacts of the operations on groundwater draw-down, depletion or recharge, and propose management options to monitor and mitigate these effects. Assess the likely response of the groundwater resource after operation of the project, including the impacts of groundwater inflow to any residual void. Assess the potential impacts on the local ground water regime due to altered porosity and permeability from any land disturbance, such as subsidence. Assess the potential for project operations or residual effects to contaminate groundwater resources. Propose measures to avoid, mitigate and remediate any impacts on groundwater resources or quality.

4.6—Coastal environment

4.6.1—Description of environmental values

Describe the existing coastal environment that may be affected by the project in the context of coastal resources and values identified in the State Coastal Management Plan and any applicable Regional Coastal Management Plans. When necessary to avoid duplication, cross-reference other sections of the EIS where coastal values, such as ecology or scenic amenity, are addressed.

Provide an assessment of physical and chemical characteristics of sediments within the littoral and marine zone potentially affected by the project.

Describe the physical processes of the littoral and marine environment, including currents, tides, freshwater flows and their interaction in relation to coastal morphology and the assimilation and transport of contaminants entering marine waters from, or adjacent to, the project area.

Develop and describe suitable indicators for measuring coastal values, and objectives that would protect the coastal resources and values.

4.6.2—Potential impacts and mitigation measures

Identify actions associated with the project that are assessable development within the coastal zone and would require approval under the *Coastal Protection and Management Act 1995*.

Assess the potential impacts that may be caused by the project on coastal processes, resources and values.

Compare the magnitude of the potential impacts to the objectives, and develop management measures that would avoid or mitigate the impacts to meet the objectives. Describe how the mitigation measures are in accordance with applicable coastal management plans, state planning policies (such as State Planning Policy 2/02—Planning and Managing Development Involving Acid Sulfate Soils), and the Department of Employment, Economic Development and Innovation's series of fisheries guidelines.

Detail a monitoring program that would audit the success of mitigation measures, and describe corrective actions to be used if monitoring shows that objectives are not being met.

4.7.4.6 Air

4.7.4.6.1—Description of environmental values

Describe the existing air environment and airshed that may be affected by the project. Discuss the background levels and sources of contaminants including suspended particulates, oxides of sulfur or nitrogen, greenhouse gases, odorous compounds and any other relevant constituent, whether major or minor, of the air environment that may be affected by the project.

Provide sufficient data on local meteorology and ambient levels of contaminants to establish a baseline for later studies and for the modelling of air quality environmental impacts within the airshed. Parameters will include air temperature, wind speed and direction, atmospheric stability, mixing depth and other parameters necessary for input to the models.

Describe and illustrate the locations of existing residences, places of work, schools, etc, agricultural or ecologically significant areas that could be impacted by emissions from the project.

Describe the environmental values, appropriate indicators and air quality objectives for the potentially affected air environment according to the Environmental Protection (Air) Policy 2008 (EPP(Air)). Assess whether any air quality

objectives are needed in addition to those in the EPP(Air).

4.7-24.6.2 Potential impacts and mitigation measures

Describe all the project's potential sources of emissions to air and expected composition of the emissions. The description will include oxides of sulfur or nitrogen, volatile organic compounds, carbon monoxide and dioxide, particulates (including dust, PM10, and PM2.5), trace metals, odours and any toxic, persistent and/or hazardous substances that would be emitted by the project. Also, specify the oxygen content of the flue gases. Present the concentrations of all components of emissions at standard temperature and pressure, and provide the mass emission rate, exit velocity, volume flow rate and temperature at exit.

Provide a separate air emission inventory of any offsite activities directly associated with the project, including fugitive emissions such as from rail or road transport of product or waste.

Use a recognised atmospheric dispersion model to predict the fate of all significant emissions. Use estimates of emission rates based on actual measurements from samples taken from similar facilities, preferably full-scale facilities operating elsewhere or otherwise from 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. State all input parameters, data sets and assumptions used in the modelling in the main text of the EIS or an appendix. The model inputs will be as detailed as possible, reflecting any variation of emissions with time and including at least a full year of representative hourly meteorological data. Provide stack parameters such as stack height, diameter, temperature, exit velocity and volume flow rate.

If there is no single atmospheric dispersion model that is able to handle the different atmospheric dispersion characteristics exhibited in the project area (such as sea breezes, strong convection, terrain features, temperature inversions and contaminant re-circulation), apply a combination of acceptable models.

Provide contour maps of predicted ground level concentrations and frequency contour plots for typical and maximum emissions under the expected range of meteorological conditions including the worst case. The averaging period for ground-level concentrations of contaminants modelled will be consistent with the relevant averaging periods for air quality indicators and goals in the Environmental Protection (Air) Policy 2008 and the National Environmental Protection (Ambient Air Quality) Measure. For example, the modelling of sulfur dioxide must be conducted for 1-hour, 24-hours and annual averaging periods.

Compare the predicted ground level concentrations to the air quality objectives, and best practice national and international source emission standards. [Consider the close proximity of the Dingo Township to the proposed project site and describe](#) any situations where people, ecosystems or an agricultural use would experience concentrations above an objective. Assess the human health risk associated with emissions from the project for all contaminants whether or not they are covered by the National Environmental Protection Council (Ambient Air Quality) Measure or the Environmental Protection (Air) Policy 2008. Assess potential impacts of emissions on ecosystems or agricultural uses of the environment.

Assess the potential cumulative impacts or interaction between the emissions from the project and other emissions in the airshed. For example, it may be necessary to evaluate whether nitrogen oxides and volatile organic compounds emissions from the project and other sources within the region would contribute to the generation of photochemical smog, or whether sulfur dioxide emissions would acidify rain or dew.

Describe airshed management and the contribution of the project to airshed capacity in view of existing and future users of the airshed for assimilation and dispersion of emissions.

If odour could be an issue, conduct odour impact assessment according to the DERM guideline Odour Impact Assessment from Developments.

Identify worst case emissions that may occur at start-up, shut-down or during 'upset' operating conditions. 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 any planned buffer between the project and neighbouring sensitive receptors will be adequate

Describe the pollution control equipment and pollution control processes to be employed on the premises and the features of the project designed to suppress or minimise emissions, including dusts and odours. Describe the backup measures to be incorporated that will act in the event of failure of primary measures to minimise the likelihood of plant upsets and adverse air impacts.

Assess how the propose emission control processes accord with the management hierarchy for air emissions in the EPP(Air).

Describe how the air quality objectives would be achieved, monitored and audited, and how corrective action would be taken when needed.

[The proponent should liaise with QR National's Queensland Rail Network Division to discuss coal rail transport](#)

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[related dust mitigation measures for new coal-loading facilities, load controls and spray-on coal dust suppressant systems as a result of the implementation of the Coal Dust Management Plan \(CDMP\).](#)

4.7.2.14.6.2.1 Greenhouse gases

Provide an inventory of projected annual emissions for each relevant greenhouse gas, with total emissions expressed in 'CO₂ equivalent' terms. Estimate emissions from upstream activities associated with the proposed project, including the fossil fuel based electricity to be used. Briefly describe the methods used to make the estimates. The Australian Department of Climate Change's National Greenhouse Accounts (NGA) factors (2009) can be used as a reference source for emission estimates and supplemented by other sources where practicable and appropriate. Coal mining projects will include estimates of coal seam methane to be released as well as emissions resulting from such activities as transportation of products and consumables, and energy use by the project.

Assess the potential impacts of the project on the state and national greenhouse gas inventories and propose greenhouse gas abatement measures, including:

- a description of the proposed measures (alternatives and preferred) to avoid and/or minimise greenhouse gas emissions directly resulting from activities of the project, including such activities as transportation of products and consumables, and energy use by the project
- an assessment of how the preferred measures minimise emissions and achieve energy efficiency
- a comparison of the preferred measures for emission controls and energy consumption with best practice environmental management in the relevant sector of industry
- [a description of any opportunities for further offsetting greenhouse gas emissions through indirect means](#)
- [investigation of the feasibility of utilising natural gas \(CSG or LNG\) as a fuel alternative to diesel for mining equipment and on site coal transport.](#)

Means of reducing greenhouse gas emissions could include such measures as:

- minimising clearing at the site (which also has imperatives besides reducing greenhouse gas emissions)
- using less carbon-emitting transport modes or fuels
- integrating transport for the project with other local industries such that greenhouse gas emissions from the construction and running of transport infrastructure are minimised
- maximising the use of renewable energy sources
- co-locating coal seam methane use for energy production with coal extraction
- carbon sequestration at nearby or remote locations.

Include a specific module to address greenhouse abatement in the draft environmental management plan. That module will include:

- commitments to the abatement of greenhouse gas emissions from the project with details of the intended objectives, measures and performance standards to avoid, minimise and control emissions
- periodic energy audits with a view to progressively improving energy efficiency
- a process for regularly reviewing 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 by renewable energy uses
- commitments to monitor, audit and report on greenhouse emissions from all relevant activities and the success of offset measures.

4.8.7 Noise and vibration

4.8.14.7.1 Description of environmental values

Describe the existing environmental values that may be affected by noise and vibration from the project. Environmental values and acoustic objectives for noise-sensitive receptors are defined in the Environmental Protection (Noise) Policy 2008 (EPP(Noise)).

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If the proposed activity could adversely impact on the noise environment, undertake baseline monitoring at a selection of sensitive receptors potentially affected by the project. Sensitive receptors are defined in the EPP(Noise). Illustrate the locations of sensitive receptors on a suitably-scaled map. Describe the results of any baseline monitoring of noise and vibration in the proposed vicinity of the project, including long-term measured background noise levels that take into account seasonal variations.

Report the daily variation of background noise levels at nearby sensitive receptors, with particular regard to detailing variations at different periods of the night. Monitoring methods will adhere to accepted best practice methodologies, relevant DERM guidelines and Australian Standards, and any relevant requirements of the Environmental Protection Regulation 2008 and the Environmental Protection (Noise) Policy 2008.

Describe and illustrate the locations of any existing residences, places of work, schools, etc. and agricultural or ecologically significant areas that could be impacted by noise and vibrations from the project. Describe any current activities near the project area that may cause a background level of ground vibration (for example major roads, quarrying activities, etc).

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Develop and describe suitable indicators for measuring noise, and objectives that would protect the environmental values from significant noise and vibration impacts.

4.8-24.7.2 Potential impacts and mitigation measures

Using a suitable acoustic model, predict the likely generation of noise for different times of day under a range of climatic conditions, including the expected worse case. Describe the predictions using suitable indicators, and illustrate the predicted noise contours on suitably-scaled maps showing the locations of noise sensitive receptors. Assess the potential impacts of noise and vibration at all potentially sensitive receptors in comparison to the objectives and standards to be achieved. Give particular consideration to emissions of low-frequency noise; that is, noise with components below 200Hz. The assessment of noise impacts will include matters raised in the document The Health Effects of Environmental Noise – Other Than Hearing Loss published by the ehHealth Council, 2004 (or later editions), ISBN 0 642 82304 9. Assess the potential environmental impacts of noise and vibration on terrestrial and marine animals and birds, including migratory species. Assess potential noise impacts on any nearby protected areas addressing amenity as well as impacts on animals. Provide information on blasting that might cause ground vibration or fly rock on, or adjacent to, the site with particular attention given to places of work, residence, recreation, worship and general amenity. Discuss the magnitude, duration and frequency of any vibration and assess the potential impacts on sensitive receptors. Reference will be made to the DERM guideline: Noise and Vibration from Blasting.

Assess potential off-site noise and vibration impacts that could arise due to increased road or rail transportation directly resulting from the project and reference Queensland Rail's Code of Practice for Railway Noise Management, as relevant.

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Define and describe practical measures for protecting or enhancing environmental values from impacts by noise and vibration, including details and illustrations of any screening, lining, enclosing or bunding that may occur either on or off the MLA. Provide a discussion of timing schedules for construction and operations with respect to minimising environmental nuisance and harm from noise and vibration. Also, describe how the achievement of the objectives will be monitored, audited and corrective action taken when needed. Describe how any complaints about noise or vibration would be managed and reported.

4.94.8 Ecology

4.9-14.8.1 Description of environmental values

Describe the existing ecological values that may be affected by the project. Address those ecological values in terms of:

- terrestrial and aquatic ecosystems, and their interaction
- biological diversity
- the existing integrity of ecological processes, including habitats of threatened or near threatened species
- the integrity of landscapes and places, including wilderness and similar natural places.

The description of the ecological values of the areas likely to be affected by the project will be illustrated by maps, diagrams and photographs. The description will start by addressing the ecology of the regional area and progress to a detailed description of the project site and any localities that could be affected by project related activities, including downstream and down-wind areas that could be significantly impacted by emissions. The description of ecological values will account for seasonal changes.

For all locations that may be affected by any aspect of the project, provide suitably-scaled maps of terrestrial vegetation based primarily on field surveys with descriptions of the mapped ecosystems and any items of special

interest. Map adjacent areas to illustrate interconnectivity, including any larger scale interconnections between areas of remnant or regrowth vegetation where the project site includes vegetation that facilitates animal movement between those other areas. Field surveys will use the Queensland Herbarium methodology and proformas in the latest version of the publication Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (EPA, 2005), and survey a minimum of three sites, each at least 50 m by 10 m, within each defined (standard system) vegetation community.

The vegetation description and mapping, produced from aerial photographs and field surveys, and having a minimum scale of 1:10 000, will cover at least the following matters:

- location and extent of vegetation types using DERM's regional ecosystem type descriptions in accordance with the Regional Ecosystem Description Database
- category A or B environmentally sensitive areas under the Environmental Protection Regulation 2008
- any areas of state, regional or local significance identified in an approved Biodiversity Planning Assessment produced by DERM
- critical habitat within the meaning of the *Nature Conservation Act 1992*
- vegetation mapped as essential habitat
- remnant or regrowth vegetation, particularly essential regrowth habitat, high value regrowth, or a regrowth watercourse
- sensitive or important vegetation types, including riparian vegetation ~~and any marine littoral and subtidal zone~~
- in-land ~~or coastal~~ wetlands
- wildlife breeding or roosting areas
- sites in, or adjacent to, areas containing important resting, feeding or breeding sites, or flight paths for migratory species listed under the Convention of Migratory Species of Wild Animals, and/or bilateral agreements between Australia and Japan (JAMBA), Australia and China (CAMBA), or Australia and the Republic of Korea (ROKAMBA)
- ~~sites adjacent to nesting beaches, feeding, resting or calving areas of species of special interest, such as marine turtles and cetaceans~~
- sites containing common species that represent a distributional limit and are of scientific value or contain feeding, breeding, resting areas for populations of echidna, koala, platypus and other species of special cultural significance
- sites containing high biodiversity that may be dependent for their long-term survival or function on connectivity with other nearby areas of habitat
- a site containing other special ecological values, for example, high habitat diversity and areas of high endemism
- bat roosting and breeding caves, including existing structures such as adits and shafts
- habitat ~~of extinct in the wild, of threatened or near threatened animals~~
- the condition of vegetation and its habitat value, particularly in relation to the conservation of any ~~extinct in the wild, endangered, vulnerable and/or threatened and~~ near threatened plant and animal species, assemblages or community types
- a complete list of species present at each site
- the relative abundance of plant species
- species of protected plants highlighting those listed as threatened or near threatened under the Nature Conservation (Wildlife) Regulation 2006
- any other plant communities or species of conservation, cultural, commercial or recreational significance
- areas that may have low resilience to environmental change
- location and abundance of any pest, weed or exotic species
- any areas that would be subject to the *Vegetation Management Act 1999*.

Plants that could not be identified during the survey will be submitted to the Queensland Herbarium for identification. Specimens of plant species of conservation significance, including those listed as protected plants under the Nature Conservation (Wildlife) Regulation 2006, other than common species, will be submitted to the

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Queensland Herbarium with sufficient information to enable their lodgement as voucher specimens.

The plant and animal surveys will address species structure, assemblage, diversity and abundance. Surveys will be sufficient to identify, or adequately extrapolate, the plant and animal values over the range of seasons, particularly during and following a wet season. In tropical areas, a major part of the survey effort will be undertaken between 1 February and 31 March, assuming the wet season follows a typical pattern. The survey will account for the ephemeral nature of watercourses traversing the project area, and seasonal variation in animal populations. Existing information on plants and animals may be used to supplement new survey work provided that the existing data are still current and have been derived from previous surveys at the site that were consistent with current best practice methodologies. Methodologies used for plant and animal surveys will be specified in the appendices to the EIS.

Undertake a comprehensive vertebrate animal survey of the project area at a sampling intensity that supports the scale of vegetation mapping (i.e. 1:10 000 or better). Surveys of terrestrial wildlife will be conducted in a manner that is sensitive to effects of seasonality and the different activity patterns and habitat use by species under different seasonal conditions.

Describe the terrestrial and riparian animals occurring in the areas affected by the project, noting the broad distribution patterns in relation to vegetation, topography and substrate. The description of the animals present or likely to be present in the area will address:

- a list of animal species, their diversity and abundance
- the existence of any threatened, near threatened or otherwise noteworthy species or communities in the study area, i.e. species of special cultural significance and any species listed by the DERM 'Back on Track' species prioritisation methodology in the study area, including discussion of range, habitat, breeding, recruitment, feeding and movement requirements, and current level of protection (such as any requirements of protected area management plans)
- any species that are poorly known but suspected of being extinct in the wild, endangered, vulnerable and/or near threatened species threatened or near threatened
- habitat requirements and their sensitivity to changes
- movement corridors and barriers to movement
- the use of the area by migratory birds, nomadic birds, bats, and arboreal and ground-dwelling animals and colonial breeding species
- feral, pest or exotic animals.

In addition to the species found in the field survey, provide an indicative list of all other known or likely species within a 100 km area around the project site and the local bioregion, highlighting any extinct in the wild, endangered, vulnerable and/or threatened or near threatened species. Correlate the occurrence of animals of conservation significance to mapped vegetation units or habitats to facilitate the development of measures for their protection. Indicate how well any affected communities are represented and protected elsewhere in the province where the site of the project occurs.

Describe the aquatic plants and animals occurring in the areas affected by the project, noting the patterns and distribution in the waterways and any associated wetlands, lacustrine and marine environments. The description of the plants and animals present or likely to be present in the area will at least include:

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

Provide a description to order or family taxonomic rank of the presence and nature of any stygofauna occurring in groundwater likely to be affected by the project. Sampling and survey methods should follow best practice, such as that published by the Western Australian Environmental Protection Authority – Guidance for the Assessment of Environmental Factors no.54 (December 2003) and No. 54a (August 2007), or any more recent publication that supersedes that guideline.

Develop and describe suitable indicators for measuring ecological values, and objectives that would protect the environmental values from significant adverse impacts.

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4.9-24.8.2 Potential impacts and mitigation measures

Assess the potential impacts on the ecological values of the area arising from the construction, operation and decommissioning of the project including clearing, salvaging or removal of vegetation. Cover terrestrial and aquatic (marine and freshwater) environments, including any potentially impacted benthic and inter-tidal communities, seagrass beds and mangroves. Assess the potentially significant environmental impacts on any plants and animals, whether on or off the project site, due to any alterations to the local surface and ground-water environment.

Specifically assess any potential impacts on a category A or B environmentally sensitive area and propose measures to avoid impacts.

If available, provide electronic shapefiles in a format compatible with ArcGIS indicating the boundary of the project area and detailing the extent of proposed vegetation clearing in relation to surrounding vegetation both within the project area and in any off-site area to be used for project related infrastructure.

Assess the indirect impacts on remaining vegetation, such as those due to edge effects, reducing vegetation area below a viable size, or reductions in connectivity. Similarly, indirect impacts on animals should be assessed, such as the reduction of a habitat area below a viable size or increased predation due to reduced cover. Short-term and long-term effects should be considered with comment on whether the impacts are reversible or irreversible.

Describe the potential impacts on stygofauna of any changes in the quality, level or quantity of groundwater, and describe any mitigation measures that may be applied.

Assess the capacity of the environment to assimilate discharges or emissions. Assess the potential impacts due to chronic, low-level exposure to contaminants or the bio-accumulation of contaminants.

Assess the potential impacts on animals of wastes at the site, particularly those related to any form of cyanide or other toxicants in supernatant water of a tailings storage facility. Propose measures to prevent harm to wildlife.

Describe and assess the potential impacts of any actions of the project that require an authority under the *Nature Conservation Act 1992*, and/or would be assessable development for the purposes of the *Vegetation Management Act 1999*. The assessment and supporting information should be sufficient for the administering authority to decide whether an approval should be granted and developing recommended conditions. The EIS should indicate whether offsets will be required for clearing vegetation within or outside the mining lease area.

Propose practical measures for protecting or enhancing ecological values, and assess how nominated quantitative standards and indicators may be achieved for nature conservation management. In particular, address measures to protect or preserve any extinct in the wild, endangered, vulnerable threatened or near threatened species.

Describe measures that would adequately mitigate potential impacts on habitats that would inhibit animal movement, propagation or feeding patterns, or change food chains. Specifically address any obligations imposed by Queensland or Commonwealth legislation or policy or international treaty obligations, such as JAMBA, CAMBA or ROKAMBA. Assess the need for buffer zones and the retention, rehabilitation or planting of movement corridors, and propose measures that would avoid waterway barriers or mitigate their construction and operation. Assess works in a waterway considering Waterway Barrier Works Development Approvals, Queensland Primary Industries and Fisheries Fish Habitat Management Operational Policy FHMOP 008, 2009.

Identify and quantify any potential net loss of environmental values. Propose environmental offsets that would counterbalance the remaining loss of environmental values. Proposed environmental offsets will be consistent with the requirements set out in any applicable specific-issue offset policies under the framework of the Queensland Government's Environmental Offset Policy (2008). Specific-issue offset policies that will be considered are:

- Policy for Vegetation Management Offsets, DERM, 2009
- Mitigation and Compensation for Works or Activities Causing Marine Fish Habitat Loss: Departmental Procedures, Fish Habitat Management Operational Policy, Queensland Department of Primary Industries, FHMOP 005, 2002
- Offsets for Net Benefit to Koalas and Koala Habitat, EPA, 2006
- Biodiversity offset requirements of the Environmental Protection and Other Legislation Amendment Act 2011
- the forthcoming Biodiversity Offsets Policy.

Propose detailed measures to remove and control the introduction or spread of weeds and feral or pest animals. This should include a risk assessment of high biosecurity risk species and their sites, and the development of threat mitigation plans for them, such as clean down and inspections at high risk sites. The biosecurity management strategies will include mitigation measures relevant to protecting any potentially affected primary production areas. When determining control strategies, reference will be made to the latest Biosecurity Queensland's Annual Pest Distribution Survey data, published biosecurity management strategies, local

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government pest management plans and any applicable model local laws dealing with locally declared pest plants and animals. ~~Develop management strategies to ensure no new marine pests are introduced as a result of the project's activities.~~ Include all management measures for pest plants and animals in a biosecurity management plan, which will form part of the project's draft EM plan.

Propose measures for the progressive rehabilitation of disturbed areas, including rehabilitation success criteria that would be used to measure the progress. Describe how the achievement of the objectives would be monitored and audited, and how corrective actions would be managed. Proposals for the rehabilitation of disturbed areas will incorporate, where appropriate, provision of nest hollows and ground litter and include any species proposed to be used in rehabilitation, including the source of the proposed species.

4.104.9 Cultural heritage

4.10.14.9.1 Description of environmental values

For non-Indigenous historical heritage, a study will be undertaken of the known and potential historical cultural and landscape heritage values of the area potentially affected by the project. The study will be undertaken by a suitably qualified or experienced person, and as a minimum, include the following elements:

- A desktop assessment reviewing all sources of information on non-Indigenous historical cultural and landscape heritage values within the region of the project site, including:
 - o the Queensland Heritage Register, for places already protected under the *Queensland Heritage Act 1992*
 - o local government heritage registers, lists or inventories
 - o results of previous cultural and landscape heritage studies conducted in the region
 - o appropriate national and international guidelines for the descriptions of sites, places and regions
- A physical archaeological investigation of the area potentially affected by the project (based on the results of the desktop assessment) that addresses:
 - o all types of historical heritage places located within the project area including built, archaeological and non-Indigenous cultural landscape values
 - o the discovery and protection of any previously unidentified archaeological artefacts or archaeological places during the course of the archaeological investigation in accordance with Part 9 of the *Queensland Heritage Act 1992*
- An investigation of whether the area potentially affected by the project includes places and locales of possible State or local heritage significance, including
 - o an assessment of places of potential heritage significance against the criteria contained in Division 1 of the *Queensland Heritage Act 1992*
 - o documented consultation with appropriate historians and with local history organisations and property owners to ensure all known heritage values are identified
 - o notification to the Cultural Heritage Branch of DERM of any places or locales that are of potential State or local heritage significance not currently on the State or local Heritage register.

Describe the existing cultural heritage values that may be affected by the project. Unless an exemption applies under s86 of the *Aboriginal Cultural Heritage Act 2003*, an Indigenous cultural heritage study must be undertaken in accordance with the requirements of Part 6 of that Act.

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

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

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

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

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

4.10.24.9.2 Potential impacts and mitigation measures

Define and describe the objectives and practical measures for managing, protecting or enhancing cultural heritage values that may be affected by the project. Describes how practices may be implemented to appropriately manage those values, and how the achievement of the objectives will be monitored, audited and managed.

4.10.2.14.9.2.1 Indigenous cultural heritage

Unless an exemption applies under s86 of the *Aboriginal Cultural Heritage Act 2003*, the potential impacts on Indigenous cultural heritage values in the vicinity of the project must be managed under a cultural heritage management plan (CHMP) developed and approved under Part 7 of that Act. Development of the CHMP will follow the guidelines gazetted under section 85 of the *Aboriginal Cultural Heritage Act 2003*. DERM's EIS Coordinator must be made aware of the progress of the CHMP approval process and of any related issues that should be addressed in the EIS assessment report.

4.10.2.24.9.2.2 Non-Indigenous historical cultural heritage

The potential impacts on non-Indigenous historical cultural heritage values and their avoidance or mitigation will be addressed in a management plan. Mitigation and management measures should take into account the assessed significance of any items or places of heritage value identified by the study and should be appropriate to the assessed level of significance. The historical heritage management plan will specifically address identified values and provide a process for managing yet undiscovered values should they become apparent during development of the project.

The development of a historical heritage management plan will be negotiated with DERM and any other relevant stakeholders.

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

- processes for mitigating, managing and protecting identified historical cultural heritage values during excavations of the construction, operational, rehabilitation and decommissioning phases of the project
- processes for reporting, as required by section 89 of the *Queensland Heritage Act 1992*, the discovery of any archaeological artefact not previously identified in the historical cultural heritage study
- procedures for collecting any artefact material, including appropriate storage and conservation
- historical cultural heritage awareness training or programs for project staff.

The training will be provided during the site induction, and will address the legislative requirements and practical measures for the recognition, reporting and preservation of cultural heritage material. A plain English manual summarising the training will be given to all site workers for their future reference.

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

4.14.10 Social values

The description of social and cultural values potentially impacted by the project, and the assessment of the impacts on those values, will be conducted in consultation, through the EIS Coordinator, with the Social Impact Assessment Unit of the Department of Employment, Economic Development and Innovation Infrastructure and Planning. The proponent will engage at the earliest practical stage with stakeholders and potentially affected parties to discuss and explain the project, and to identify and respond to issues and concerns regarding social impacts. The stakeholder engagement processes will continue throughout the EIS and contribute to the identification of social and cultural values and to the assessment of impacts.

4.14.10.1 Description of existing social values

Define the social and cultural values within the project's area of influence, including the local, district, regional and state level as appropriate, 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, including integrity of social conditions, liveability, social harmony and wellbeing, and sense of community
- Indigenous social and cultural characteristics, such as areas under native title rights or application.

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Undertake a targeted baseline study of the people in the project's social and cultural area to identify social values that may be impacted by the project. The social baseline study will be based on qualitative, quantitative, and participatory methods supported by stakeholder engagement processes. It will reference relevant data contained in local and state government publications, reports, plans, guidelines and documentation, including regional plans and any 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:

- total enumerated population and the full time equivalent transient population
- existing or anticipated major population trends and changes irrespective of the project
- family structures
- age and gender distributions
- education, including schooling levels
- measures of community safety, health and wellbeing
- cultural and ethnic characteristics
- Indigenous population including age and gender
- personal and household income
- labour force by occupation and industry
- housing tenure type and landlord type for rental properties
- housing availability:
 - o private ownership: number and percentage of houses for sale
 - o rental market: size, vacancy rate and seasonal variations
 - o availability of social housing
- housing costs:
 - o private ownership: typical costs of houses for sale in project area and monthly housing repayments with percent of dwellings in each category published by the Australian Bureau of Statistics (ABS)
 - o rental: weekly rent with percent dwellings in each category published by the ABS
- housing affordability separately for private ownership and rent
- household and family type
- disability prevalence
- the social and economic index for areas, index of disadvantage—score and relative ranking
- types and prevalence of crime, including domestic violence
- any other indicators determined through the community engagement process as relevant.

The social baseline study should also take account of and address issues such as:

- the social infrastructure including community and civic facilities, services and networks (for definition see South East Queensland Plan 2005–2026 Implementation Guideline No.5, <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
- 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:
 - o the number of properties potentially directly or indirectly affected by the project
 - o rural properties, farms, croplands and grazing areas including on-farm activities near the proposed activities
 - o properties used for other primary, secondary or tertiary industries

- o residential acreage properties
- o townships or other relatively small block residential areas
- the number of families potentially directly or 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 or tourism
- Indigenous cultural use of plants and animals.

4.11.24.10.2 Potential impacts and mitigation measures

Describe the stakeholder engagement processes and summarise their outcomes, including the response of Indigenous and non-Indigenous communities to the project.

Assess and describe the type, level and significance of the project's beneficial and adverse impacts on social and cultural values identified in the social baseline study and address issues raised in the stakeholder engagement processes. Assess the cumulative potential beneficial and adverse impacts of the project in relation to other major projects or known proposals in the social and cultural area. Discuss whether impacts would be felt at a local, regional or national level.

Assess the impacts in sufficient detail for local and state authorities to make informed decisions about the project's potential effect on their business and social infrastructure. If the project is likely to result in a significant increase in the population of the area, then the proponent should consult the relevant state authorities and summarise the results of the consultations in the EIS.

Provide separate profiles of the expected workforce for the construction, operational and decommissioning phases of the project that describe the:

- numbers and variations of personnel to be employed
- skills base of the required workforce
- likely sources of personnel, such as local, regional, national or overseas.

Provide an outline of the proponent's and contractors' recruitment schedules and their policies for recruitment of workers; describe initiatives for local employment business opportunities; and address the recruitment of Indigenous workers, people from culturally and linguistically diverse backgrounds and people with a disability. Outline training that would be provided to increase the skills levels of workers.

Assess the social and cultural impacts of recruiting and training the construction or operational workforces from within the host community and of bringing in workers from outside. [Outline the workforce roster assumptions for the purpose of the EIS and the impacts on the social environment of the camps](#)

Estimate the population growth due to the proposal, directly, indirectly (such as due to service industry growth) and cumulatively with other projects, providing detail on gender, age and any other relevant cohorts. Assess the potential impacts on:

- demographic patterns
- local, regional and state labour markets for separate occupational groupings of the workforce, particularly highlighting any potential skill shortages
- disruptions to existing lifestyles
- health and social wellbeing of families and communities
- social dysfunction, including use of alcohol and drugs
- crime and violence.

Assess the potential impacts of the project on vulnerable groups including women, children and young people, the aged and people with a disability.

Describe the social impacts of changes in land use, the alienation of property and loss of connection with the land, including the impacts and stresses associated with relocations.

Assess the impacts of construction and operational workforces, their families, and associated contractors on land, housing and accommodation availability and affordability. Assess the capability of existing housing and rental accommodation, including public housing, to meet any additional demands created by the project including direct impacts on disadvantaged groups and Indigenous people.

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Estimate how much service revenue and wages from the project would be likely to flow to the project's social and cultural area, and assess the beneficial and adverse impacts of that financial inflow.

Describe the transport operations that would be used to move staff between their residences, dormitory camps and work sites. Modes of transport should be described in section 4.3, but this description should address the mix of privately-owned, public or chartered transport operators. Assess the potential social impacts of transport operations on the local and regional communities, including any road safety issues.

Propose measures, developed in consultation with relevant local authorities, state government agencies and stakeholders [and having regard to the Department of Local Government and Planning's Major Projects Housing Policy](#), that would avoid, mitigate or offset any short, medium or long-term adverse impacts, particularly those on:

- housing affordability and availability, including the rental market, in the social and cultural area
- demographic changes in the profile of the region
- the capacity of social infrastructure to meet community needs, particularly in the areas of health, welfare, early childhood education and care, other education and training, policing and emergency services
- provision of education, training and employment opportunities for women, people with a disability, and Indigenous peoples.

Describe consultation with local and state authorities and stakeholders about their acceptance of proposed mitigation strategies and how practical management and monitoring regimes are proposed to be implemented.

Provide a draft social impact management plan that promotes an active and ongoing role for impacted communities and local authorities through the project life cycle. The draft plan should cover:

- an overview of the project
- all proposed mitigation measures and benefit strategies
- action plans to implement mitigation measures and benefit strategies
- assignment of accountability and resources for mitigation measures and project benefits
- practical mechanisms to monitor and adjust mitigation measures and action plans
- ongoing updates to stakeholders on activities and commitments
- mechanisms to respond to public enquiries and complaints
- mechanisms to resolve disputes with stakeholders
- stakeholder engagement processes including periodic review mechanisms.

4.12.4.11 Health and safety

4.12.4.11.1 Description of values

Describe the existing community values for public health and safety that may be affected by the project. Provide maps showing the proximity of the project to any potentially affected places of human residence, work or recreation including, but not necessarily limited to, kindergartens, schools, hospitals, aged care facilities, office buildings, factories and workshops. Projects that could discharge contaminants, even accidentally, into water bodies should identify and describe any downstream extraction for potable use. For projects proposing air emissions, and/or those with the potential to emit odours, identify and describe nearby and other potentially affected populations. Pay particular attention to those sections of the population, such as children and the elderly who are especially sensitive to environmental health factors.

4.12.4.11.2 Potential impacts and mitigation measures

Assess the potential impacts on the community in terms of health, safety, and quality of life from project operations and emissions, including odour, dust and noise. Assess potential impacts on public health in the short and long term, and the cumulative impacts on public health either in isolation or by combination with other known existing or planned sources of contamination. The assessment should address the potential contamination not only of public water supplies but also of private water sources such as rainwater tanks with roof collection.

Assess the potential extent of contamination and public health risk should an extreme meteorological event, flood or catastrophic failure cause the release of toxic material from such infrastructure as tailings dams or chemical store. Describe strategies to notify relevant stakeholders during such an event.

Assess the project's potential for providing disease vectors. Propose measures to control mosquito and biting midge breeding, including measures to be used for any residual ponding after mining ceases, such as due to

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subsidence. Assess any proposed use of recycled water for its potential to cause infection by transmitting bacteria and/or viruses by contact, dispersion of aerosols, and ingestion (including via use on food crops). Similarly, the use of recycled water should be assessed for its potential to cause harm to human health via water supply or the food chain due to contaminants such as heavy metals and persistent organic chemicals.

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, and how the achievement of the objectives will be monitored, audited and managed.

4.13.12 Economy

4.13.14.12.1 Description of potentially affected economies

Describe the existing local, regional or national economies that may be affected by the project, including:

- appropriate statistics of economic activity, such as gross regional product and aggregate regional income
- trends in relevant economic indicators
- industries and businesses that could be beneficially or adversely affected by the project, their current and historical contribution to local, regional or national economies, and their current input costs
- the economic value of existing resources that could be impacted or sterilised by the project
- local, regional and national governments' aspirations, objectives, strategies and policies for the economic and industrial sectors that may be affected
- economic viability
- historical descriptions of large-scale resource developments and their effects in the region.

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

4.13.24.12.2 Potential impacts and mitigation measures

Provide an assessment from national, state, regional and local perspectives of the direct and indirect economic benefits and impacts of the project. Describe the methods used, assumptions and sensitivity of the assessment.

At a level of detail appropriate to the scale of the project, the assessment will consider:

- the separate phases of the project, such as construction, operation and after ceasing operations
- the effects of this project on the local and regional economies, including goods and services supplied to, or received from, local or regional markets
- the long and short-term beneficial (such as job creation) and adverse impacts (such as increased labour costs, or competition with local small business) that are likely to result from the development
- impacts on the economic value of existing resources
- stimulus, catalytic or second-order effects
- cumulative effects of the project in relation to other economic development opportunities
- a benefit-impact table that disaggregates the benefits and impacts or costs
- the potential, if any, for direct equity investment in the project by local businesses or communities
- the cost to all levels of government of any additional regulatory function or infrastructure provision
- implications for future economic development in the locality (including constraints on surrounding land uses and existing industry)
- the potential economic impact of any major hazard identified in section 4.14
- the distributional effects of the project including proposals to mitigate any negative impact on disadvantaged groups
- the value of lost opportunities or gained opportunities for other economic activities anticipated in the future
- economic impacts on local property values.

The assessment must consider the Local Industry Policy – A Fair Go for Local Industry (Qld Gov., 2008).

Consider the impacts of the project in relation to energy self-sufficiency, security of supply and balance of payments benefits.

Define and describe the objectives and practical measures for avoiding or mitigating impacts or enhancing economic benefits. [Development of these measures should be done in consultation with local and state governments.](#) Describe how nominated quantitative standards and indicators may be achieved for economic management, and how the achievement of the objectives will be monitored, audited and managed.

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4.14.13 Hazard and risk

Describe the potential hazards and risk to people and property that may be associated with the project as distinct from hazards and risk to the natural environment, which should be addressed in other sections of the TOR. When addressing natural hazards, particularly in regard to places where people work and live (such as a mine's accommodation camp), the EIS should consider the principles of natural hazard management in State Planning Policy 1/03 (SPP1/03), Mitigating the Adverse Impacts of Flood, Bushfire and Landslide, even if the development is exempt development under the Sustainable Planning Act 2009. SPP1/03 may not be applicable as a statutory instrument for exempt development, but it contains information that guides best practice for all development.

4.14.14.13.1 Description of values

Detail the values related to people and property that could be affected by any hazardous materials and actions associated with the project.

4.14.24.13.2 Potential impacts and mitigation measures

Describe the potential hazards and risk that may be associated with the project, including consideration of both natural and man-made hazards. The assessment of risk should be in accordance with relevant standards.

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

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

Details should be provided of:

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

Assess the potential impacts and risks of both natural and induced emergency situations and counter disaster and rescue procedures as a result of the project on resources such as forests, water reserves, state and local government-controlled roads, places of residence and work, and recreational areas. The assessment should outline the implications for and the impact on the surrounding land uses, and should involve consultation with Department of Emergency Services, Queensland Fire and Rescue Authority, and Queensland Ambulance Service. Undertake a preliminary hazard analysis, conducted in accordance with appropriate guidelines for hazard analysis, [\(e.g. AS/NZS ISO 31000:2009 Risk Management – Principles and guidelines and HB203:2006 Environmental Risk Management Principles and Processes\)](#), and addressing:

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

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

Develop an integrated risk management plan for the whole of the life of the project including construction, operation and decommissioning phases. The integrated risk management plan should include the following components:

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

The EIS will address the development of a training plan for Emergency Management and Mass Casualty Incident Management.

4.154.14 Cross-reference with the terms of reference

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

5. Environmental management plan

Provide an environmental management plan (EM plan) that includes the mitigation measures detailed in section 4 of the EIS. Its purpose is to state the proponents' environmental protection commitments in a way that allows them to be measured and audited.

The EM plan is an integral part of the EIS, but will be capable of being read as a stand-alone document without reference to other parts of the EIS. For a mining project the EM plan must meet the content requirements of section 203 of the *Environmental Protection Act 1994*, whereas the EM plan for a petroleum project must meet the content requirements of section 310D of that Act.

The EM plan will be used by the administering authority to develop conditions to apply to project approvals. Therefore, the EM plan is a relevant document for project approvals, environmental authorities and permits, and may be referenced by them. The EM plan may suggest conditions that will form the basis for developing the draft environmental authority.

6. Commitments not included in the EM plan

Summarise any commitments made by the proponent that are not included in the EM plan (such as a commitments to assist a local community group). It should be clear how and when the commitments will be fulfilled.

7. References

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

8. Recommended appendices

A1. Final terms of reference for this EIS

Provide a copy of the final TOR bound with the main body of the EIS. Other appendices can be provided in separate volumes.

A2. Regulatory approvals

List the regulatory approvals required by the project.

A3. Study team

Describe the qualifications and experience of the study team, specialist sub-consultants and expert reviewers.

A4. The standard criteria

Provide a brief summary of the project's compatibility with the standard criteria as defined by the *Environmental Protection Act 1994*, which include the principles of ESD and other relevant policy instruments. With regard to the principles of ESD, as listed in the National Strategy for Ecologically Sustainable Development, published by the Australian Government in December 1992 (available from the Australian Government Publishing Service), discuss how the project conforms with each principle from inception to decommissioning.

A6. Specialist studies

Include all specialist study reports undertaken for the EIS as appendices.

A7. Research

Outline in an appendix any proposals for researching alternative environmental management strategies or for obtaining any further necessary information.

1 November 2011

Permit and Licence Management
Department of Environment and Resource Management
GPO Box 2454
Brisbane QLD 4001

Dear Sir / Madam,

RE: APPLICATION FOR ASSESSMENT OF THE DINGO WEST COAL MINE PROJECT VIA EIS – DINGO WEST COAL PTY LTD

Dingo West Coal Pty Ltd (DWC) is seeking to obtain the necessary approvals to develop the Dingo West Coal Mine Project (the Project). In doing so, we are writing to formally commence the environmental assessment of the Project pursuant to the requirements of the *Environmental Protection Act 1994* (EP Act).

As background, DWC submitted an application for an Environmental Authority (MIN102925311) to DERM on 27 July 2011. In support of this application DWC sought to have the Project approved via Environmental Management Plan (EMP). A draft EMP was submitted to DERM for assessment on 20 September 2011.

DERM has undertaken the Assessment Level Decision of the Environmental Authority application and has determined that the application will be assessed as a Non Code Compliant Level 1 mining project. Pursuant to s.162 of the EP Act, DERM advised DWC on 5 October 2011 that the project will be assessed via an Environmental Impact Statement (EIS).

In support of our request to initiate the formal EIS process for the Project, we attach the following documents:

- a. Dingo West Coal Mine Project Initial Advice Statement;
- b. Details of Potentially Affected Persons and Interested Parties; and
- c. Draft Terms of Reference (ToR) for the Dingo West Coal Mine Project.

The attached draft ToR is based on the DERM Generic ToR for mining projects available at http://www.derm.qld.gov.au/environmental_management/impact_assessment/eis-processes/index.html with amendments shown in track changes.

Should you have any queries in regard to this submission, please do not hesitate to contact Section 78B(2) Manager Infrastructure on Section 78B(2) or by email at Section 78B(2)@bandannaenergy.com.au.

Yours Sincerely

sch4p4(6) Personal in
Managing Director

Attachments

1. Dingo West Coal Mine Project Initial Advice Statement;
2. Details of Potentially Affected Persons and Interested Parties; and
3. Draft Terms of Reference for the Dingo West Coal Mine Project

Attachment A - Dingo West Coal Mine Project Initial Advice Statement

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Attachment B - Details of Affected Persons and Interested Parties

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Table 1. Potentially affected persons

Lot and Plan	Current Owner	Postal Address	Street Description
1HT424 100RP882349	sch4p4(6) Personal information	sch4p4(6) Personal information	sch4p4(6) Personal information
13HT63	RESERVE FOR CEMETERY	STATE OF QUEENSLAND (REPRESENTED BY DERM) - UNKNOWN TRUSTEE	0 CAPRICORN HWY
2HT138	sch4p4(6) Personal information	sch4p4(6) Personal information	sch4p4(6) Personal information
22HT119	RESERVE FOR RAILWAY	C/-FACILITIES ASSET MANAGER, RAILWAY STATION, CLERMONT ST, EMERALD QLD 4720	0 CAPRICORN HWY
3RP801280 4RP801280	sch4p4(6) Personal information	sch4p4(6) Personal information	sch4p4(6) Personal information
624SP129819	QUEENSLAND RAIL	C/-FACILITIES ASSET MANAGER, PO BOX 198, ROCKHAMPTON QLD 4700	0 RAILWAY CORRIDOR
643SP129820	QUEENSLAND RAIL	C/-FACILITIES ASSET MANAGER, PO BOX 198, ROCKHAMPTON QLD 4700	0 RAILWAY CORRIDOR

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Table 2. Potentially interested parties

Regional Councils	
Central Highlands Regional Council	PO Box 21, Emerald, QLD 4720 Ph: 1300 242 686 Email: enquiries@chrc.qld.gov.au
Gladstone Regional Council	PO Box 29, Gladstone DC, QLD 4680 Ph: 07 49700700 Email: info@gladstonerc.qld.gov.au
Rockhampton Regional Council	PO Box 1860, Rockhampton, QLD 4700 Ph: 1300 225 577 Email: enquiries@rrc.qld.gov.au
Native Title Claimants	
Not applicable	
Utilities	
Sunwater	Level 9 120 Edward Street Brisbane QLD 4001
Powerlink	PO Box 1193 Virginia QLD 4014
Petroleum Tenure Holders	
Bow Energy	GPO Box 5244 Brisbane Qld, 4001
OME Resources	Level 2,103-113 Nerang Street, Southport QLD 4215
Federal Departments	
DSEWPac	GPO Box 787 Canberra ACT 2601
State Departments	
DERM	GPO Box 2454 Brisbane QLD 4001
DERM	PO Box 906 Emerald QLD 4720
Other Departments as advised by DERM	To be advised

Attachment C - Draft Terms of Reference for the Dingo West Coal Mine Project

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Initial Advice Statement

Dingo West Coal Mine Project



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Bandanna Energy Limited

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1. Introduction

1.1 Background

Dingo West Coal Pty Ltd (the Proponent) proposes to develop the Dingo West Coal Mine (the Project). The Project site is located in central Queensland approximately 6 km west of Dingo and approximately 120 km to the east of Emerald (see **Figure 1**).

The Project involves the development and operation of a new open cut mine that will export pulverised coal injection (PCI) and high energy thermal coal to the international market via the existing Blackwater rail system and coal handling facilities and export terminal at Gladstone. Exploration to date has identified an inferred resource of 91.1 million tonnes (Mt) of coal (Bandanna Energy 2011 Annual Report) which will allow production of up to 1.4 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal and approximately 1.0Mtpa of product coal for approximately 30 years. The Project is expected to commence in construction 2012 and continue for approximately 30 years.

The Project area, defined by the Mining Lease Application (MLA80180) covers 4,649.7ha. The Project area includes the mine, haul road and rail load out facility and is wholly located within MLA80180.

1.2 Proponent

The Project will be developed and operated by Dingo West Coal Pty Ltd, a wholly owned subsidiary of Bandanna Energy. Bandanna Energy is an Australian owned public company which listed on the Australian Securities Exchange's in 2008. Bandanna Energy has been in operation since 2008 and has over 1,400 million tonnes of JORC compliant Resources and Reserves (Bandanna Energy 2011 Annual Report).

The contact details for Dingo West Coal are:

Dingo West Coal Pty Ltd
Level 12, 410 Queen Street
Brisbane Qld 4000.

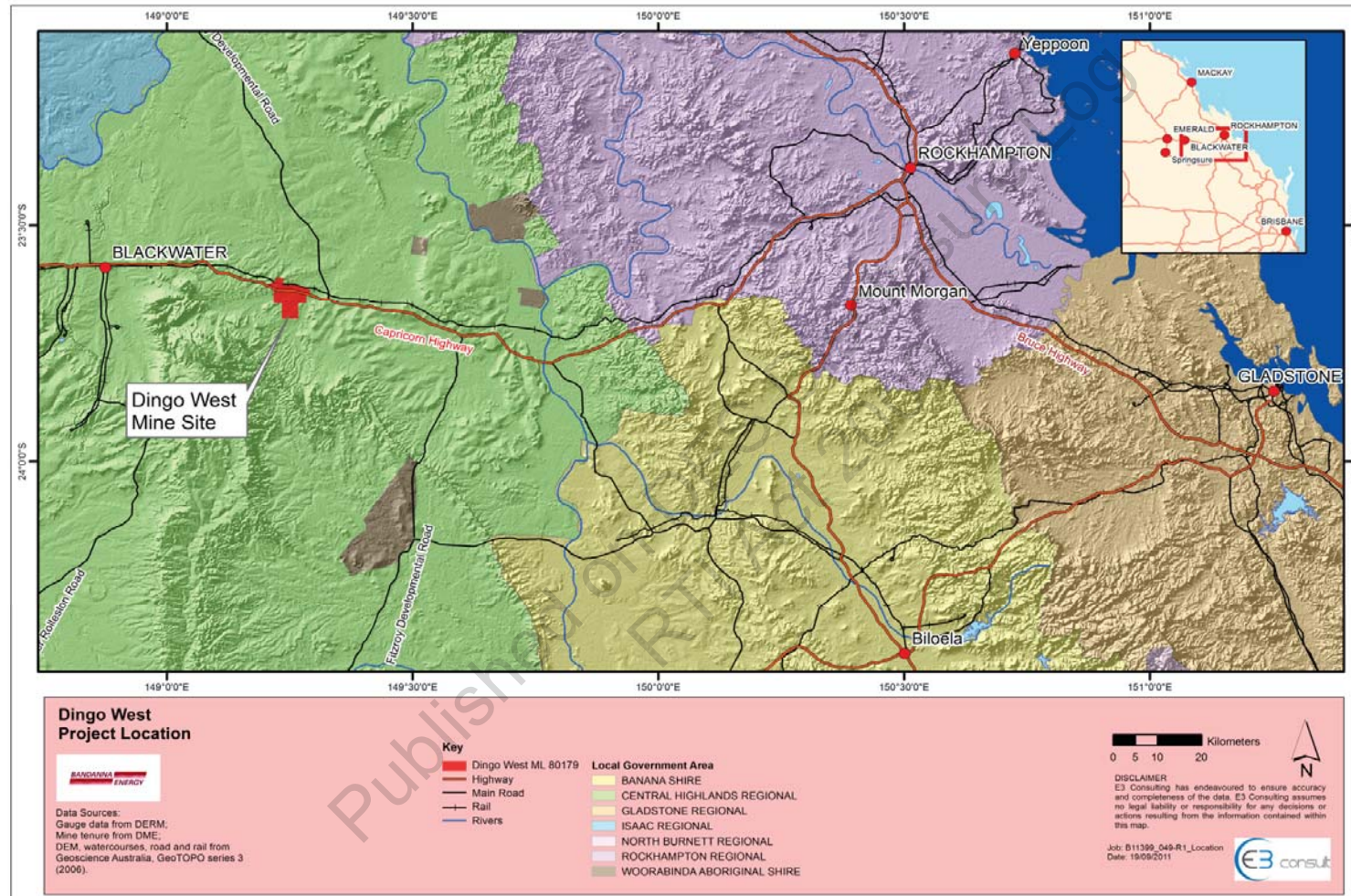
1.3 Project Assessment

The Proponent is seeking to have the Dingo West project approved pursuant to the *Environmental Protection Act 1994* (EP Act) via an approved Environmental Impact Statement (EIS) and Environmental Authority (mining lease) (EA(ml)).

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Figure 1. Project Location



Pursuant to the EP Act, activities that will, or have the potential to, release contaminants into the environment and which may cause environmental harm are defined as Environmentally Relevant Activities (ERA).

The Dingo West Coal Mine proposes to undertake the following ERAs:

- ERA 8 Chemical storage – storing gas, liquid or solid chemicals classified as dangerous goods in containers;
- ERA 15 Fuel burning – using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour;
- ERA 18 Boilermaking or engineering – boilermaking, assembling, building or manufacturing a total of 200t or more of metal product a year;
- ERA 31 Mineral processing –processing in a year 1,000t or more of coke or mineral products;
- ERA 33 Crushing, Mining, grinding or screening – crushing, grinding, milling or screening more than 5000t of material in a year;
- ERA 56 Regulated waste storage – operating a facility for receiving and storing regulated waste for more than 24 hours; and
- ERA 63 Sewage treatment – operating no-release works with a total daily peak design capacity of at least 21 equivalent persons (EP).

Under the SP Act, ERAs are exempt development for mining activities as defined under the MR Act. The EA sought is an integrated authority that allows for the carrying out of separate ERAs that are to be managed in an integrated manner. The EA is expected to provide approval conditions for each of the required ERAs.

A referral under the *Environment Protection and Biodiversity Conservation 1999* (EPBC Act) has been made to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) to determine if there are any controlling provisions for the project. The Project was declared “Not a Controlled Action if Undertaken in a Controlled manner” (EPBC Referral 2010/5775) by DSEWPaC based on the minimal impact the Project would have on Matters of National Environmental Significance (MNES).

1.4 Purpose of the Initial Advice Statement

The purpose of this Initial Advice Statement (IAS) is to provide sufficient information to the Queensland Government Department of Environment and Resource Management (DERM) to assist the proponents Mining Lease Application (MLA).

2. Project Description

2.1 Overview

The Project is located within one of the principal geological structural units of the Bowen Basin, the Dawson Fold Zone, which overlays part of the western extent of the Taroom Trough. The area comprises sediments from the Rewan, Rangal, Burngrove and Fairhill Formations, and is bound in the west by the Yarrabee Fault.

The Dingo West coal deposit contains the Aries, Castor, Pollux, Orion and Pisces seams of the Rangal Coal Measures. Recoverable coal with these seams will primarily come from within the Rangal Coal measures but also the Upper Burngrove formation. At present, the Dingo West Mine has an initial inferred raw, low-volatile thermal coal resource of 92.2Mt. However, this resource estimate will be confirmed during the upcoming future planned exploration program and the definitive feasibility study.

The coal is described as low-volatile bituminous coal with moderate ash, sulphur and phosphorus. Coal quality across the deposit is variable but typically indicative of a high specific energy thermal coal. It is considered that selective mining and blending and washing of many of the intersected seams would provide a potential PCI product. Current assumptions indicate the coal handling and preparation plant (CHPP) will wash part or all raw coal to a PCI Coal. Consideration will also be given to in-pit crushing to produce PCI and bypass the CHPP during the early stage of the mine operation.

Key features of the Project include:

- Development of a green field open cut coal mine within the proposed MLA80180;
- A mine life of approximately 30 years;
- Construction will include site access roads and haul roads, train load out (TLO) facility, CHPP, mine infrastructure area (MIA), construction of clean water dam and pit dewatering dam, flood protection levees particularly around infrastructure in close proximity to existing waterways, raw water and co-disposal/tailings dams (final tailings options will be determined during a detailed options analysis scheduled for Q1 2012) and mine surface water management systems;
- Mining to occur in three main pit areas: Pit one will be exclusively mined in the first 11 years. It is expected that concurrent mining will then follow in pits two and three for remainder of the mine life and this will be determined during the definitive feasibility study due for completion in 2012;
- Total ROM output is expected to remain relatively stable at approximately 1.4Mtpa for the life of the mine;
- 20 hours a day, seven days a week operation excavating to depths of 96m;
- The predominant mining method used will be blasting of overburden and overburden, interburden and coal removal using a combination of shovels, excavators, frontend loaders and trucks;
- Overburden and interburden will initially be used for construction activities with the remainder stored in an out-of-pit dump. Overburden and interburden generated past year one will be back-filled into the pit;
- Progressive rehabilitation of disturbed areas with minimal voids expected following mining activities;
- Development of a works accommodation camp designed to house up to a maximum of 220 persons during construction and 120 during operation; and
- Installation of a package potable water treatment plant and a sewage treatment plant.

Dingo West Coal will contract the mining operation to a mining contractor and the construction of the mining and associated infrastructure (e.g. CHPP, MIA, conveyors, accommodation camp). Dingo West Coal will maintain a management team to manage the construction and operation contractors.

2.2 The Resource

The Dingo West area is contained within the Dawson Fold Zone, which overlays part of western extent of the Taroom Trough (see **Figure 2**). The Dawson Fold Zone is located west of the Gogango Overfold Zone and east of Comet Ridge morphotectonic zone. To date Dingo West Coal has identified total resources of 91.1 million tonnes.

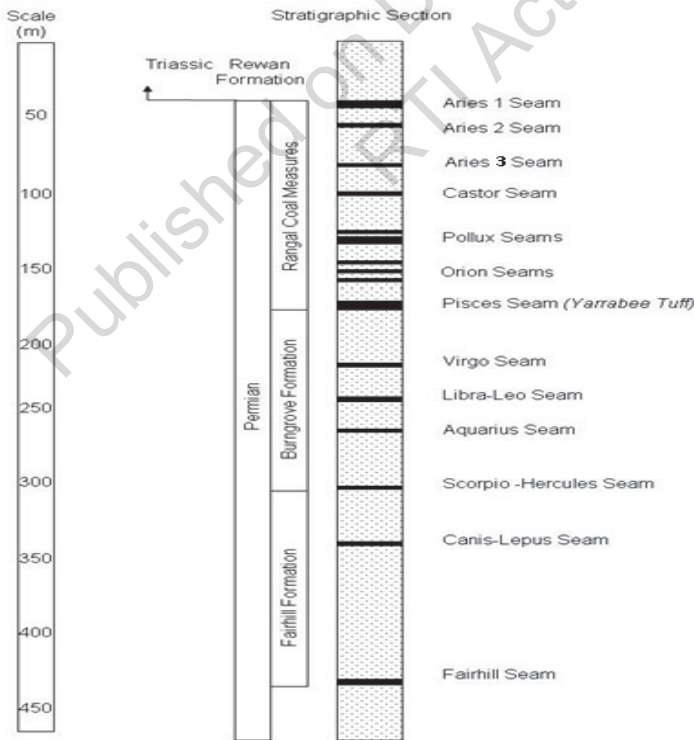
The area comprises sediments from the Rewan, Rangal, Burngrove and Fairhill formations, and is bound in the west by the Yarrabee fault. The hanging wall of the Yarrabee fault exhibits approximately 300 m of deformation to the west, on a series of shallowly ramping decollement surfaces.

The Yarrabee Fault defines the western boundary of MLA80180. The structural geology of the deposit is complex with isolated dips of up to 70° having been observed in recent exploration core drilling.

The Dingo West coal deposit contains target seams within the Rangal Coal Measures, correlated with the Aries, Castor, Pollux, Orion and Pisces seams from the Blackwater area and Upper Burngrove Formation.

The deposit area is structurally complex with significant faulting (both minor and major) and folding occurring throughout the lease area. A significant proportion of the folding appears to be directly related to the major faulting (Yarrabee fault and other major faults) of the deposit area, with the exception of the more significant anticline structure in the south of the lease, which is responsible for a proportion of the faulting in that area.

Figure 2. Representative stratigraphic column for MLA80180



2.3 Land Tenure

The Project is situated in the rural zone of the CHRC – Duaringa Shire. The current Duaringa Shire Planning Scheme lists the agricultural land classification of the Project area as Class C2 – “Pasture land suitable for grazing native pastures with or without the addition of pasture species introduced without ground disturbance”. The land is typically used for low density cattle grazing with rural homesteads located on properties surrounding the Project area.

The mining lease area incorporates nine separate allotments comprising freehold, leasehold and state owned land. Land tenure and ownership details for these properties within the mining lease are shown in **Table 1**. **Figure 3** shows land tenures within and surrounding the Project area.

Table 1. Land tenure and ownership details

Real property description	Tenure	Primary land use
Lot 1 HT424	Freehold	Cattle breeding and fattening
Lot 2 HT138	Freehold	Cattle breeding and fattening
Lot 3 RP801280	Freehold	Cattle grazing and breeding
Lot 4 RP801280		
Lot 13 HT63	State Land	Reserved for cemetery
Lot 3 SP226576	Freehold	Cattle grazing and breeding
Lot 100 RP882349		
Lot 643 SP226575	State Land	Queensland rail easement

There are several coal and petroleum tenements within the immediate surrounding area of the wider MLA. Six Exploration Permits for Coal (including Bandanna Energy’s current EPC 881) adjoin the Project area and two Petroleum Exploration Permits and one Petroleum Survey Licence intersect the current mining lease. Two existing gas exploration wells are located within the mining lease area; however, these do not interfere with the proposed mining operation. The future development objectives of coal seam gas (CSG) proponents are yet to be determined; however, future consultation will need to be undertaken by these proponents and Dingo West Coal. These tenements are shown in **Table 2**. Refer to **Figure 4** and **Figure 5** for spatial locations of coal and petroleum tenements respectively.

Figure 3. Land tenure

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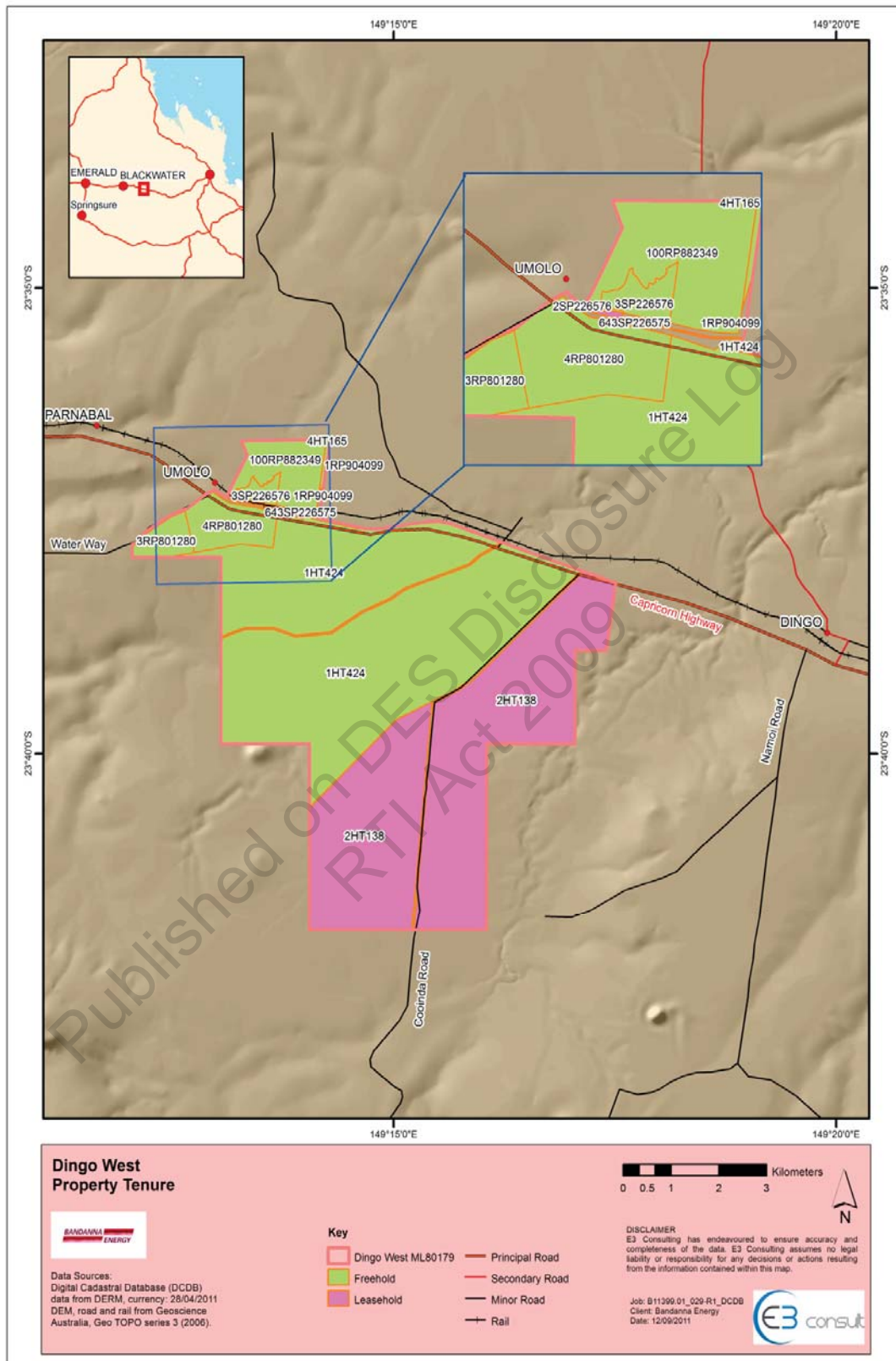


Figure 4. Coal tenements

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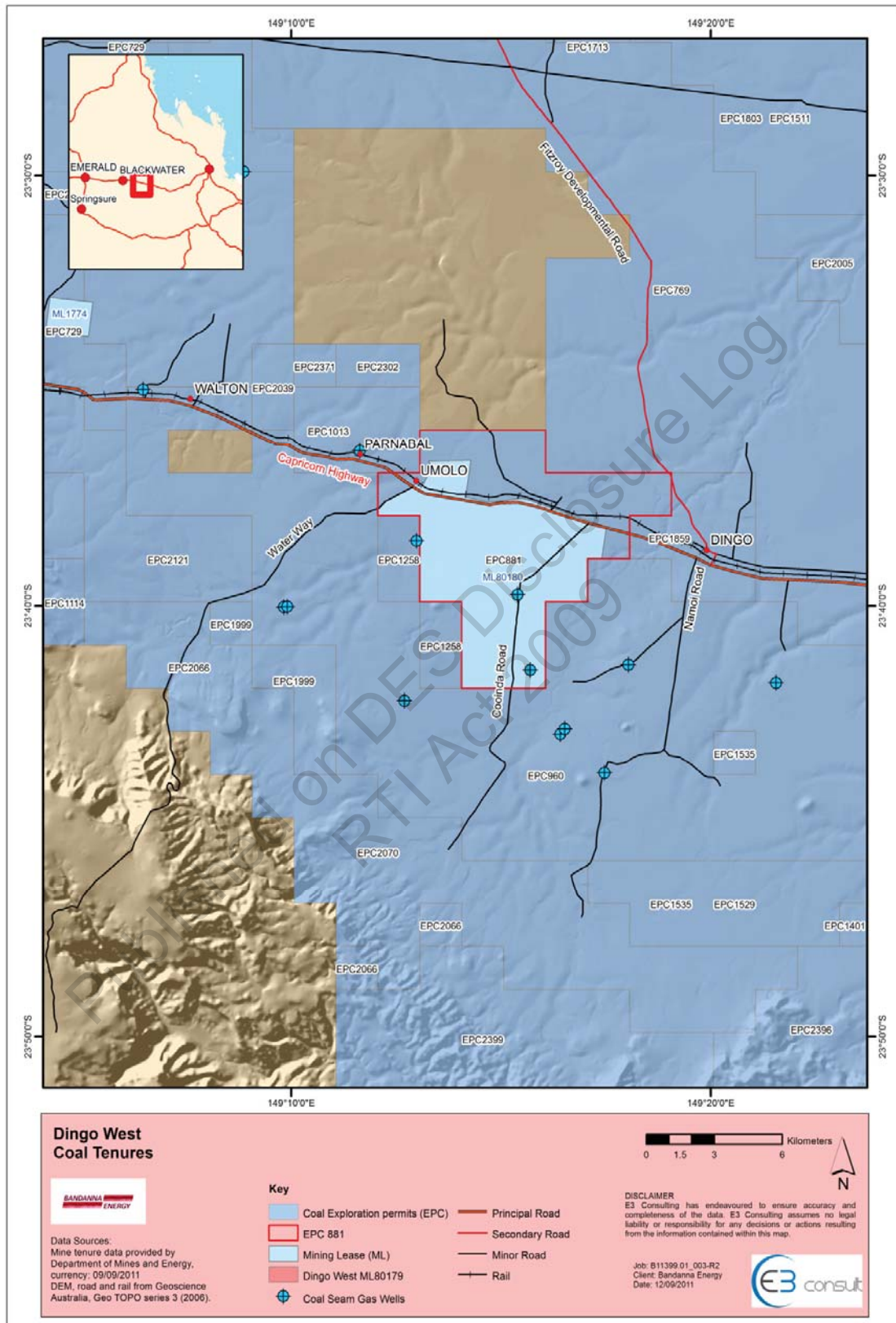


Figure 5. Petroleum tenements

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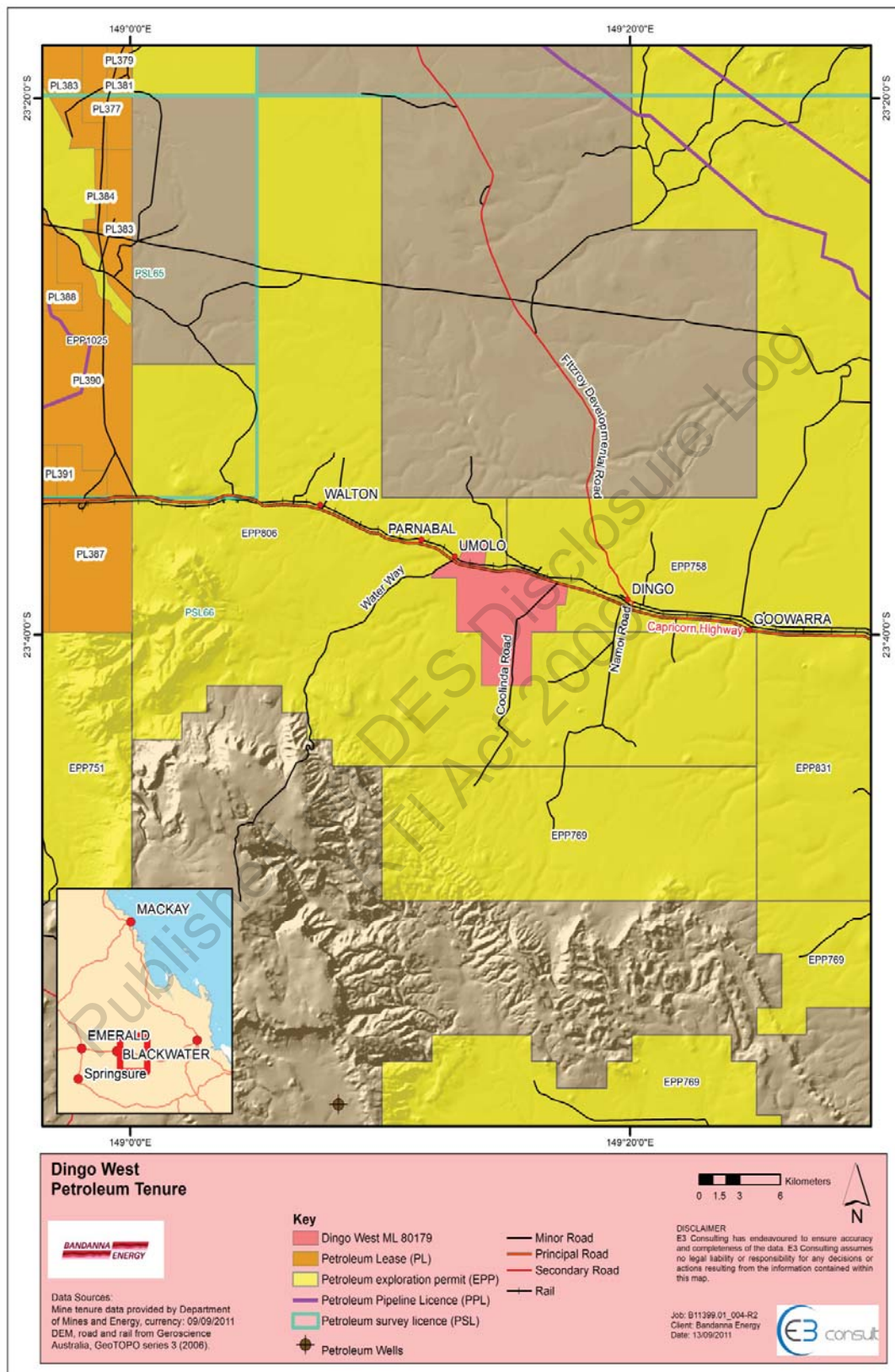


Table 2. Mining and petroleum tenements in the immediate vicinity of the mining lease

Tenure	Tenure holder	Granted	Expires
Coal			
EPC 1013	Argos Pty Ltd	3 October 2005	15 December 2011
EPC 1258	MCG Resources Pty Ltd	26 October 2008	21 October 2013
EPC 960	Argos Pty Ltd	30 May 2005	29 May 2011 (renewal lodged)
EPC 1859	Area Coal Pty Ltd	31 May 2011	30 May 2016
EPC 769	Capricorn Coal Pty Ltd	3 September 2002	2 September 2011
Petroleum			
PSL 66	BOW Energy Pty Ltd	12 May 2011	n/a
EPP 806 (ATP)	OME Resources Pty Ltd	30 April 2007	30 April 2019
EPP 758	OME Resources Pty Ltd	19 October 2004	31 October 2008 (renewal lodged)

2.4 Mining Process

Margin rank analyses identified seven main areas of interest within the area of MLA80180. From these areas, three open cut pits in the southern portion of the MLA80180 area and wholly within the proposed mining lease, have been identified as the most probable locations based on a range of factors including coal seam thickness, quantity of overburden and interburden, cost of extraction and environmental considerations. Indicative locations of these pits are shown in **Figure 6**. These locations will be finalised following results from ongoing and future planned exploration drilling to be completed during the definitive feasibility study due for completion in 2012.

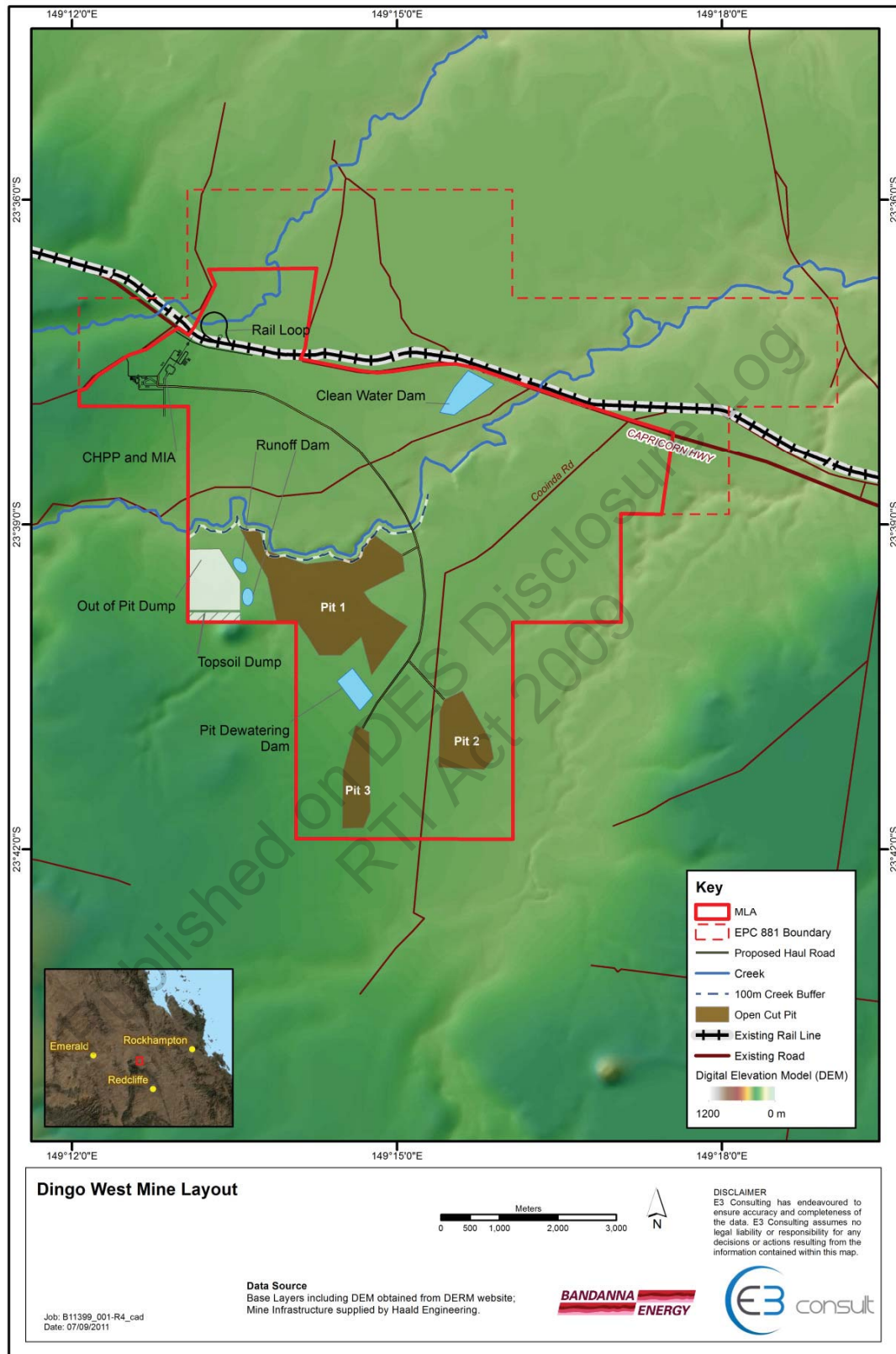
It is anticipated that mining will only be undertaken in these pit areas for the life of the mine – exploration drilling indicates that mining in the area to the north of pit one is unlikely due to poor resource recovery estimates. Pit one, which lies immediately to the south of Charlevue Creek, is expected to be mined exclusively for the first 11 years. Mining in the area of pits two and three is expected to commence following cessation of mining in pit one.

The relatively shallow depth of the targeted seams – pit depth range from 96m to 85.1m – and the coal seam cumulative thickness of 3.5m to 4.5m from the Pollux and above seams make the Dingo West area ideal for open cut mining. Seam depth and orientation have been used to develop a mining strip layout suitable for truck and shovel mining and is typically based on mining strips approximately 100m wide.

Figure 6. Mine layout

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Although pit one will be mined for at least 11 years, detailed production estimates have initially been undertaken for the first five years only. Mining schedules for the remainder of pit one and for pits two and three will be developed following completion of the current and future planned exploration operations. Production at Dingo West is unlikely to increase significantly beyond 1.4Mtpa of ROM coal due to the complex geological faulting which prohibits high tonnage outputs. An indicative mine schedule and strip plan for years 1-5 within pit one are provided in **Figure 7**.

Approximately 103 million bank cubic metres (Mbcm) of overburden and interburden will be generated during the first five years of operation ranging from 29Mbcm in year one to 14.8Mbcm in year three. It is the intention of Dingo West Coal to avoid where possible, the use of an out of pit dump and use overburden to construct haul roads, levees/bunds and infrastructure pads with excess overburden back-filled into the pit(s). Only excess outside of these activities will be stored in an out of pit dump. Production estimates for the corresponding period are provided in **Table 3**.

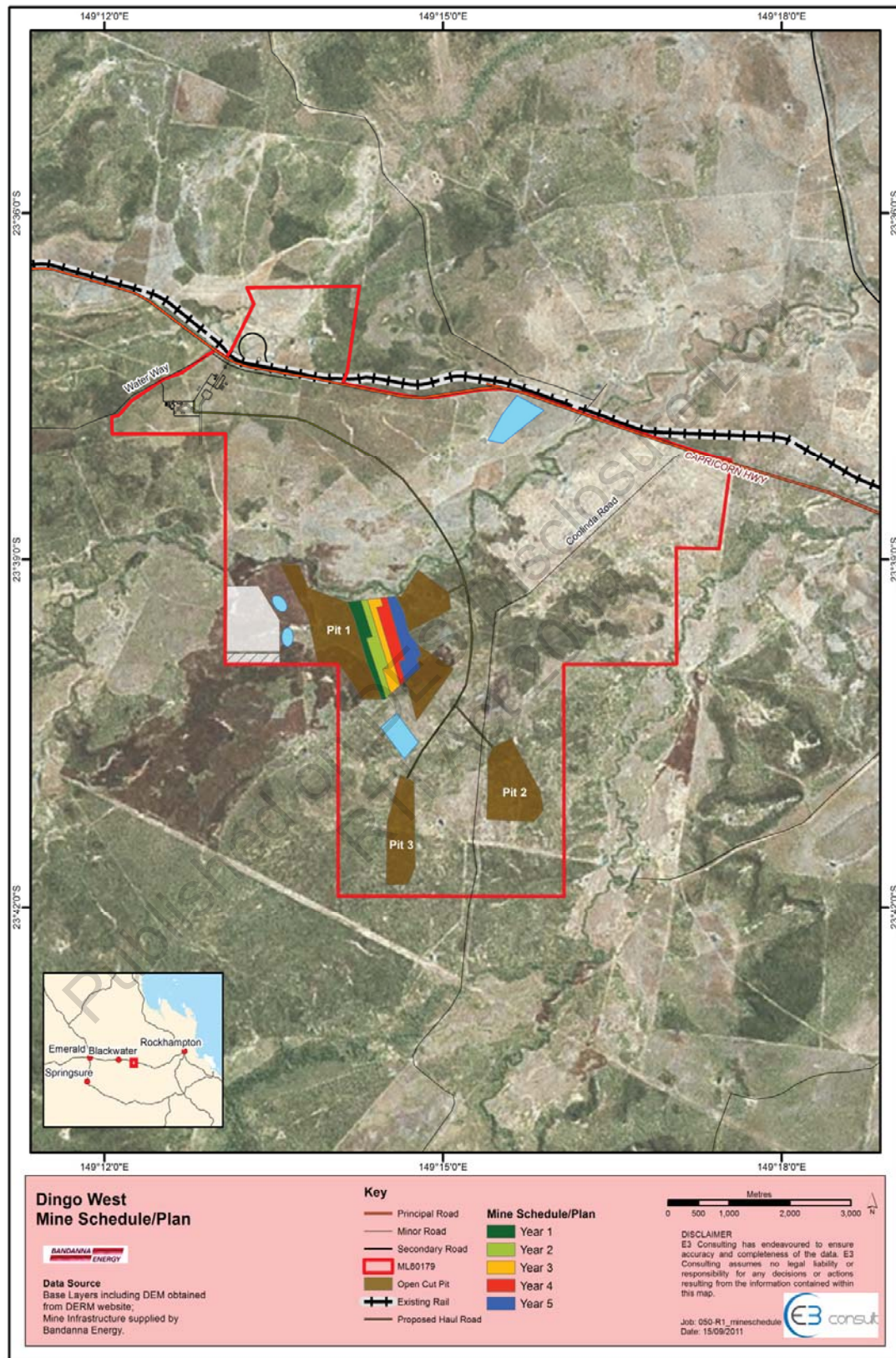
Table 3. Annualised schedule of production

Year	1	2	3	4	5
Total Waste (bcm)	29,004,860	16,331,424	14,879,126	18,526,696	24,338,529
ROM Coal (t)	1,430,000	1,430,000	1,430,000	1,430,000	1,430,000
Product Coal (t)	999,565	1,001,000	1,001,000	1,001,000	994,521
Pit Depth (m)	96.0	85.1	90.9	93.8	95.3

Main features of the mining sequence are outlined below:

- Vegetation clearing, topsoil stripping and stockpiling;
- Blasting of overburden. Blasting will be conducted between 9am and 3pm Monday to Friday and if required, 9am to 1pm on Saturdays. Blasting will not be undertaken on Sundays or public holidays;
- Removal of overburden by shovels, excavators and trucks;
- Extraction of coal by frontend loaders, excavators and trucks;
- Removal of interburden by shovels, excavators and trucks;
- Overburden and interburden disposal to the out-of-pit dump ;
- Delivery of ROM coal to the ROM stockpile adjacent to the CHPP using rear dump trucks;
- Transference of ROM coal to the CHPP for processing;
- ROM coal will be processed through the CHPP to produce PCI product coal;
- Coarse and fine rejects will be co-disposed in a co-disposal dam and returned to the mining void after drying;
- Product coal will be transported to the TLO via an over-road conveyor;
- Product coal will be transported to the port via rail for export; and

Figure 7. Mine schedule



- Water management including:
 - Supply and storage of raw water;
 - Potable water;
 - Sewage treatment;
 - Recycling of reject water for re-use in the CHPP;
 - Use of pit water for dust suppression;
 - Erosion and sediment control;
 - Flood protection;
 - Landform re-profiling and revegetation; and
 - Decommissioning and rehabilitation.

2.5 Mine Layout

The pits will be accessed by a purpose built coal haul road which will be used by both heavy and light vehicles. The main haul road extends in a south-east direction from the MIA and CHPP in the north-western section of the MLA to the pit locations in the southern section. The main haul road will be approximately 5km in length to pit one and constructed from compacted overburden material taken during the development and excavation of pit one.

It is expected the main haul road will also connect to pit two whereas access to pit three will be via a shorter additional road that branches off the main haul road. However, the final boundaries of these pits won't be finalised until Q2 2012. An indicative cumulative distance of the haul road from pit two to the MIA and CHPP is approximately 8km and approximately 2km further to pit three. Indicative pit and mining infrastructure locations are shown in **Figure 6**.

2.6 Coal Handling and Preparation Plant

The available in situ raw coal quality data suggests that the CHPP will wash the raw coal feed to a PCI product. A dense medium cyclone plant with spirals for fine coal treatment has been chosen, being typical of existing CHPPs treating similar coals. With Hardgrove Grindability Index (HGI) of 85, the raw coal is soft and additional fines will be generated during handling and sizing operations. Additional spirals will be required to process these fines. Coarse and fine rejects will be co-disposed and returned to the mining void after drying. Water drained from the co-disposal dam will be returned to the plant.

A thermal product can be produced by either bypassing the CHPP or washing all or part of the raw coal feed. The product conveyor tail end has been extended and a modulating flop gate installed to allow raw coal bypass. With only one stockpile and a single stacking conveyor, campaign washing of thermal coals from selected seams would be required to prevent contamination of PCI product on the stockpile.

With some seams exhibiting coking products, an additional rewash dense medium cyclone circuit would need to be installed to produce a coking coal and a PCI/thermal coal simultaneously. The existing product coal stacking conveyor will need to be replaced by two product conveyors feeding mobile stackers operating on two product stockpiles. A second reclaim tunnel, coal valves and reclaim conveyor will be installed to feed onto the existing product reclaim and TLO conveyor. The additional conveying and stacking equipment will negate the need to campaign wash when producing a thermal coal product.

2.6.1 Operating capacities

Initial throughput capacity of the CHPP is 1.4 Mtpa ROM coal. With a two shift, seven day roster and the plant producing for 20 hours per day for 50 weeks per year, the total operating hours annually is approximately 7,000 hours. This requires an average feed rate of 200tph (tonnes per hour).

A conservative CHPP name plate feed rate was chosen at 250tph for initial planning studies. This allows for regular maintenance and one campaign shutdown period for maintenance and repairs each year.

2.6.1.1 ROM receival

The ROM pad will be approximately 100m by 100m in size and has the capacity to store in excess of 10,000t of ROM coal with the ability to push out to 40,000t when the plant is shut down. A single front end loader will manage the coal supply from the stockpile to the ROM bin, while a dozer will be used to push coal out during the shutdown periods. This dozer will be taken from the existing mining fleet or the product coal stockpile.

2.6.1.2 Raw coal management

The ROM coal will pass through a grizzly at the top of the bin and onto a feeder breaker which will size the coal to $\leq 150\text{mm}$. The feeder breaker will feed onto a conveyor on which the coal will be transported to the sizing tower and the surge bin. The feeder on the bin discharge will deliver coal to a secondary sizer followed by a tertiary sizer. The output of the tertiary sizer, sized to $\leq 50\text{mm}$, will then be delivered to a flop gate which will direct coal to the CPP feed conveyor or the product coal conveyor. The required number of sizing stages will be finalised prior to construction.

2.6.1.3 Co-disposal

The prefeasibility study for the Dingo West plant has acknowledged that there are a number of options for disposal of tailings / rejects. These options will be further investigated during the Definitive Feasibility Study. Further coal washability testing will be undertaken to assist in the selection of the tailings / rejects management option.

The preferred option based on expected coal washability data is to use co-disposal methods for rejects management. Coarse rejects from the plant (separated with the use dense medium cyclones and screens) will be stockpiled whilst fine rejects will be pumped to fine coal management cells (as shown on **Figure 8**). The fine coal management cells will allow for the solids to form a fines "beach" with water to be recovered through two settlement dams, a polishing dam and then returned to the plant for re-use. Bunds (refer to as the environmental earth barrier on **Figure 8**) will essentially surround the MIA, CHPP and the settlement cells and prohibit discharge from the cells to the wider receiving environment.

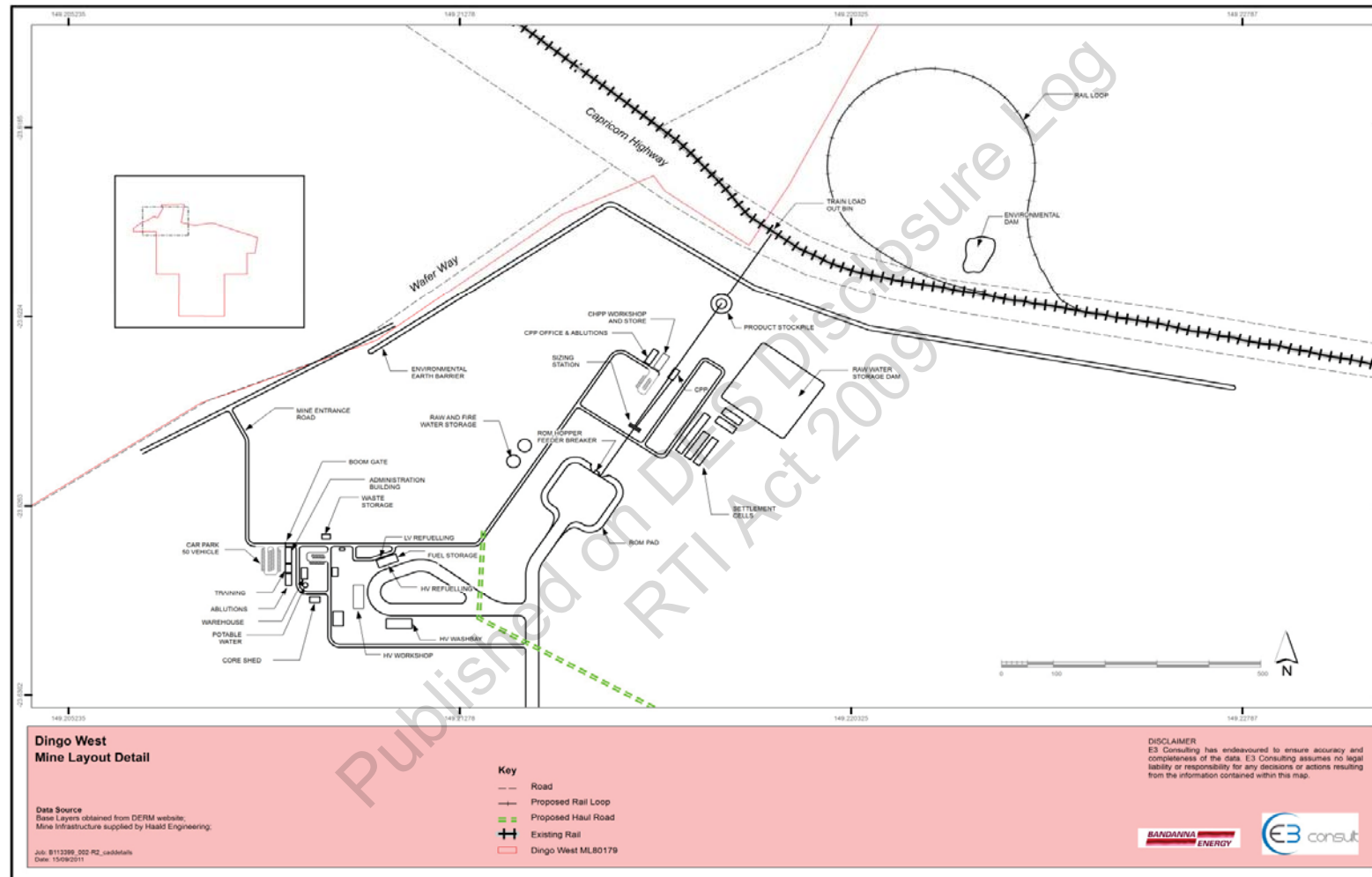
Coarse and fine rejects will then be co-disposed and returned to the mining void after drying.

2.6.1.4 Product coal handling

Product coal from the CHPP and bypassed coal will be transported to the product stockpile. The stockpile will be a single conical stockpile with 20,000t free fall. The total capacity of the stockpile will be 50,000t using dozer push out.

INITIAL ADVICE STATEMENT
DINGO WEST COAL PROJECT

Figure 8. Mine layout general arrangement



2.7 Product Coal Reclaim and Train Load Out

The product coal will be reclaimed by coal valves onto the reclaim conveyor located in a reclaim tunnel. The reclaim conveyor will transport coal to the TLO on the northern side of the Capricorn Highway. The TLO will be a flask loader incorporating a 300t surge bin with a 50t weigh bin for train loading. The reclaim and TLO system has an operating capacity of 4,250tph to ensure that a single 8,500t nominal capacity train can be filled within the two hour time frame specified by QR National Pty Ltd.

A typical TLO and general arrangement of this is provided in **Figure 9**, **Figure 10** and **Figure 8**.

Figure 9. Existing Blackwater reclaim conveyor – Capricorn Highway



Figure 10. Existing Blackwater train load out facility – Capricorn Highway



2.8 Mining Equipment

An indicative list of the equipment anticipated for mining is shown at **Table 4**. The number of equipment are based on the mine plan and proposed mining operations currently under consideration.

Table 4. Estimated construction equipment fleet

Type of Equipment	Indicative Number in Construction Fleet
Haul truck (180t)	5
Drill Rig	1
Front End loader	1
Tracked dozer	2
Excavator	1
Grader	1
Fuel Truck	1
Water Truck	1

2.9 Onsite Mine Infrastructure

This section outlines the anticipated locations, size and general specifications of all on-site infrastructure excluding mining pits, haul roads, CHPP and TLO.

Infrastructure within the site layout includes:

- Light vehicle roads including access roads and car parks;
- Water management including storage and reticulation of raw water, potable water, firewater, sewage, and drainage;
- Power and communications;
- MIA including administration, ablutions, workshops, stores, tanks and ancillary buildings and surrounds; and any fuelling, wash-down, and service bays; and
- Waste management including all waste handling, storage and disposal other than that generated by the mine or CHPP (spoil and rejects).

2.9.1 Light vehicle roads

Current estimates require approximately 2km of sealed, dual lane roads for access around the MIA and CHPP. Unpaved tracks for accessing remote infrastructure elements (e.g. dam pumps) will be identified and established during the construction phase of the project. It is envisaged that approximately 5km of tracks will be required.

2.9.2 Site water management

2.9.2.1 Water supply

Security of water supply is one of the biggest risks to the Dingo West project. The most probable solution for securing long-term water supplies is via an allocation from the water grid from the proposed SunWater pipeline to be constructed in 2013 that will run from Duaringa to Blackwater along the Capricorn Highway

(across the proposed mining lease area) that will be fed by treated CSG surplus water. Discussions with SunWater are ongoing and a 2 Gigalitre (GL) to 3GL allocation from this pipeline, which is enough to cover the annual water usage expected, is likely to be available.

At present, underground water allocations are currently being examined for the Project. DERM activated a Moratorium on Water Usage from the Fitzroy Basin on 14 December 2010. This moratorium prevents the use of bore or creek water in the region unless the Project is declared significant under s.26 of the *State Development and Public Works Organisation Act 1971*. The Project is not declared significant under that Act.

Several options have been explored for top-up water during operation and possibly for construction as follows:

- Amend current irrigation permits to mining use. Medium priority allocations can be converted to high priority allocations at a rate of around one-third the allocation. A pipeline would need to be constructed from either the Mackenzie or Dawson River to take this allocation. However, these water allocations cannot be guaranteed during prolonged dry spells;
- Apply for underground water use and sink bores holes. However, as the Moratorium states that for the project must be declared significant by the State potential issues may arise. In addition, exploratory drilling will be required to determine if water is present to adequate levels;
- Contact existing mining companies in close proximity to Dingo West to seek permission to treat and pump excess water from their sites. All necessary legislative approvals would need to be obtained prior to pumping; and
- Capture and re-use as much on-site water as possible including:
 - Re-use of water recovered from fine and coarse rejects;
 - Capture and re-use of runoff water from the plant and MIA area;
 - Capture and re-use of runoff water from the out of pit dump; and
 - Dewatering of the pits will be sent to a dewatering dam for use as dust suppression water on the pit roads.

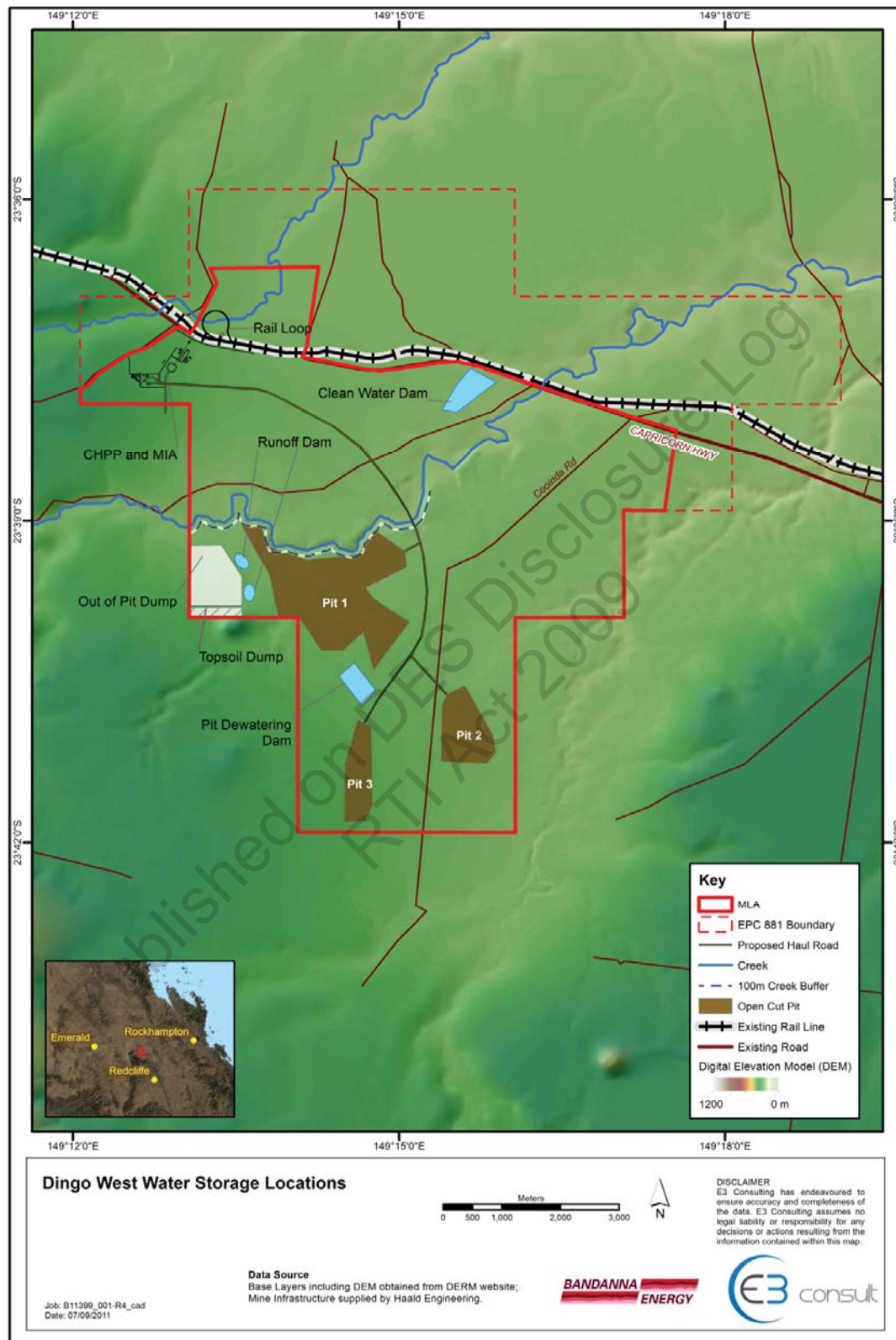
2.9.2.2 Water storage and drainage

The current mine layout has been designed to avoid any watercourse diversions and all dam locations and erosion and sediment control devices have been chosen to minimise potential runoff into receiving environments (refer to **Figure 11**).

A number of dams and associated drainage systems have been conceptually designed for the Dingo West Project as follows:

- A clean water dam supplied by overland flow will be located immediately west of Charlevue Creek and bounded by the Capricorn Highway to the north. Run-off in the undisturbed portion of the Project area to the west of Charlevue Creek and to the east of the MIA will be captured in this dam;
- Cut and fill contoured pads will be constructed at the MIA and CHPP, which will direct water flows to two runoff catchment dams. Water will then be directed from these dams to the settlement and polishing dams for use in the plant;
- The raw water dam of approximately 40 ML is filled with water pumped from the clean water dam. Two 600,000L tanks will be installed at the MIA and filled with water from the raw water dam. Water from one of these tanks will be used exclusively for fire fighting;
- A mine de-watering dam will be located between the proposed first two pits on high ground to avoid inundation during floods. Water from this dam will be pumped into water trucks and used for pit and haul road dust suppression;

Figure 11. Water storages

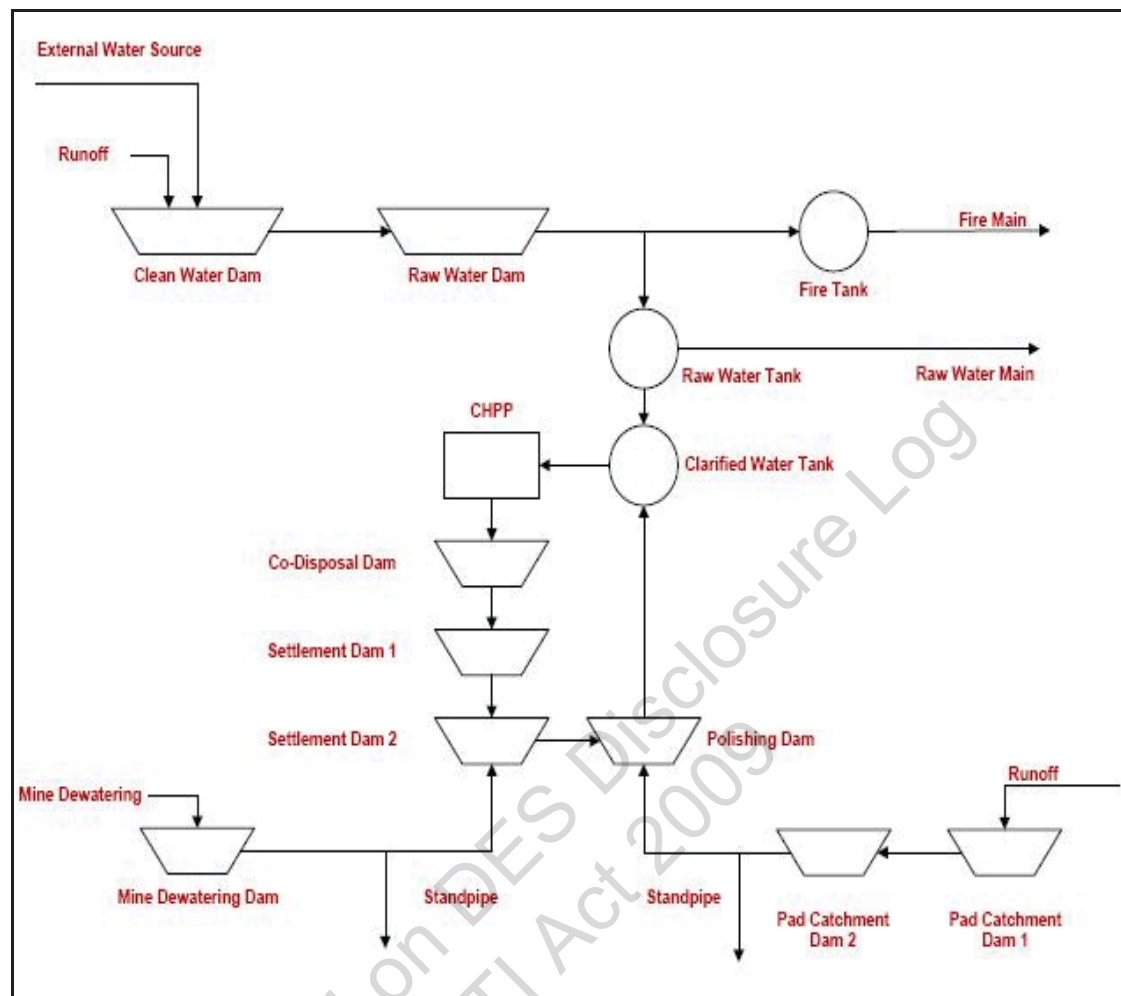


- Out of pit spoil (if required) and topsoil stockpiles will be positioned near the pit(s) once mining begins. Where out of pit dumps are required, runoff control dams will be provided down slope of the dumps to intercept and contain stormwater runoff from the dumps. Stormwater runoff from out of pit dumps will be pumped back into the mine water management system for meeting site water demands;
- With pit one located adjacent to Charlevue Creek, a levee will be constructed to ensure the pit can remain safe from inundation (and hence avoid dewatering) during high rainfall events. As part of the definitive feasibility study a 1:1000 flood study will be conducted with designs developed to avoid inundation. The flood protection levee will be designed in accordance with the DERM *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*. The mine flood study will be used to determine the levee height and flood velocities for design of suitable scour protection. The flood study will also assess the impacts of the flood protection levee on upstream and downstream flooding conditions and the need for compensatory channel earthworks to mitigate any adverse impacts on flooding conditions outside of the proposed mining lease; and
- A detailed water balance model will also be undertaken during the definitive feasibility study.

A preliminary site water flow is shown in **Figure 12** (potable water is not included in this diagram).

Figure 12. Site water flow block diagram

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2.9.2.3 Potable water

Currently, the potable Water Treatment Plant (WTP) will be located at the proposed accommodation camp. Water will be trucked to a 200,000l tank positioned north of the main access road near at the MIA.

DERM have confirmed that a permit will be required for extracting groundwater for potable usage. However, approval applications for drinking and ablution usage should be a routine approval. In the event that underground flow is insufficient, discussions will be undertaken with one of the larger towns (Emerald or Rockhampton) water supply authority for purchasing potable water.

2.9.3 Mine Infrastructure Area

The MIA includes the following infrastructure:

- Administration and training facilities;
- Bathhouse;
- Communication facilities;
- Crib facilities;
- Drill core storage facilities;
- Equipment storage facilities;

- Fire fighting system;
- Fuel and lubrication facilities;
- Hazardous materials storage facilities;
- Laydown areas;
- Maintenance workshop;
- Medical facilities;
- Power facilities;
- Security office and boom gate;
- Sewage treatment plant;
- Temporary accommodation, services and offices;
- Vehicle wash down bays; and
- Waste station.

The MIA layout was selected to optimise traffic flows on the site and keep heavy vehicle/light vehicle interactions to a minimum, with logical separations around the fuel system and workshop areas.

2.9.4 Sewage treatment and disposal

The sewage treatment and disposal comprises collection, intermediate storage, and treatment capacity required to service the demands of the site and accommodation camp. The sewerage treatment plant (STP) for the Project will be located at the accommodation camp. Being outside of the proposed mining lease, the camp will require separate legislative approvals.

Sewage from the site ablutions will be collected from on-lease gravity collection storages and trucked to the STP. The plant will be sized to cater for the construction personnel load and specified to efficiently manage any turn-down required for the reduced operational demands. This approach will not place additional demand on the local council sewage treatment infrastructure.

2.9.5 Power supply

The power supply for the mine site will be provided by 415V, three-phase diesel generators, installed at the MIA and the CHPP.

2.9.5.1 MIA

The MIA Substation consists of two 300KVA 415V diesel generator sets mounted in a fully bunded area adjacent to the MIA 415V Switchroom. The normal mode of operation for the generators is synchronised and connected to the load through a bus tie. However, they have been sized to provide redundancy with each generator capable of carrying the total load.

The generators are complete with their own diesel day tanks capable of holding sufficient diesel for a minimum of seven days operation on full load. The generators will be hired to minimise initial capital costs and the hire company will be responsible for all repairs and maintenance.

The MIA 415V Switchroom houses the main 415V Distribution Board. Sub-main circuits are distributed to each of the MIA buildings, service points and area lighting. The area lighting consists of hinged lighting towers fitted with 1,000W floodlights.

2.9.5.2 CHPP

The CHPP area is serviced by two substations, one at raw coal area and the other at the CHPP. The raw coal substation consists of one 500KVA 415V diesel generator set mounted in a fully bunded area adjacent to the Raw Coal 415V Switchroom. The CHPP substation has three 500KVA 415V diesel generator sets mounted in a fully bunded area adjacent to the CHPP 415V Switchroom. The normal mode of operation for the four generators is synchronised and connected to the load through bus ties with an interconnecting cable installed between the two substations. The generators have been sized to provide redundancy with three generators capable of carrying the total load.

Similar to the generators used at the MIS, each have their own diesel tanks capable of holding sufficient diesel for a minimum of seven days operation on full load.

The Switchrooms house the motor control centres (MCC), programmable logic controls (PLC) and instrumentation equipment, as well as the 415V Distribution Board which supply light and power. The area lighting consists of hinged lighting towers fitted with 1,000W floodlights.

2.9.6 Communications

2.9.6.1 LAN and data communications

A Site LAN and temporary servers will be installed to service voice and data requirements during construction phase. A permanent air conditioned computer and communications room will be constructed as part of the administration building at the MIA. Equipment associated with all site communications such as the satellite system, radio system and servers for voice and data transmission will be installed here. An optical fibre (OF) backbone will be installed between this room and all offices, switch rooms and buildings at the MIA, CHPP and TLO. The CHPP SCADA control system will be interfaced by the OF backbone to provide a site wide control system with nodes at the control room, administration office and security office and gate, workshops and other authorised users as required. CCTV cameras at the security office and gate, the CHPP, TLO and ROM pad will be installed and connected to the LAN using the FO backbone cabling.

A computerised log on system, also connected to the LAN using the OF backbone, will be used by employees, contractors and visitors for recording personnel on site. This system is used for contractor management, fatigue management and identification of onsite personnel during emergency evacuations.

2.9.6.2 Radio communications

A digital trunked radio communication system (based on TETRA technology) will be installed in stages commencing with communications for the construction phase. This initial installation will provide coverage over the entire tenement, the township of Dingo, the accommodation camp site and the highway road access for response to calls for assistance when travelling to and from site.

The initial installation will consist of a 26m cyclonic concrete pole mast, located at the construction site, with easy access to the construction site LAN and mains power. An air conditioned relocatable building will house the electronic equipment with provision to install a microwave backbone radio LAN system at a later date when mining commences. This installation will be relocated to the MIA when construction is complete.

The second stage is an upgrade of the system to provide illumination of any working pit areas. A radio trailer with stabilised legs, a mast to ensure adequate coverage over the pit, and housing a TETRA base station will be positioned in the mining area to provide a full duplex microwave link backbone between the original site LAN at the MIA and the trailer. Power for the equipment will be provided by solar panels recharging a battery system. The system supports full duplex communications to provide full duplex private one on one and telephony calls and embraces IP technology and interfaces with the site LAN and fixed voice systems.

Further upgrades will be performed at a future date to encompass all Bandanna Energy mine sites in the region. Each site will operate individually, or for management and operational purposes, as a multi station, multi site wide area network.

2.9.6.3 Fixed voice communications

Fixed phones using IP telephony will be connected to the LAN for integration with the satellite and radio systems.

2.9.7 Maintenance workshops

The Project will require two maintenance workshop facilities. It is envisaged they will be low cost without fixed overhead cranes and will rely on hired mobile cranes as required as well as off-site maintenance for larger or more complex jobs.

2.9.7.1 CHPP workshop

The CHPP Workshop will be an 18 x 12m building with two small offices, a dual purpose crib room/meeting room with room for 10 employees, and toilets. Outside will be an area designed and bunded for lubricant and solvents storage both clean and dirty.

2.9.7.2 Heavy vehicle workshop

The Heavy Vehicle Workshop will be a 30 x 15 x 12m building with a floor capable of withstanding maintenance activities on mine trucks with an empty operating machine weight of 120 t. The building will contain two offices and a dual purpose crib room/meeting room large enough for 12 employees, and toilets.

2.9.8 First aid / medical room

The First Aid centre will be located in the administration building, occupying the northern end of the building with the security office. The centre will have suitable access from both east and west sides of the building for any medical supplies or persons that may require access in the case of an emergency. It will open onto the emergency vehicle park on the western side. It will be designed to have adequate space for a private examination room and a bathroom.

2.9.9 Bath house

It is proposed a bath house of 12 x 24m be included on site to cater for up to 40 employees. It will have a dirty side and a clean side with showers and toilets down the middle. A separate section for female staff will be included.

2.9.10 Vehicle wash-down bays

Washdown bays for both heavy and light vehicles are required for cleaning prior to maintenance and for adequate cleaning and wash-down of vehicles and equipment before leaving site.

The heavy vehicle wash-down bay will be designed to allow 200t payload capacity mine trucks to be cleaned. Nominal dimensions will be 25 x 12m and it will contain a means of removing waste oil and reusing water. An oil-water parallel-plate separator system including storages for dirty and clean water will be installed and will be sized to strip vehicle wash-down effluent and oily-water sourced from other areas of the MIA, mine, CHPP and TLO.

The light vehicle wash-down bay will be designed to allow vehicles up to Toyota troop carrier size to be cleaned. Nominal dimensions will be 10 x 5m. This wash-down bay will contain a means of transferring the waste water to the heavy vehicle wash-down way for stripping using the installed oil-water separator facility.

2.9.11 Fuel and lubricants installation

The fuel and lubricant bay will store and dispense diesel and lubricating oils and refuel heavy and light vehicles as well as mine service vehicles. The installation will be configured to store waste oils returned from servicing of mobile equipment prior to collection for disposal.

The bulk storage capacity for diesel fuel will be 300,000l which equates to five days supply. Estimates are based on three self-bunded storage tanks with pumping equipment capable of supplying separate light and heavy vehicle fuelling points. B-Double vehicles with an average load of 50,000l will deliver fuel to the installation. It is envisaged that local storages serving fixed diesel generating units at the camp and on site will be fuelled by the site mine service vehicle. Bulk storages and filling areas will be bunded to contain spillages, with liquid waste contained for pump-out and processing through an oil-water parallel-plate separator system.

Bulk lubricant delivery will be by road tanker with compartment sizes varying between 5,000l and 8,000l. Storage tanks have been sized for this requirement. Total lubricant consumption averages around 5,500l per week. Tanks and fill areas will be bunded to contain spillages, with liquid waste contained for pump-out and processing through an oil-water parallel-plate separator system.

2.9.12 Waste station

A purpose-built waste station will be built consisting of a bunded concrete pad with concrete wing walls to allow segregation of dry waste types for collection. Waste will be kept in skips or bins for transfer and disposal off-lease. Waste storage and its disposal will be managed in accordance with DERM administered policies on Waste Management and the enabling Waste Regulations.

2.9.13 Car parks

The main site car park will be adjacent to the administration building and be nominally 36 x 50m with 50 parking spaces with a sealed surface. Smaller vehicle parking bays will be located outside all MIA installations as required.

2.9.14 Hazardous materials storage

Small volume hazardous materials (e.g. some adhesives, coatings, cleaners, etc.) will be kept in purpose-built containment cupboards in accordance with the relevant material safety data sheets (MSDS) and statutory requirements. Purpose-built containment cupboards will be located in the vicinity of the workshops and stores they serve.

Larger volume hazardous materials will be managed according to their respective MSDS and in line with current industry standards. The design for the fuel and lubricant installation will incorporate all necessary aspects for the safe storage and delivery of diesel and oils. Other hazardous items, such as any radioactive metering products, will be managed in accordance with industry guidelines and manufacturers' recommendations.

2.9.15 Drill core storage

All core analysis will be performed off site. On site storage will be in an enclosed shed with a concrete floor and forklift access to store the drill cores as they are produced. If required, this shed will also be used to store product samples from the CHPP before they are taken off site for analysis.

2.9.16 Crib facilities

Crib facilities similar to current mine practice will be included in the administration building, CHPP Office, HV (heavy vehicle) Workshop and Mine Office.

2.9.17 Gate

The mine site will have a boom gate situated at the security office on the northern end of the administration building controlling access to the mine, CHPP, TLO and key MIA elements. This will be the only point of access to the site.

2.9.18 Security office

The purpose of the security office is to control access of personnel and vehicles to operational areas. The security office will be a single office located at the northern end of the Administration Building.

2.9.19 Mine store

A warehouse with laydown yard will house mining consumables and spares. The warehouse will consist of a lockable shed of 12 x 12m with a concrete floor and lighting with a 50 x 50m yard attached.

2.9.20 Laydown areas

Future design will allocate suitable space in specified locations as laydown areas.

2.9.21 Administration building

The administration building will be located at the eastern side of the MIA car park. Nominal dimensions are 32 x 12m. This single storey building will contain a reception area, four offices, a meeting room, a kitchenette, rest rooms, the first-aid room and the security office.

2.9.22 Training room

The training room will be nominally 18 x 12m, designed to seat 40 personnel and located south of the administration building.

2.9.23 Fire fighting systems

Installations that require specialised fire fighting systems, such as the fuel and lubricants bay, will have a proprietary system incorporated into their design. A water cart will be included in the mining contractor's fleet fitted with a water monitor, foam generator and fire extinguishers to fight fires that may ignite in the Mine, MIA, CHPP or on haul roads.

The CHPP and MIA will have the aforementioned 600,000l fire water tank and associated pumping and reticulation systems.

2.9.24 Temporary services

Principal temporary services required will include power, potable water, ablutions and communications. For the temporary site office and works:

- Power will be supplied by diesel generators with diesel fuel being delivered by local contractor. A suitably sized diesel tank serving the needs of generator day tanks and vehicle refuelling will be located on lease;
- Potable water will be stored in a suitably sized tank served by a pump and replenished from a local council facility by contract; and
- Mobile phones will be used for communication utilising existing networks.

2.9.25 Temporary accommodation

Temporary accommodation will be required for personnel performing initial site works. It is envisaged that the administration centre during initial works will be located close to the homestead (Red Rock Camp) nearest the proposed rail loop. Several portable buildings are already located at Red Rock Camp but in the event additional buildings are required, these will be located adjacent to the existing accommodation facilities.

Temporary offices and work spaces will be managed using demountable buildings located between the proposed sites of the MIA and CHPP.

2.9.26 Rail spur and loop

The preferred balloon loop location is located immediately north of the Capricorn Highway opposite the CHPP as shown in **Figure 8**. The proposed loop is 600m in diameter and a minimum 4km in length.

2.9.27 Existing infrastructure

The only existing infrastructure associated with the Project is the Blackwater Railway System and the Capricorn Highway. On 5 September 2011, Bandanna Energy entered into the Wiggins Island Rail Project (WIRP) agreement with QR Network Pty Ltd. This agreement ensures construction of the necessary rail infrastructure and connection for source mines of the Stage 1 WICET project and provides Bandanna Energy with capacity to export Dingo West coal to either WICET or the existing RG Tanna export facility.

2.10 Offsite Mine Infrastructure

The following infrastructure described below is either not contained within the proposed mining lease or will be delivered to the site via an outside source and include:

- Logistics and transport;
- Off-lease communications infrastructure;
- Off-lease power infrastructure;
- Off-lease roads that influence or are influenced by the proposed site;
- Potable water plant;
- Sewerage treatment plant;
- The export facility; and
- Workforce accommodation.

2.10.1 Roads

Off-lease roads include the turnoff requirements from the Capricorn Highway into Charlevue Road (also referred to as Water Way) and the turnoff requirements from Charlevue Road onto the lease and the upgrade of 600m of Charlevue Road between the two turnoffs.

Development approvals will be required from the CHRC for the Charlevue Road/Water Way upgrade and turnoff onto the proposed mining lease and from Queensland's Department of Transport and Main Roads (DTMR) for any upgrades required for the Capricorn Highway turnoff into Charlevue Road/Water Way or the turnoff into Cooinda Road.

2.10.2 Communications

A leased remote satellite terminal will be installed at the mine site to provide telecommunications access, voice, data and messaging services via the Iridium satellite network. Seamless connectivity will be provided for the mine site radio and communication systems.

A similar leased remote satellite terminal will be installed at the camp. Seamless connectivity will be provided with the camp's distributed communications and data system which is being delivered as part of the camp contracted package.

2.10.3 Potable water

All potable water will be supplied, under licence, from treated underground water. A WTP will be located in the accommodation camp and supply both the accommodation camp and operational requirements. Operational requirements will be transported by road for storage at the MIA.

2.10.4 Sewage

A STP will be located at the camp and will process both camp sewage and sewage from the mining lease. Sewage from the lease will be transported by road to the camp STP for treatment. The liquid waste discharged from the STP will be Class A+ recycled water, suitable for general surface irrigation of plants and gardens and dust suppression.

2.10.5 Workforce accommodation

A camp to accommodate construction, operations and occasional contract and visitor personnel will be located in the vicinity of the Dingo Township. The camp will be sized to accommodate up to a maximum 220 temporary construction personnel and up to 120 operations personnel.

The camp will utilise diesel generators for power supply and will have its own potable water treatment plant and sewerage treatment plant. Personnel will be bussed between camp and site at shift commencement and completion.

The camp will be constructed to a high level of amenity to enhance its appeal to suitability skilled personnel for the mine, given the level of competing construction and operations activity in Queensland and locally. The camp will be operated by a specialist camp supplier and a "take or pay" agreement established for numbers of man-nights occupied during the construction and operation phases

The camp infrastructure will be supplied, constructed and managed as a single package and will include:

- All catering and cleaning services;
- An all-weather assembly point;
- BBQ areas;
- Current accommodation standards being offered in the industry / region;
- Dining Room;
- Fire fighting capability;
- Games room;
- Gymnasium;
- Potable water treatment plant;
- Power supplied by generating sets;
- Security infrastructure;
- Sewage treatment plant;
- Shop covering basic personal needs;
- Single person accommodation units; and

- Smoking areas.

2.10.6 Export facility

It is anticipated that Dingo West coal will be exported via the WICET, which is located to the west of the existing RG Tanna Coal Terminal in Gladstone Harbour and is due for completion in 2014. WICET Pty Ltd is owned and currently being developed by a consortium of 16 coal companies including Bandanna Energy and Bandanna Energy has secured an initial 4.0Mtpa allocation that can be filled from any of its proposed mining projects, including Dingo West. Discussions have also been undertaken with Gladstone Ports Corporation (GPC) in regard to utilising the existing RG Tanna terminal as an export avenue for Dingo West coal.

2.11 Activities Potentially Causing Environmental Harm

Mining operations have the potential to cause environmental harm unless effective management programs are developed and implemented to mitigate, remediate and rehabilitate the associated impacts. Activities associated with the construction and operation of the Dingo West mine include:

- Vegetation and topsoil removal;
- Earthmoving associated with construction and development of surface facilities;
- Drilling and blasting;
- Removing and relocating overburden;
- Extracting, transporting, stockpiling and loading coal for rail transport; and
- Operation of surface facilities:
 - Administration offices;
 - Workshop and warehouse;
 - Fuel facilities;
 - Laydown pads and vehicle wash facilities;
 - Mine water supply and storage and wastewater treatment system; and
 - Diesel powered generators.

2.12 Rehabilitation and Decommissioning

Remediation, decommissioning and closure activities will be a part of the overall rehabilitation strategy for the Project. Rehabilitation will be used to achieve multiple environmental objectives where possible, including for water and sewage management, enhancement of habitat for biodiversity, carbon offsets and increasing landscape resilience to drought and flooding.

The Project area will be progressively rehabilitated during operations and, upon decommissioning, the area will be returned to a condition that it:

- Is safe for humans and wildlife, as far as is practical;
- Is non polluting of surface or ground water;
- Is stable and not prone to subsidence, slippage, or erosion;
- Is suitable for low intensity cattle grazing where practical; and
- Enhances the environment for native species and communities.

On the completion of mining, pit voids, tailings dumps, dams and other infrastructure will be treated as follows:

- Pit voids will be backfilled where possible, with the slope of the remaining void reduced to 1 in 6 (>17%) to reduce risk of slope failure, and competent rock armouring used where there are stability risks;
- Waste rock piles will be contoured to low relief to conform with the surrounding landscape, covered with topsoil and organic material where possible, and revegetated;
- Mine roads will either be left for use of subsequent land holders or deep ripped and rehabilitated;
- Water storage dams will be retained if requested by subsequent land holders and approved by regulators; otherwise the dam walls will be breached and the area rehabilitated;
- All buildings, plant including the CHPP, and equipment will be removed and surfaces rehabilitated; and
- Concrete pads will be broken up and covered with benign spoil and topsoil, and then revegetated.

2.13 Workforce

The Project is expected to employ approximately 220 employees during construction and 120 employees during operations.

It is expected that the Project workforce will include a combination of personnel that live locally and a fly-in / fly-out contingent where vacancies cannot be filled by local personnel.

Options for transporting the workforce to and from the site are currently being considered. The most likely method will be transporting the workforce to the site via coaches from Emerald and Blackwater. It is expected that Senior management will drive to and from the site daily by car.

2.14 Native Title

Native Title is extinguished over the subject land; however, at present; there is an unregistered native title claim over the Project area by the Kangoulou People.

3. Existing Environment and Potential Impacts

The following sections summarise the existing environment within the proposed study area.

3.1 Climate

Climate data was sourced from several of the closest Bureau of Meteorology (BOM) weather stations in order to obtain a meaningful representation of the climatic conditions within and surrounding Project area. The main data sources were the weather stations at the Blackwater Water Treatment Plant (station # 035290; 23.60 °S, 148.87 °E; elevation 187m) located approximately 40km to the west of the Project and the Baralaba Post Office (station # 039004; 24.18 °S, 149.81 °E; elevation 100m) approximately 80km to the south-east. The Dingo West Post Office recording station only provided rainfall data. However, this data was considered given the data spans 115 years (1896 – 2010) and the close proximity of this station to the Project area.

Climate data from the BOM weather stations are provided in **Table 5**, **Table 6** and **Table 7**. Data from Blackwater and Baralaba show the mean values calculated from the historical data for rainfall, temperature, relative humidity and wind speed. Only mean monthly rainfall data is shown for the Dingo Post Office.

Table 5. Rainfall data from the Dingo Post Office (1896 - 2010)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm)	111.9	109.1	73.8	37.0	33.8	35.9	27.2	21.8	24.5	46.5	64.0	103.3

Source: Climate data from Dingo Post Office (BoM, 2011a).

Table 6. Climate data from Blackwater to the west of the Project area (1995 - 2010)

Month	Rainfall	Temperature (°C)		Relative Humidity (%)		Mean wind speed (m/h)	
	Mean	Mean Min	Mean Max	9.00am	3.00pm	9.00am	3.00pm
January	68.2	22.4	34.1	65	45	11.4	n/a
February	78.8	22.3	33.3	66	48	12.4	n/a
March	30.5	20.8	32.6	63	41	11.2	n/a
April	28.6	17.9	29.9	60	41	9	n/a
May	21.4	13.1	26.5	59	39	8.1	n/a
June	42.1	10.7	23.6	66	45	7.7	n/a
July	15.1	8.5	23.4	63	37	7.1	n/a
August	25.9	10.6	24.9	60	35	10.6	n/a
September	19.3	14.1	29	55	30	11.1	n/a
October	61.6	17.8	31.7	58	33	12.6	n/a
November	66.3	19.5	32.4	58	37	11.8	n/a
December	79.5	21.6	34.1	61	39	10.9	n/a
Annual	542.8	16.6	29.6	61	39	10.3	n/a

Source: Climate data from the Blackwater Water Treatment Plant weather station (BoM, 2011b).

Table 7. Climate data from Baralaba to south-east of the Project area (1926 - 2010)

Month	Rainfall	Temperature (°C)		Relative Humidity (%)		Mean wind speed (m/h)	
	Mean	Mean Min	Mean Max	9.00am	3.00pm	9.00am	3.00pm
January	92.9	21.4	34.3	65	43	7	7.7
February	115.8	21.2	33.4	69	46	6.9	7.8
March	72.9	19.4	32.6	67	41	7.1	7.6
April	45.1	16	30.4	67	42	7.5	7.6
May	41.8	12.3	26.6	69	42	7.2	7.4
June	34.7	8.9	23.6	74	46	7.1	8.2
July	28.8	7.4	23.1	70	40	7.2	8.5
August	21.8	8.7	25.2	66	38	6.9	8
September	25.9	11.9	28.4	62	34	8.2	8.6
October	55.4	15.6	31.2	60	35	8.5	8.5
November	76.9	18.4	32.8	60	38	7.9	7.8
December	103.9	20.3	34.1	62	40	7.9	8.1
Annual	715.8	15.1	29.6	66	40	7.5	8

Source: Climate data from the Baralaba Post Office (BoM, 2011c).

3.1.1 Rainfall and evaporation

Historical climate data, particularly from the Dingo and Baralaba stations, shows there is a distinct wet-season with the highest rainfall occurring during the summer months with drier periods predominating in the winter months. Rainfall appears to decrease significantly at Blackwater where mean summer rainfall is approximately 40mm/month lower than at Dingo which is only 40km to the east. Average monthly rainfall ranged from lows in winter of 15.1mm to 21.8mm to highs in summer of 79.5mm to 115.8mm. Annual mean rainfall is relatively high and ranges from 542.8mm in Blackwater to 715.8mm in Baralaba.

Initial assessments indicate that total annual evaporation for the Project area is approximately 2,000 – 2,400mm. This equates to approximately three to four times the average annual rainfall for the area.

3.1.2 Air temperature

Temperature in Central Queensland is characteristic of a sub-tropical climate, with cool winters and hot summers. Similar minimum and maximum temperatures are evident at both Blackwater and Baralaba with the coolest temperatures recorded in July and the warmest in January. Mean minimum and maximum temperatures ranged from 7.4°C to 8.5°C and 21.4°C to 22.4°C in winter and 23.1°C to 23.4°C and 34.1°C to 34.3°C in summer.

3.1.3 Humidity

Relative humidity patterns are similar for both Blackwater and Baralaba and reach their highest levels in late summer (February) and their lowest levels in late winter/early spring (September, October and November). Comparison between 9am and 3pm humidity levels indicates mornings are typically more humid than afternoons (refer to **Table 6** and **Table 7**).

3.1.4 Wind conditions

Wind conditions measured at Blackwater and Baralaba represent mean wind speed and direction data obtained over the last 15 years at Blackwater and 35 years at Baralaba. Wind direction is somewhat similar at both locations with the primary wind direction coming from the east at Blackwater and the south and southeast at Baralaba (**Figure 13**, **Figure 14** and **Figure 15**). As shown in **Table 6** and **Table 7**, the average morning and afternoon wind speed from Baralaba were similar in magnitude. Morning wind speeds at Blackwater however, were significantly higher relative Baralaba (note: afternoon wind conditions at Blackwater were unavailable).

Average annual wind speeds ranged from 7.5km/h to 10.3km/h depending on location and time of day. The cooler winter and autumn months generally had lower wind speeds relative to the summer and spring months and this was irrespective of location or time of day (refer to **Table 6** and **Table 7**).

Figure 13. Annual 9am wind rose for the Blackwater Water Treatment Plant weather station (BOM, 2011d)

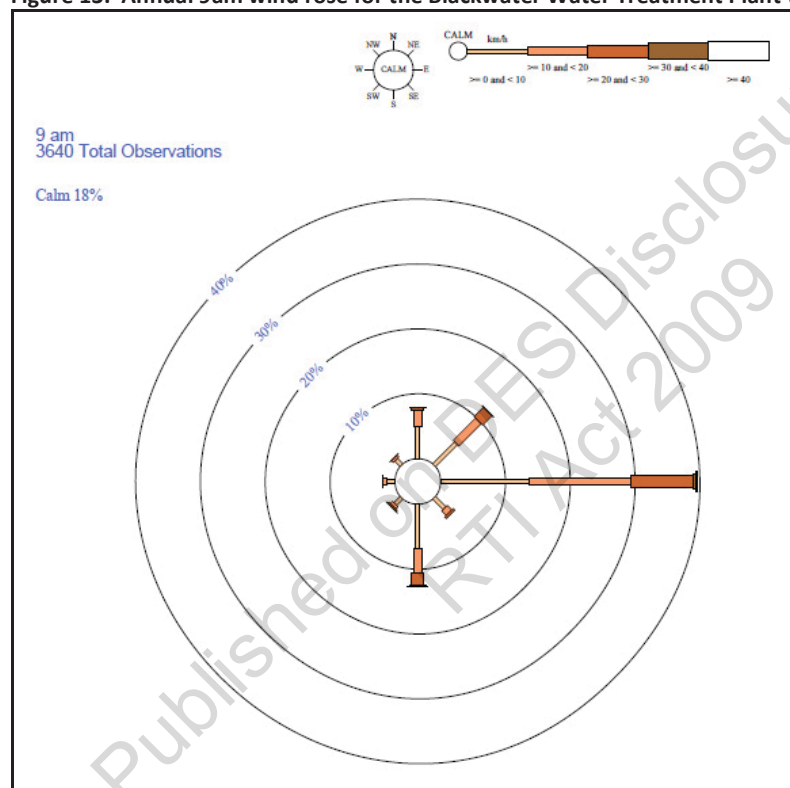


Figure 14. Annual 9am wind rose for the Baralaba Post Office weather station (BOM, 2011e)

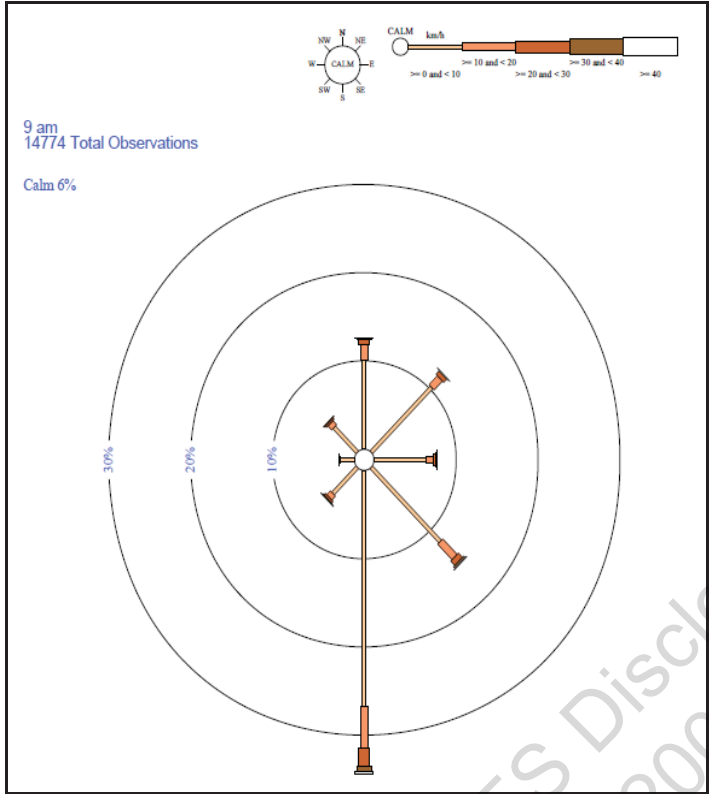
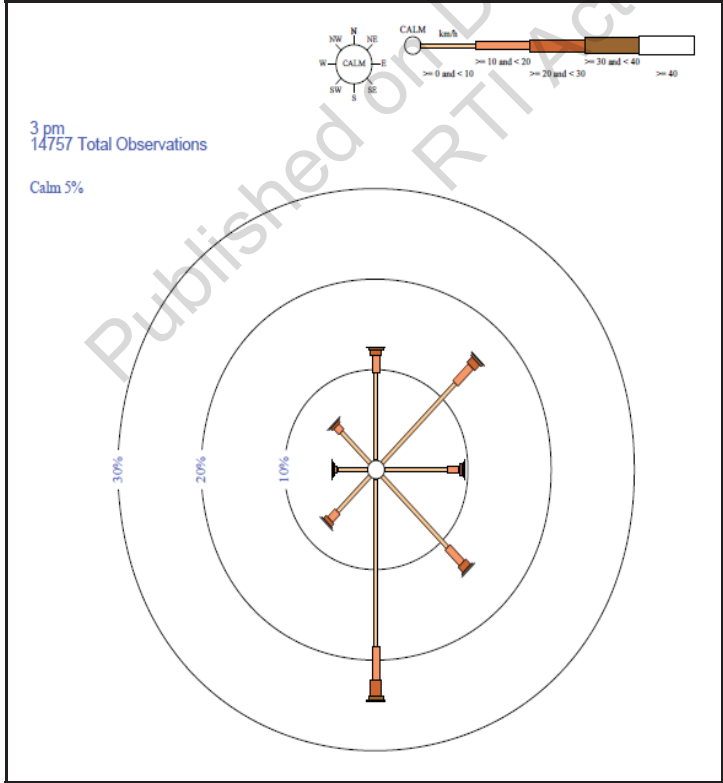


Figure 15. Annual 3pm wind rose for the Baralaba Post Office weather station (BOM, 2011f)



3.1.5 Natural or induced hazards in the region

3.1.5.1 Storms

Severe thunderstorms cause more damage than any other natural hazard in Australia and can result in flash flooding, large hailstones and destructive wind gusts (Emergency Management in Australia (EMA), 2011). In Queensland, the most severe storms occur between September and March and coincide with increased solar energy (EMA, 2011).

The average number of lightning strikes per km² per year for the Project area is approximately two as shown in **Figure 16**. The average number of days per year that thunder was recorded within the Project area is approximately 20 (see **Figure 17**). Severe storms are generally confined to small localised areas and primarily occur along the coast.

Hence, the potential for severe storms to occur within the Project area is considered to be low.

Figure 16. Average annual lightning strikes (BOM 2011g)

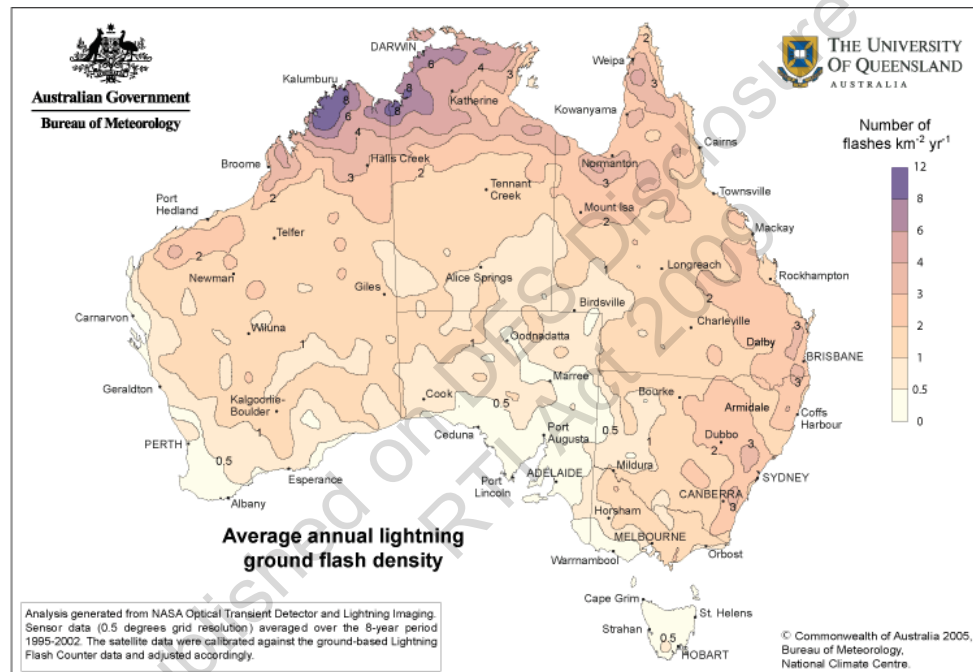
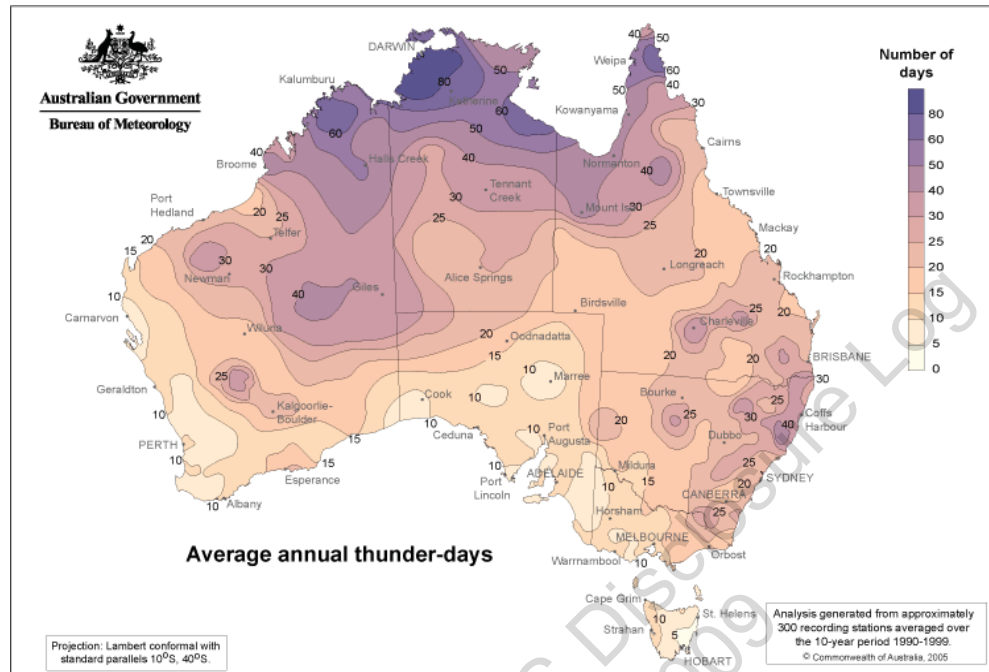


Figure 17. Average annual thunder days (BOM, 2011h)



3.1.5.2 Cyclones

Tropical cyclones in Queensland primarily occur in the northern part of the state between November and April. However, cyclones have occurred along the southeast Queensland coast and tracked inland where they subsequently reduce in intensity.

The average number of cyclones per year that have the potential to occur in the Project area is 0.2 as shown in **Figure 18**. As shown on **Figure 19**, over the last 105 years only four cyclones have been recorded within 100km of Emerald and one within 50km (cyclone Una) as outline below:

- Tropical cyclone un-named (#4): February 1911 (red line);
- Tropical cyclone un-named (#1): January 1913 (blue line);
- Tropical cyclone un-named (#3): January - February 1934 (green line); and
- Tropical cyclone Una: December 1973 (pink line);

The Project area's inland location and the low probability for cyclones to develop in the area suggest that the potential for the Project to be directly impacted by cyclones and cyclonic conditions is low. However, indirect impacts such as flooding are more likely to impact the Project.

Figure 18. Average number of cyclones per year (BOM 2011i)

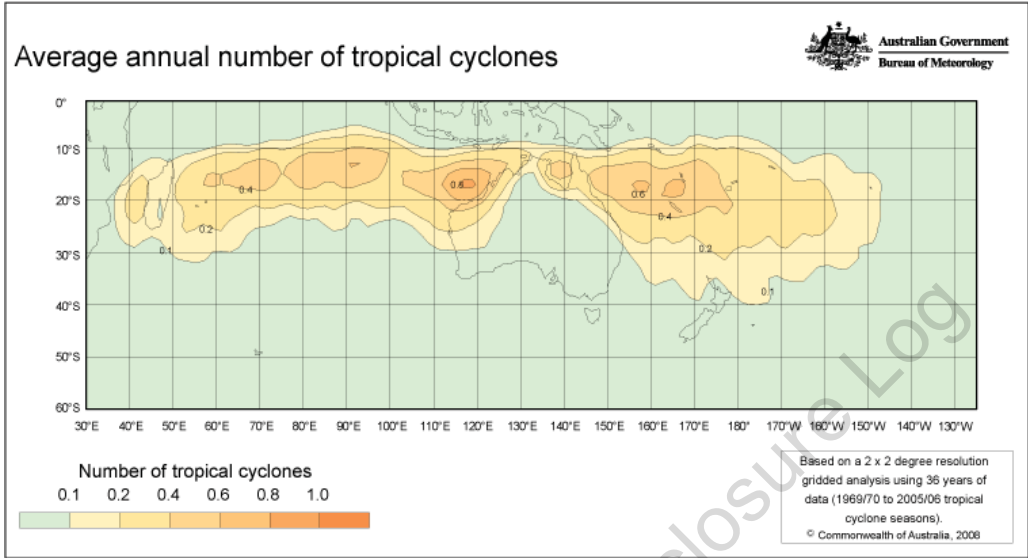
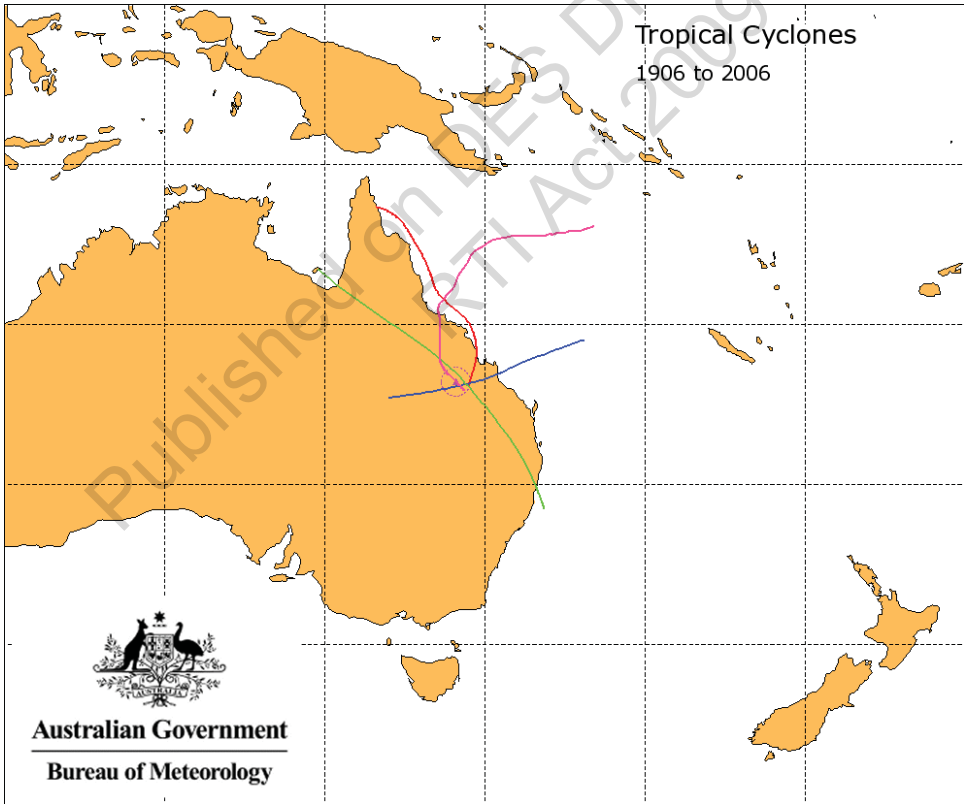


Figure 19. Occurrences of tropical cyclones within 100km of Emerald between 1906 and 2006 (BOM, 2011j)



3.1.5.3 Floods

The Project area has a localised catchment area of approximately 640km² that is located within the Isaac Connors Mackenzie subregion of the Fitzroy River Basin. Three tributaries of the Mackenzie River traverse the

Project area. All three are ephemeral and generally only flow following high rainfall events that primarily occur from November to March.

During the extreme rainfall events of late 2010 to early 2011, the Central Highlands region received significant rainfall that resulted in widespread major flooding within all major river catchments including the Comet, Isaac, Mackenzie and Fitzroy Rivers. During this time there were four main flood events. However, flooding within the Project area was localised and primarily restricted to riparian zones and topographical depressions.

Although the Fitzroy River catchment has the potential for severe flooding, the potential for flooding in the Project area is considered relatively low due to the Project being located in the upper reaches of the catchment and the small catchment size of the Project area.

3.1.5.4 Bushfires

A review of the Queensland Fire and Rescue Services bushfire risk mapping for the Central Highlands indicates that the project site is located in a low to medium area of bushfire risk. In addition, the Duaringa Shire Planning Scheme Bushfire Prone Land overlay map shows the proposed MLA occurs primarily in an area of Low Bushfire Severity with small areas of Moderate Bushfire Severity interspersed throughout the MLA.

The risk of bushfires occurring during the life of the Project is moderate. All efforts will be undertaken to firstly, minimise the potential for a bushfire to occur and secondly, manage bushfires via specific management procedures that will be outlined in the Emergency Management and Response Plan. This Plan will be developed in association with the Construction and Operations Environmental Management Plans.

3.1.5.5 Landslips

Topography of the Project area is flat to very gently undulating and is characterised by very long slope lengths and gradients of generally less than 5%. These factors in concert with the meandering drainage lines suggest the landscape within the Project area is geologically stable. As such, no landslips have been recorded in the project area within the last 60 years (Geoscience Australia (GA) 2011a) and landslip risks in the future are considered low.

3.1.5.6 Earthquakes

Australia is typically considered to be a tectonically stable continent (GA, 2011b). Nevertheless between 1977 and 2000, 110 earthquakes per year on average have been recorded by the Queensland seismic network (Earth Systems Science Computational Centre (ESSCC), 2011). Most however, are of very low magnitude. Over the last century, there have been 17 earthquakes of magnitude six or greater including one in Central Queensland in 1918 that caused property damage in Rockhampton (ESSCC, 2011).

Only one minor earthquake has occurred within the wider Project area in the last 60 years. The estimated epicentre of the earthquake was located approximately 30km to the northeast of Dingo. No damage or disturbance was recorded from the 2.7 magnitude earthquake.

As the area is considered geologically stable, it is unlikely that an earthquake of a magnitude that could adversely impact the Project would occur.

3.1.5.7 Droughts

In July 2011, no areas of Queensland were drought declared which contrasts significantly with the same period in 2007 when over 60% of the State was drought declared (DEEDI, 2011). Heavy rains between late 2009 and early 2011 contributed to 2010 being Queensland's wettest year on record (BOM, 2011k).

Due to Australia's location under the sub-tropical belt of high pressure, low and variable rainfall is the norm. Queensland is particularly vulnerable to this variability and several severe droughts have occurred in the last 20 years (DEEDI, 2011). The risk of drought impacting the Project is moderate to high but can be minimised if raw water for the operation is supplied from a reliable and sustainable source.

3.1.6 Potential impacts and mitigation measures

The climatic conditions of the Project area are typical of locations within Central Queensland and are not significantly different from the other regional locations of Blackwater and Baralaba.

Based on historical data, average annual rainfall for the Project area is moderate and impacts from normal rainfall patterns are likely to be low. Severe storms events may however, adversely affect the Project and impact on pit operations, water management systems including dams waste, containment systems and soil erosion.

The potential for excessive wind and cyclonic events to occur is low and unlikely to be a risk for the Project. However, other natural hazards including bushfires have the potential to adversely impact the Project. An Emergency Management and Response Plan will be developed to address all foreseeable site-specific risks including bushfires, earthquakes, droughts and floods.

3.2 Land Resources

3.2.1 Soils

The underlying geology of the proposed Dingo West mine lease area is dominated by conglomerate sandstone and clay, lithic and feldspathic sandstone, and alluvium. The predominant soil types within the proposed Dingo West mine lease area are Kandosols and Sodosols.

Sodosols are soils with a strong texture contrast between the A horizon and sodic B horizon within the soil profile. The B horizon is the layer of soil within a soil profile with characteristics different to the surface layer (A Horizon). An abrupt textural change occurs at the B horizon in which most of the upper part of the B2 horizon is sodic and not strongly acidic. Sodosols have a high percentage of exchangeable sodium and are prone to dispersion and erosion. These soils are predominantly red, brown, yellow, grey or black in the B horizon and may have hardpans or calcrete. Sodosols also exist in predominantly flat to undulating topography and on alluvial and colluvial sediments.

Mapped landscape units within the MLA indicate that the dominant soils are sandy to loamy surfaced duplex soils and areas of Loamy red and yellow earths. This supports the dominant soils mapping.

3.2.2 Topography

The topography of the Project area reflects the mapped landscape units being flat to gently undulating and is intersected by the Charlevue, Springton and Stanley Creeks. The topography is classified as:

- Ub68 – gently undulating lands; and
- SI7 – very gently undulating or level alluvial plains.

3.2.3 Land Suitability

The entire area of the Project site is mapped as GQAL **Class C2 Pasture Land**.

The four class system that is described by DPI/DHLGP (1993) identifies **Class C** Agricultural Land as pasture land, being land suitable for improved or native pastures but with limitations which preclude continuous cultivation for crop production. The Duaringa Shire Planning Scheme divides the Agricultural Land Class C further, as follows:

- **Class C1:** Pasture Land - Suitable for grazing high quality pastures, either sown pastures where ground disturbance is possible for pasture establishment or native pastures on higher fertility soils;

- **Class C2:** Pasture Land - Suitable for grazing native pastures with or without the addition of pasture species introduced without ground disturbance; and
- **Class C3:** Pasture Land - Suitable for light grazing of native pastures in accessible areas, otherwise very steep land more suited to forestry, conservation or catchment protection.

For the Project area, the above is interpreted to mean that some areas may tolerate short-term cultivation for improved pasture and forage crop establishment. Other areas are primarily suited to grazing of native pastures, with or without the addition of improved pasture species without ground disturbance. Elsewhere, the land is suited to restricted light grazing of native pastures in accessible areas, otherwise very steep hilly lands more suited for forestry, conservation or catchment protection.

3.2.3.1 Land use

The existing land use at within the Project area is classed as livestock grazing, as shown in **Figure 20**. This reflects the predominant land uses in the vicinity of the Duaringa Shire. In addition, protected areas and forestry occur within 10km to the Project site. The Project is also in the vicinity of Dingo and as such, various land uses including residential, manufacturing and commercial services exist in close proximity (see **Figure 21**). Major transport corridors including the Capricorn Highway, the Blackwater coal rail line and stock routes (along these transport corridors) intersect the Project area directly North of the proposed mine infrastructure area.

3.2.3.2 Land use suitability

The Land Use Suitability guidelines (DME, 1995) provide advice on the applicability and use of land suitability assessment techniques to determine pre-mining land suitability and post-mining land use potential. The objectives of the guidelines are to achieve acceptable post-mining disturbance land use suitability and/or capability through the use of appropriate land resource assessment techniques at the pre-mining stage.

Existing land suitability studies indicate the Project area is broadly composed of three types of land resource areas (1:500,000 scale) (Shields *et al.* 1991). The land at the Project site is predominately suitable for grazing, though areas suitable for irrigated and rainfed cropping also exist (see **Table 8**).

Table 8. Land suitability within the Project site

Land Resource Area ¹	Major Agricultural management Units	Land Suitability
Alluvial Plains (1)	Dee, Retro, Callide, Dawson	Rainfed cropping, irrigated cropping, grazing
Mixed Brigalow Plains (2)	Rolleston, Greycliffe, Oombabeer, Mungabunda	Rainfed cropping, grazing and limited irrigated cropping
Eucalypt Duplex Uplands (5)	Rhyddings, Dawes	Grazing

The mapped dominant soil types within and surrounding the Project area are presented in **Figure 22**, and confirm the dominant presence in the proposed mining lease of Kandosols, while Sodosols are present along the northern and southern boundaries of the extended Project area. Field observations have verified the presence of Kandosols, Chromosols and Sodosols within and surrounding the Project area.

Characteristics for each of the three soil types are as described in the Australian Natural Resources Atlas (DSEWPac, 2007), and are summarised in **Table 9**.

Figure 20. Existing landuse

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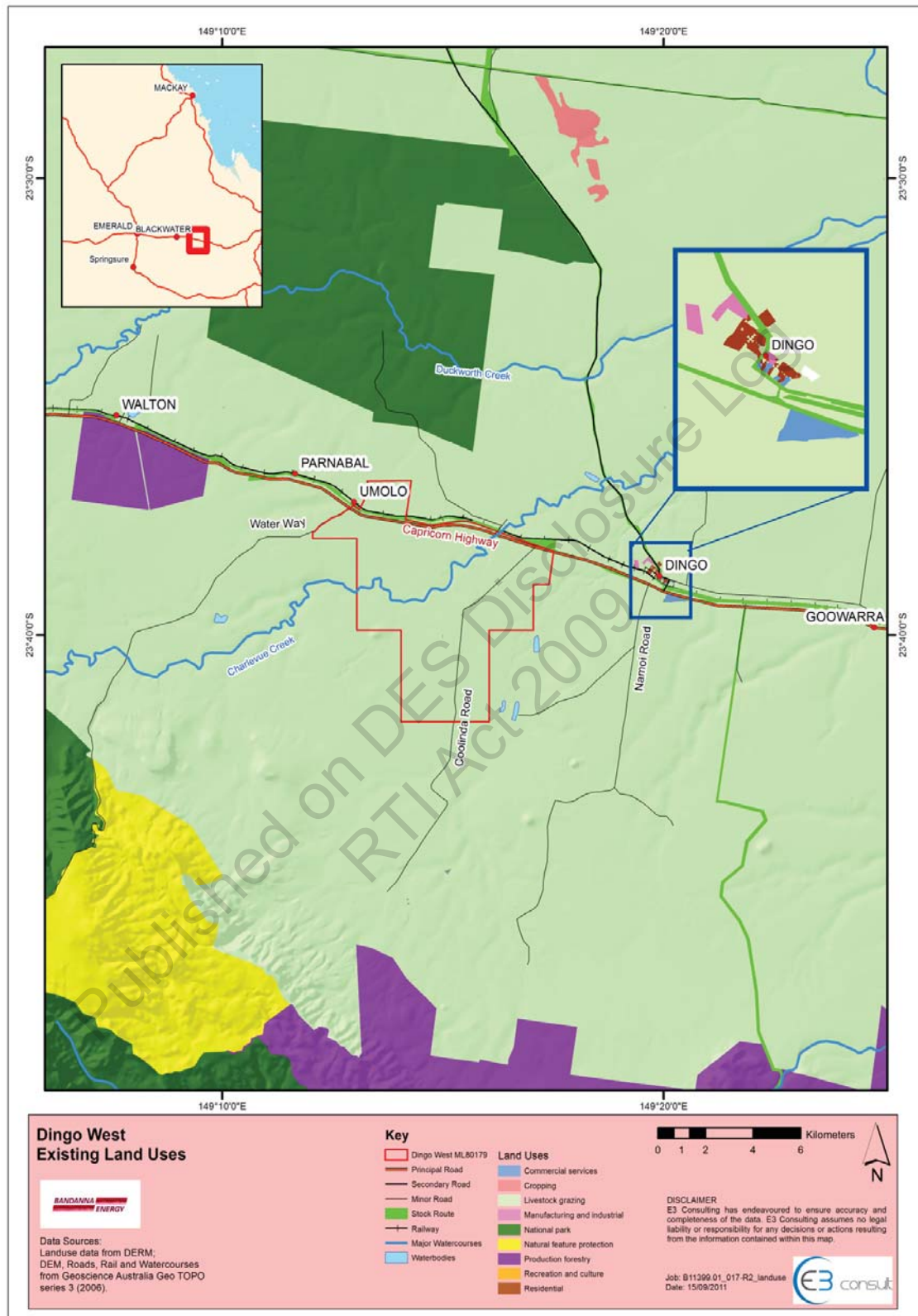


Figure 21. Land use infrastructure

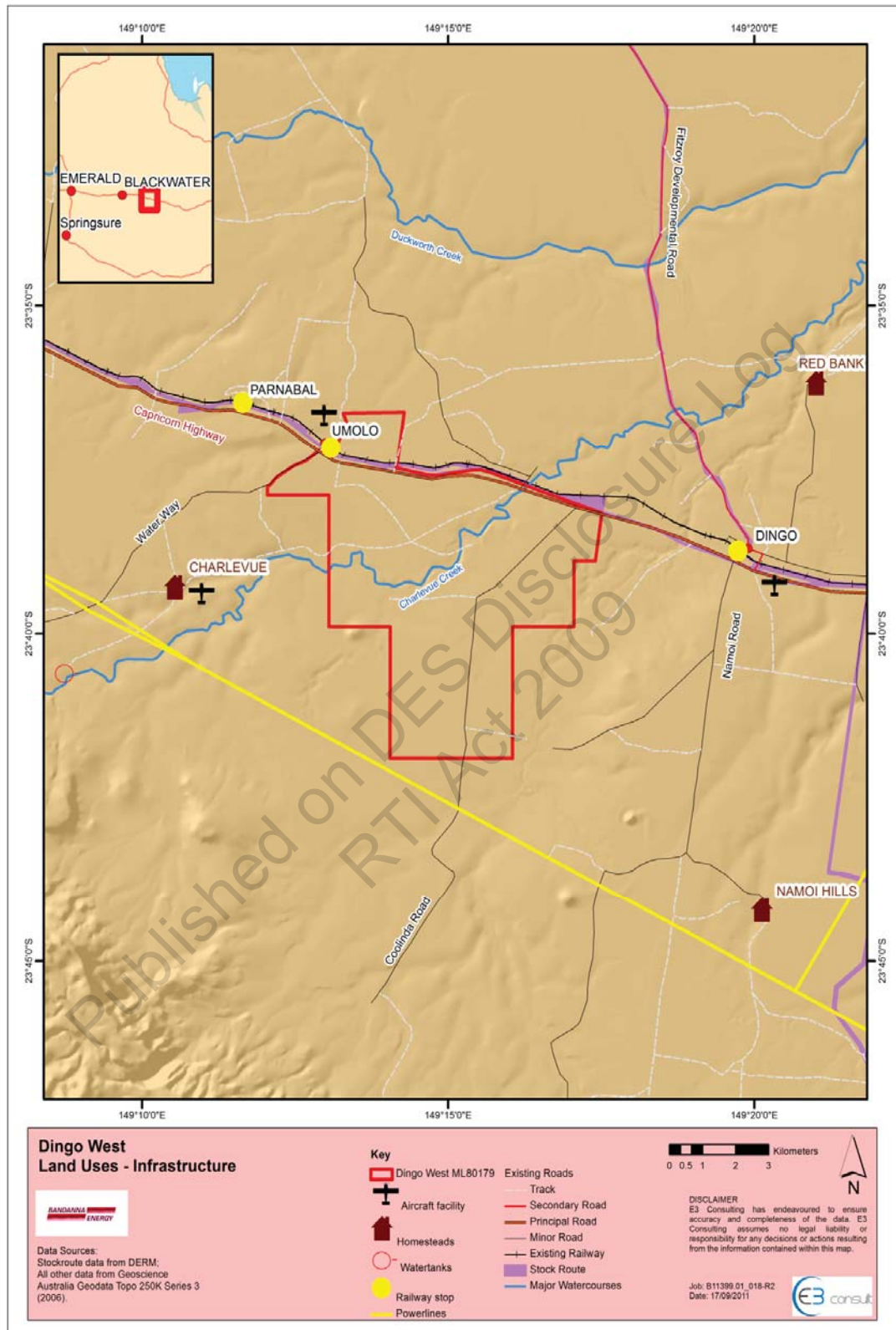


Figure 22. Mapped dominant soils

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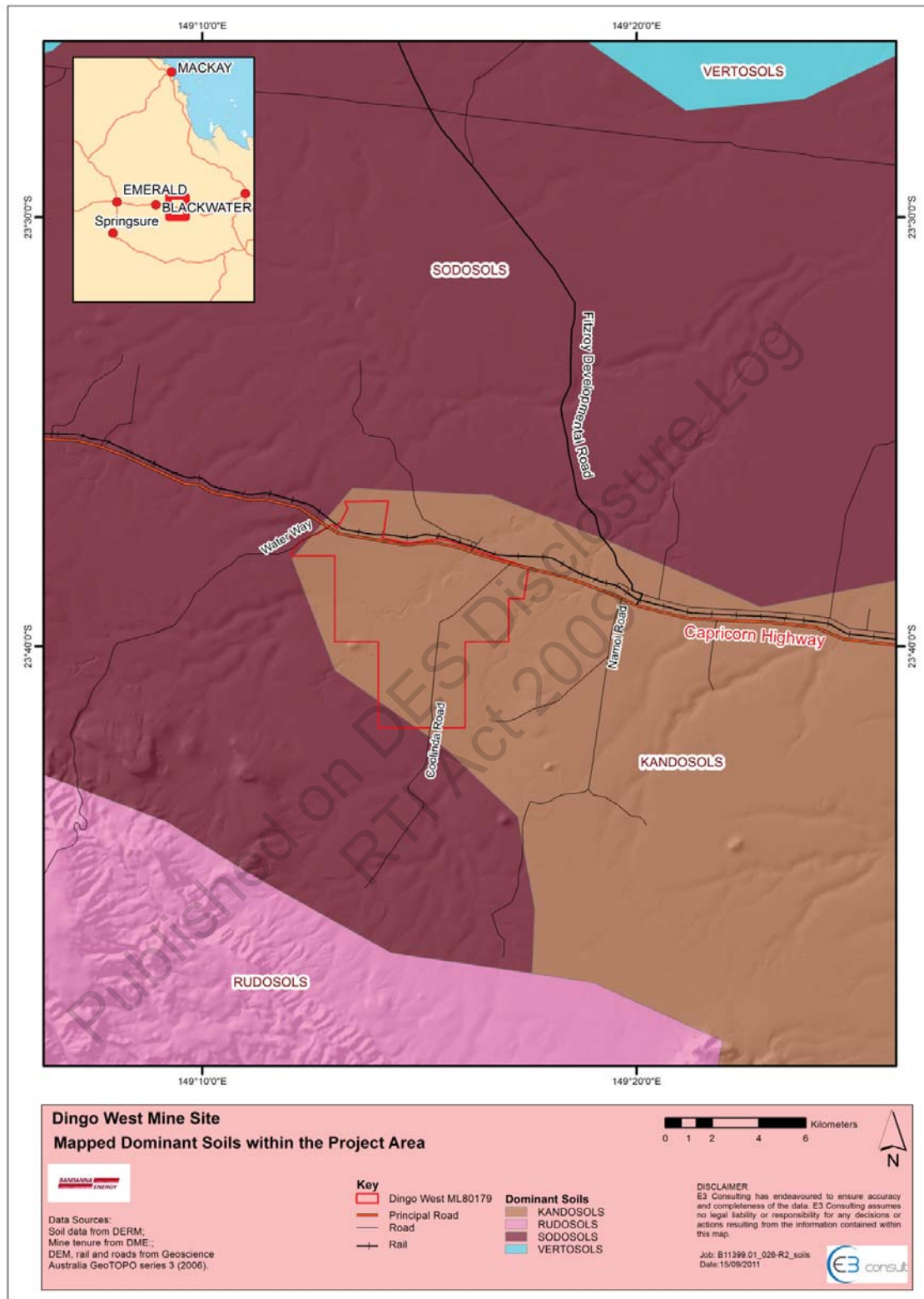


Table 9. Typical characteristics of the three soil types identified in the Project area

Soil Type	Water Availability	Drainage	Aeration	Physical root limitations	Erosion Hazard	Nutrient Availability	Toxicities	Workability
Kandosol	Moderate to High (150-350 mm) less in shallower soils (<1.5m)	Most are well drained	Well aerated	There are few restrictions to root growth	Severe on slopes in high intensity rainfall areas	Usually low in nitrogen and phosphorus	Uncommon	Surface soil subject to crusting and hard setting
Sodosol	Moderate to very low depending on the thickness of the A horizon.	Imperfectly drained. Soil may remain saturated for several weeks. Sandy surface soils are commonly water repellent	Poor aeration in the A2 horizon.	Dense clay subsoil may restrict roots	High when exposed by cultivation or over grazing. Sandy surface soils are subject to wind erosion and dispersive subsoils are prone to gully erosion.	Low organic matter. Most likely to be deficient in phosphorus, nitrogen, copper and zinc.	Moderate salinity in the lower subsoil horizons and possible boron toxicity.	Wide variation but good for loose, soft surfaces ranging to poor for hard setting surfaces

**INITIAL ADVICE STATEMENT
DINGO WEST COAL PROJECT**

Soil Type	Water Availability	Drainage	Aeration	Physical root limitations	Erosion Hazard	Nutrient Availability	Toxicities	Workability
Chromosol	Storage varies greatly but usually adequate and between 100 - 200 mm	Imperfectly to well drained but the B horizons can be an impediment	Generally adequate although temporary saturation can occur in bleached A2 horizons if present	Main restrictions are caused by strong and dense B horizons and structurally degraded surface layers	Low to moderate depending on slope but increasing with degradation of the A horizons. Susceptible to surface slaking upon rapid wetting, resulting in hard setting if organic matter is low	Low contents of phosphorus and nitrogen with good responses to fertilizer	Boron in areas of Western Australia, South Australia and Victoria. Less commonly, aluminium associated with induced acidification	Degraded, hard setting surfaces have poor workability but this can usually be overcome with increased organic matter

3.3 Surface Water

Three main creek systems intersect the Project area and are a potential source of drinking water for stock and local wildlife (see **Figure 23**). They also provide habitat for native flora and fauna, and may provide farmers with irrigation water for surrounding vegetation in dry areas. It is unlikely that water from the creeks would be a major source of water for farmers as they are ephemeral and as such would not provide a reliable, year round water source. A significant amount of the waterways were observed to be dry during the June 2011 surveying period, even though the Central Queensland region was subjected to a heavy rainfall period and significant flooding during the first quarter of 2011.

3.3.1 Charlevue Creek

Charlevue Creek is a major watercourse that runs in a north-easterly direction through the middle of the proposed mine lease. It originates south-west of the Project area at an elevation of 760m and joins with Springton Creek approximately 10km the north-east of the Project area. Although water was present within the Creek during site investigations in June 2011, no running water was observed and all water was restricted to isolated pools. Riparian vegetation was highly disturbed, and in some cases nonexistent. A high abundance of non native plants were present on the upper and fallen trees and debris was common. Pit one will border a section of Charlevue Creek, but will not physically change the location of the watercourse or its features. Charlevue Creek is an ephemeral creek with deeply incised banks that depends heavily on consistent rainfall for flow.

3.3.2 Springton Creek

Springton Creek originates at an elevation (above sea level) of 139m and ends at 62.3m at the confluence with Charlevue Creek. Springton Creek bisects the south easterly section of the Project area, flowing in a north easterly direction. On-site investigations in June of 2011 identified Springton Creek as the only Creek system containing flowing water. However, it is likely this Creek system is ephemeral and the higher water levels most probably due to unseasonably high level of rainfall that the region received in previous months (December 2010-March 2011). Similar to the other Creeks, significant bank erosion was evident and the upper banks were dominated by native riparian vegetation.

3.3.3 Stanley Creek

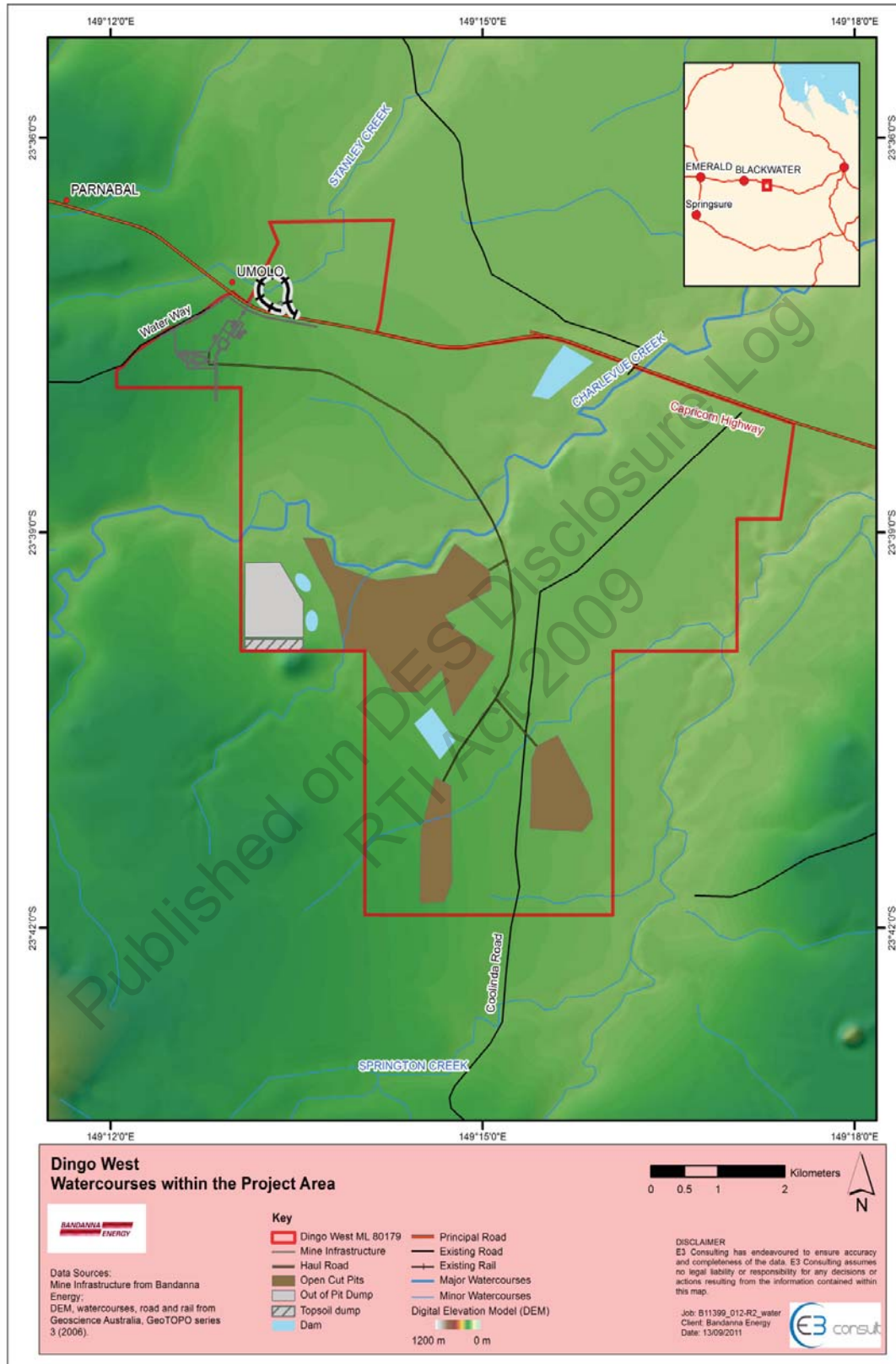
Stanley Creek is a small creek system bisecting the north westerly corner of the site and flows in a north easterly direction to the confluence of Duckworth Creek approximately 20km downstream. Similar to the other watercourses in the Project area, Stanley Creek is an ephemeral system that intermittently flows following high rainfall events. This creek system is heavily eroded with significant bank scouring and the majority of this creek system was completely dry during the June 2011 sampling period.

3.3.4 Hydrology

The Project area has a contributing catchment area of approximately 640km² predominantly associated with Charlevue Creek. All the major and minor waterways influencing the area are described as ephemeral and generally only flow during intense or prolonged periods of rainfall.

The minimum elevation (above sea level) at the catchment outlet is approximately 100m with an average slope through the majority of the mid to lower catchment of 0.67%. Steeper catchments located in the upper highlands have catchment slopes of approximately 4.1%.

Figure 23. Watercourses



3.3.5 Potential Impacts to Surface Water Environmental Values

According to the EPP (Water), the surface water environmental values that may potentially be impacted as a result of the Project include the:

- Biological integrity of the water course;
- Suitability of the water for agricultural uses;
- Suitability of the water for supply as drinking water;
- Suitability of the water for recreational use;
- Suitability of the water for industrial use; and
- Cultural and spiritual values.

The Project has the potential to impact on the water quality of Stanley, Charlevue and Springton Creeks through the following interactions:

- Potential contamination of surface water and/or sediment from:
 - Runoff or seepage from stockpiles (soil, rock, ore, other sediment that may contain concentrated levels of metals or other contaminants) areas cleared of vegetation or tailings;
 - Overflows from dams or flooding of pits;
 - Construction of a haul road crossing over Charlevue Creek;
 - Run-off and spills associated with mining activities and hydrocarbon/ chemical storage areas;
 - Accidental release of effluent (from workers camp or mine infrastructure) and grey water; and
 - Sediment laden run-off from disturbed surfaces.
- Altered flow regime or catchment hydrology due to infrastructure requirements or stream diversions.

3.4 Groundwater

The Project is located within the Bowen Basin in Central Queensland. The groundwater flow directions within the Bowen basin are likely to loosely follow topographic gradients and generally flow from west to east. The aquifer lithology underlying the area is dominated by sedimentary strata including sandstone, shale, and conglomerates. Bore yields are typically low (<5 L/s), and range in salinity from 1,500 – 5,000 mg/L Total Dissolved Ions. These waters can be considered generally suitable for stock water and irrigation purposes, albeit saline in areas.

The proponent will undertake detailed studies and modeling to define the groundwater at the site as part of the EIS and the detailed feasibility assessment. These studies will look at the baseline environment and various options for the mine development. This will assist the proponent in predicting potential localised and regional impacts to current and potential groundwater users. In addition the detailed assessments will be used to develop mitigation measures to minimize potential impacts associated with groundwater extraction associated with mine development and operations.

3.4.1 Potential Impacts to Groundwater

Mining will occur below the regional water table and it will be necessary to dewater the mine in advance of operations to allow mining to occur safely to the intended depth. Mine dewatering will be required for geotechnical reasons (i.e. to depressurise behind the pit walls and below the floor of the mine, to prevent

slope failure and floor heave) and for operational reasons (to prevent uncontrolled inflows to the mine, which would result in wet digging, equipment wear, and potential safety issues).

Mine dewatering has the potential to impact on:

- Groundwater levels;
- Groundwater flow direction;
- Groundwater chemistry; and
- Recharge and discharge mechanisms.

Detailed field investigations and numerical baseline groundwater modelling will be undertaken to assess the long-term groundwater impacts of the operation.

3.5 Nature Conservation

3.5.1 Flora

The Project area is located in the Isaac-Comet Downs subregion, which is one of 13 subregions of the Brigalow Belt North bioregion that covers an area of 59,824 km². Vegetation within the Isaac-Comet Downs subregion includes woodlands and open forest characterised by species including, Brigalow (*Acacia harpophylla*), Bendee (*A. Catenulate*) or Lancewood (*A. Shirleyi*), Narrow-leaved Ironbark (*Eucalyptus crebra*), Blackbutt (*E. Cambageana*) and Coolabah (*E. Coolabah*). Large sections of the Brigalow Belt North bioregion have been cleared of remnant native vegetation for grazing, agriculture and mining. Remaining vegetation is generally confined to rockier hilly areas, linear strips of roadside vegetation and riparian vegetation and relatively small isolated remnants.

Typical land use in the wider area includes mining and agriculture. Several dams have been previously constructed within the area to supply water for irrigation, urban, stock and industrial uses. Native vegetation has been disturbed by agricultural and mining activities over the past 150 years resulting in a highly fragmented landscape with large expanses of cleared land separating vegetation patches.

Vegetation within the proposed ML is representative of the wider Isaac-Comet Downs subregion and comprises heavily disturbed habitats that have previously undergone significant clearing for agricultural pastures and for cattle production. Remaining vegetation is heavily fragmented and generally associated with rocky outcrops and alluvial floodplains associated with Charlevue Creek, Springton Creek and their tributaries and have limited ecological values due to fragmentation and edge effects.

3.5.2 Regional Ecosystems

The northern portion of the Project area has been largely cleared for grazing. The central and southern portion of the Project area still contains fragmented areas of relatively undisturbed remnant vegetation.

Current RE Mapping (Version 6, November 2009) identified six Regional Ecosystems (REs) within the project area including two Endangered communities and one Of Concern community spread over three main land zone types in (refer to **Table 10** and **Figure 24**). A number of these REs comprise mixed polygons and are not located in isolated patches of single REs due to the dispersed nature of descriptor species inhibiting clear polygon delineations.

Table 10. Currently mapped regional ecosystems within the Project area

RE code	RE description	VM Act status	EPA Biodiversity status	EPBC Act status
11.3.1	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains	Endangered	Endangered	Endangered
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	Of concern	Of concern	Not listed
11.3.25	<i>E. tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	Least concern	Of concern	Not listed
11.5.2	<i>E. crebra</i> , <i>Corymbia</i> spp., with <i>E. moluccana</i> on lower slopes of Cainozoic sand plains/remnant surfaces	Least concern	No concern at present	Not listed
11.5.9b	<i>E. crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains/remnant surfaces. Plateaus and broad crests	Least concern	No concern at present	Not listed
11.7.2	<i>Acacia</i> spp. woodland on lateritic duricrust. Scarp retreat zone	Least concern	No concern at present	Not listed

3.5.3 Regulated regrowth

In 2009, regulated regrowth laws came into effect under the *Vegetation Management Act 2009* (VM Act) that protects regulated regrowth vegetation which is defined as native vegetation that has been previously cleared but is less mature than remnant vegetation. Four small areas of high value Endangered regrowth occur within the Project area as identified on DERMs regrowth vegetation mapping, version 2 (November, 2009). None of these areas; however, occur within the proposed MLA.

3.5.4 Environmentally sensitive areas

Environmentally sensitive area (ESA) mapping of the wider MLA area identified three ESA within the broader study area. One Category 'A' ESA (National Park) and one Category C ESA (Nature refuge) occur to the north and outside of the proposed ML boundary. One category B ESA (Endangered RE) is mapped within the ML boundary and includes two small areas, one in the northern portion and one linear strip to the north of Charlevue Creek (refer to **Figure 25**).

Preliminary field surveys did not identify any unmapped areas likely to be considered ESAs.

3.5.5 Essential habitat

Essential Habitat under the VM Act is remnant RE vegetation that an 'endangered', 'vulnerable', 'rare' or 'near threatened' fauna species is known to inhabit. Current RE mapping did not identify any essential habitat as occurring within the Project area.

Figure 24. Regional Ecosystems within and surrounding the project area

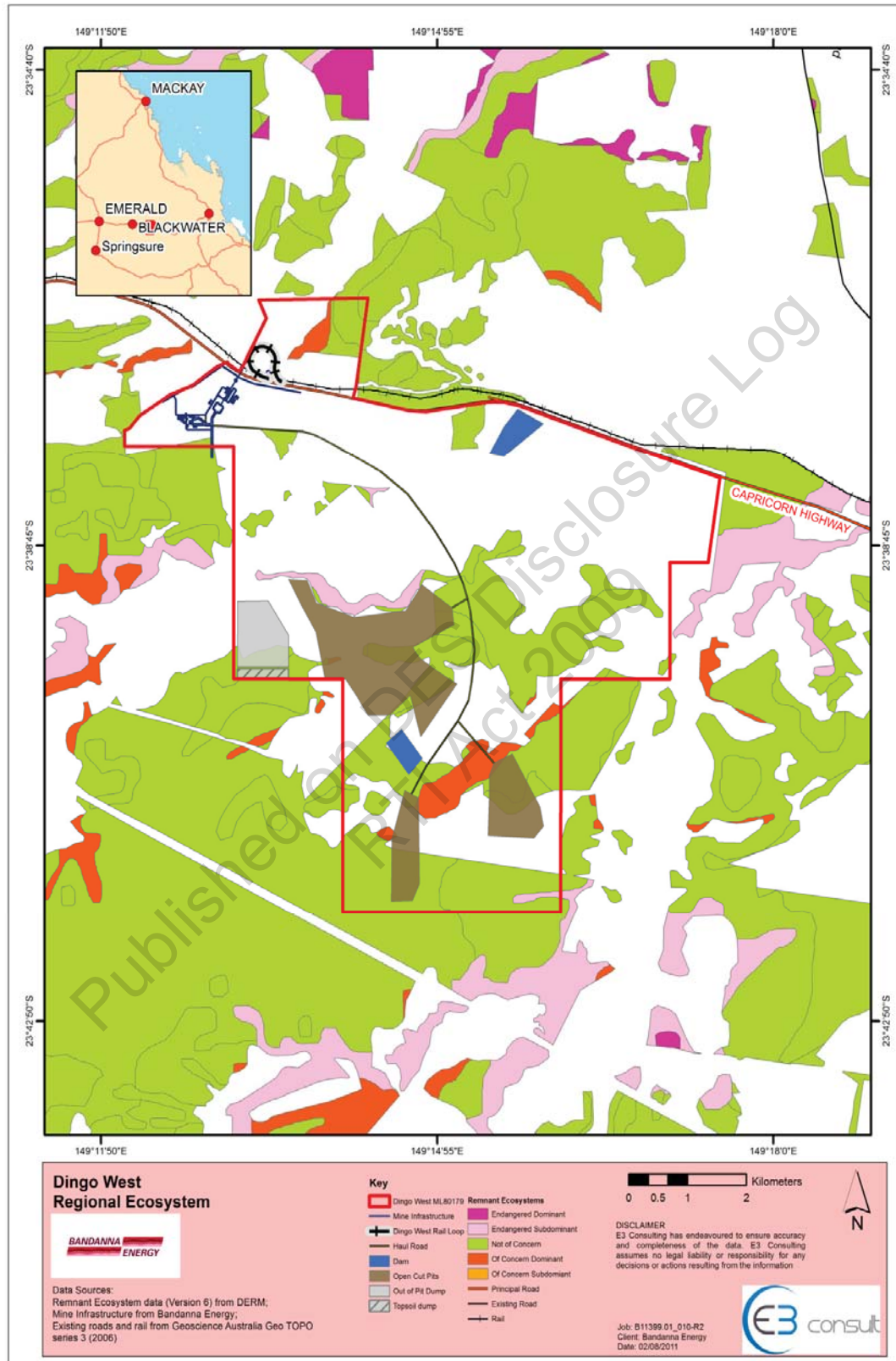
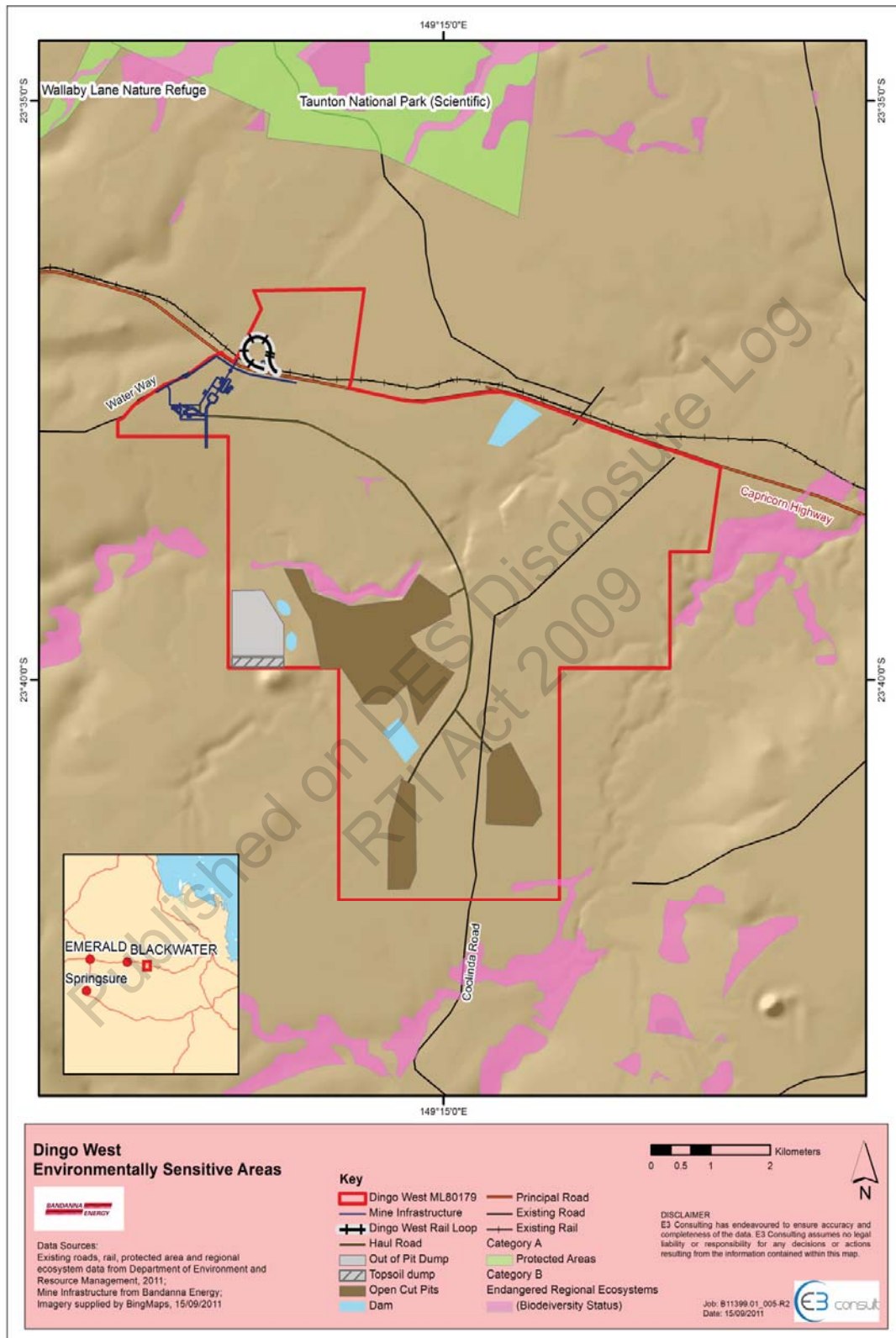


Figure 25. Environmentally Sensitive Areas within the Project area



3.5.6 Protected species and Threatened Ecological Communities

Searches of the EPBC Act protected matters and DERMs Wildlife Online databases were conducted around the Project area. Searches revealed three Threatened Ecological Communities and four plant species as potentially occurring within a 10km radius of the Project area (refer to **Table 11** and **Table 12**).

Table 11. Listed plant species potentially occurring in the Project area

Botanical name	Scientific name	Status	
		NC Act	EPBC Act
<i>Solanum adenophorum</i>	-	Endangered	-
<i>Solanum elaeagnifolium</i>	-	Endangered	-
<i>Dichanthium setosum</i>	-	Near threatened	-
<i>Cadellia pentastylis</i>	Ooline	Vulnerable	Vulnerable

Table 12. Listed TECs potentially occurring in the Project area

TEC	Status	Potential to occur
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)	Endangered	Community known to occur within area
Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin	Endangered	Community may occur within area
Weeping Myall Wetlands	Endangered	Community likely to occur within area

3.5.7 Fauna

Database searches returned 55 conservation significant fauna species within a 100km radius of the Project area. These species are comprised of 18 listed as Endangered or Vulnerable under the EPBC Act (16 of which are also listed as Endangered or Vulnerable under the *Nature Conservation Act 1992* (NC Act), 28 additional species listed as Endangered, Vulnerable or Near Threatened under the NC Act, and 11 species listed as Migratory under the EPBC Act (one Migratory species also listed as Near Threatened).

Field surveys identified 178 species at the study area; six of these species are of conservation significance or are migratory. These species included the Great Egret (*Ardea alba*) (migratory), Cattle Egret (*Bubulcus ibis*) (migratory), Squatter Pigeon (*Geophaps scripta scripta*) (listed under the EPBC Act and NC Act), Rainbow Bee-eater (*Merops ornatus*) (migratory), White-throated Needletail (*Hirundapus caudacutus*) (migratory) and Little Pied Bat (*Chalinolobus picatus*) (listed under the NC Act).

Species comments and details of relevant EPBC and/or NC Act status is detailed in **Table 13**.

Table 13. Conservation significant and Migratory Fauna recorded within the study area

Common Name	Scientific Name	Status		Comments on species
		EPBC Act	NC Act	
Great Egret	<i>Ardea alba</i>	M	S	This wide-spread and common species was observed utilising flooded pastures and waterways. The proposed actions will not remove any significant or critical wetland habitats, and there is no breeding colony in the study area. It has ability to move large distances and the local landscape provides a range of suitable habitats, many of which are outside of the disturbance area. Overall there is little to no potential for any significant impact on this species from proposed actions.
Cattle Egret	<i>Ardea ibis</i>	M	S	This introduced and common species was recorded in low numbers in association with domestic stock. There is no breeding colony in the study area. There is no potential for significant impact on this species or its long term security in the local landscape.
Squatter Pigeon	<i>Geophaps scripta scripta</i>	V	V	A relatively common resident in the study area. The Squatter Pigeon occurs mainly in grassy woodlands and open forests that are dominated by eucalypts. It also occurs in sown grasslands with scattered remnant trees, disturbed habitats (i.e. around stockyards, along roads and railways, and around settlements) and acacia growth, and remains relatively common in heavily-grazed country north of the Tropic of Capricorn, particularly in habitats located close to permanent water. The proposed actions will remove some habitat and result in increased threats (increased vehicular movements), but are not expected to have a significant impact on the survival of the species in the local landscape.
Rainbow Bee-eater	<i>Merops ornatus</i>	M	-	A common visitor to the study area. This common and widespread aerial insectivore is unlikely to be reliant or dependant on habitats within the study area. The species may use some of the study area for breeding, particularly eroded creek banks, and detailed surveys over seasons would be required to establish the actual level of presence and its habitat partitioning. Overall, the proposed actions are not expected to have a significant impact on the species or its occurrence in the local landscape.
White-throated Needletail	<i>Hirundapus caudacutus</i>	M	-	A wide-ranging aerial insectivore. The proposed actions will not have a significant impact on this species or its ability to traverse the landscape.
Little Pied Bat	<i>Chalinolobus</i>	-	NT	Occurs in dry habitats including open forests, woodland, mulga woodlands, chenopod scrublands, <i>Callitris</i>

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Common Name	Scientific Name	Status		Comments on species
		EPBC Act	NC Act	
	<i>picatus</i>			forest, mallee and notophyll vine forest gullies, particularly in riparian areas. Roosts in caves, tunnels, disused buildings and tree hollows (Hall and Richards, 1979). The proposed actions will remove some potential habitat for the species. However, the proposed disturbance area is small relative to the availability of potential habitat in the broader landscape, so no significant impact on the long-term survival of the species is expected.

M = Migratory; V = Vulnerable; NT = Near Threatened; S = Of Special Concern.

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In addition to the observed species, an additional 17 conservation significant species listed as Endangered or Vulnerable under the EPBC Act (all of which are also listed under the NC Act), eight Migratory Species (seven listed as special least concern and one as near threatened under the NC Act) and 25 species listed solely under the NC Act may potentially occur within the study area. However, based on habitat preferences and previous sightings, the potential for these species to occur in the Project area is low.

3.5.8 Exotic fauna species

The EPBC protected matters search identified five terrestrial feral animals as having the potential to occur within the Project area. Field assessments identified eight introduced fauna species within the Project area. Of these, three are declared as a Class 2 pest species under the *Land Protections (Pest and Stock Route Management) Act 2002* (LP Act):

- Dingo (*Canis lupus dingo*);
- Feral cat (*Felis catus*); and
- Rabbit (*Oryctolagus cuniculus*).

3.5.9 Great Barrier Reef Wetlands

No Great Barrier Reef wetlands are located within the Project area. Therefore the Temporary State Planning Policy for wetlands is not relevant to future activities associated with the Dingo West Mine.

3.5.10 Potential Impacts

The majority of the Project area has been heavily fragmented and highly disturbed by historical agricultural activities. These impacts can be seen across much of the project area which is dominated by Buffel Grass (*Cenchrus ciliaris*) interspersed with scattered patches of remnant and regrowth vegetation.

Without appropriate mitigation measures the proposed mining activities have potential impacts including the generation of dust, noise and light, introduction of weed species, wildlife mortality through collisions with vehicles, accidental release of pollutants and inadvertent clearing for temporary facilities or lay down areas storage.

3.5.10.1 EPBC listed TECs

No TECs are located within the proposed mine footprint area, as such no impacts to TECs are expected from construction and operation of the mine. Due to the high level of disturbance associated with agricultural activities it is unlikely that any TECs are present within the wider landscape surrounding the Project area. The proposed mining activity is not expected to impact any TECs.

3.5.10.2 REs

The proposed mine footprint, which includes open cut pits, water management dams, haul routes and other supporting infrastructure is located where possible, within disturbed areas of the Project area. Clearing of remnant vegetation has been limited to approximately 90ha and the majority of these areas are severely impacted by grazing and weed infestation and having limited habitat value.

Table 14 outlines the RE types within the Project area, their quantities based on current DERM RE mapping and an estimate of the amount of each RE that will be cleared for the Project. Note that the majority of clearing is located in the southern section of the Project area and associated with the open cut pit areas and the haul road (exact clearing quantities won't be known until detail design).

The amount of remnant vegetation to be cleared for the proposed mining activities is a small proportion of what will remain in the wider area and demonstrates the mining activities will have minimal impact on REs in

the wider Project area and region. Thus, cumulative impacts on clearing from this Project are expected to be low.

Table 14. Regional ecosystem to be cleared within ML

RE	Total area within the MLA (ha)	Total area within a 10km radius of the MLA (ha)	Area cleared for propose mine (ha)
11.5.2 (Least Concern)	141.6	1,073,583	16.2 (<0.01%)
11.7.2 (Least Concern)	442.8	6563.7	63.6 (0.97%)
11.3.25/11.3.1 (Of Concern/Endangered)	46.3	442	0.0 (0%)
11.5.2/11.5.9b (Least Concern)	432.3	4123.9	120.0 (2.9%)
11.3.2/11.3.25 (Of Concern)	103.1	681.6	4.9 (0.7%)

Note: The extents of REs are based on current DERM mapping and in the case of 11.3.1 (Brigalow) is a significant overestimate based on observations made during flora surveys. Areas within brackets are the percentage of the RE within a 10km radius of the MLA to be cleared as a result of from the proposed mine infrastructure.

3.5.10.3 Threatened flora species

No listed species were observed during field surveys and no habitat for threatened flora species listed under the EPBC Act or NC Act was encountered during field assessments. Therefore impacts to threatened flora species is expected to be low.

3.5.10.4 General impacts on flora

Weed abundance was found to vary greatly throughout the Project area with some areas presenting low weed infestations 5-10% to other areas with moderate to high levels 70-90%.

Six environmental weeds classified as class two under the LP Act were identified. A class 2 pest is one that has, or could have a substantial adverse economic, environmental or social impact. Landowners are required to take reasonable step to keep land free of Class 2 pests.

Mining activities may increase weed abundance through earthworks, movement of soil and attachment of seed to vehicles and machinery. The proposed activities have the potential to disperse weeds into areas of remnant vegetation where weed species are currently limited. A detailed weed management plan will be developed with the aim of minimising dispersal but also reducing overall weed abundance.

Edge effects refer to disturbance associated with an edge or boundary between retained vegetated habitats and cleared areas such as mining areas or infrastructure. Effects could include loss of soil moisture, increased wind, dust and noise impacts, changes to species composition and abundance, increased predation and competition and particularly increased weed invasion.

The vegetation on site is already highly fragmented and will already be subject to significant edge effects. Therefore, it is unlikely that the Project would significantly increase the overall extent of edge effect in the area.

Management measures such as fences and vegetation health monitoring programs will be employed during construction and operations to minimise the potential for impacts to occur to high.

3.5.10.5 Impacts on fauna values

The Project is likely to remove some habitat and result in increased threats through increased vehicular movements. However the threatened fauna observed are bird and bat species, all of which are all highly

mobile and often observed foraging around disturbed areas adjoining road and rail lines. Overall the mining operation is unlikely to have a significant impact on this species or its long term presence in the local landscape.

No wetlands or large permanent water bodies exist within the Project area. The waterways (creeks) within the area are situated in the upper catchment and are therefore ephemeral and only flow during intense periods of rainfall, which is primarily constrained to the wet season. These waterways rapidly drain following rain events leaving limited areas of standing water within the landscape.

Furthermore, the proposed mine footprint will not result in the disturbance of large areas of permanent or semi-permanent water. The small water bodies such as farm dams present within the vicinity of the Project area provide limited habitat value to significant populations of migratory wetland species. Due to the limited availability of large permanent water bodies within the area and little to no disturbance to existing water sources, the potential impact to migratory species is considered as low.

3.5.10.6 Impacts on fauna values

Eight introduced terrestrial vertebrate species were recorded within the Project area, three of which are declared as Class two under the LP Act. The proposed mining activities are not expected to result in an increase in exotic fauna within the region. However, a pest management plan will be developed as part of the overarching construction management plan.

Artificial lighting has the potential to alter foraging regimes of some nocturnal native mammals and birds and potentially make some species more vulnerable to predation. Artificial lighting could impact local fauna; however the potential impacts are not expected to be major.

Dust and emission generated from mining vehicles and equipment used during the construction stage and operation is expected to be low. However, if not properly managed may impact both flora and fauna within the Project area. Sediment runoff into water bodies also has the potential to adversely impact water quality which may in turn, impact fauna.

Clearing and disturbance of remnant vegetation can lead to increased fragmentation, reduction in habitat connectivity and overall habitat value. These actions have the potential to place increased stress on fauna species, particularly those that are less mobile and/or tolerant of disturbance. The mine footprint is primarily located within areas which have undergone extensive clearing and/or disturbance from current agricultural practices. In addition, vegetation to be cleared is generally of limited habitat value and is unlikely to support significant populations of conservation significant species.

Barrier effects occur when a particular species is unwilling or unable to travel between fragmented habitats. Barrier effects can reduce genetic continuity within populations, effectively reducing its population size. Fencing, road infrastructure and areas largely cleared of vegetation associated with the mining has the potential to increase barrier effects. It is anticipated that more mobile species within the project area such as birds and some mammals species will be less impacted by barrier effects relative to species that are less mobile, habitat specialists or vulnerable to predation.

3.6 Noise

The area within and surrounding the Project is rural with the primary sources of noise and vibration being:

- Traffic travelling on the nearby State and local government roads;
- Coal trains travelling along the Blackwater rail system;
- Cattle;
- Farm activities; and

- Natural influences such as vegetation and native fauna.

3.6.1 Sensitive receptors

The proposed mine lease area incorporates land from nine separate land owners. Sixteen sensitive receptor locations surrounding the Project have been identified as representative of sensitive receptors within the area as shown in **Figure 26** and outlined in **Table 15**.

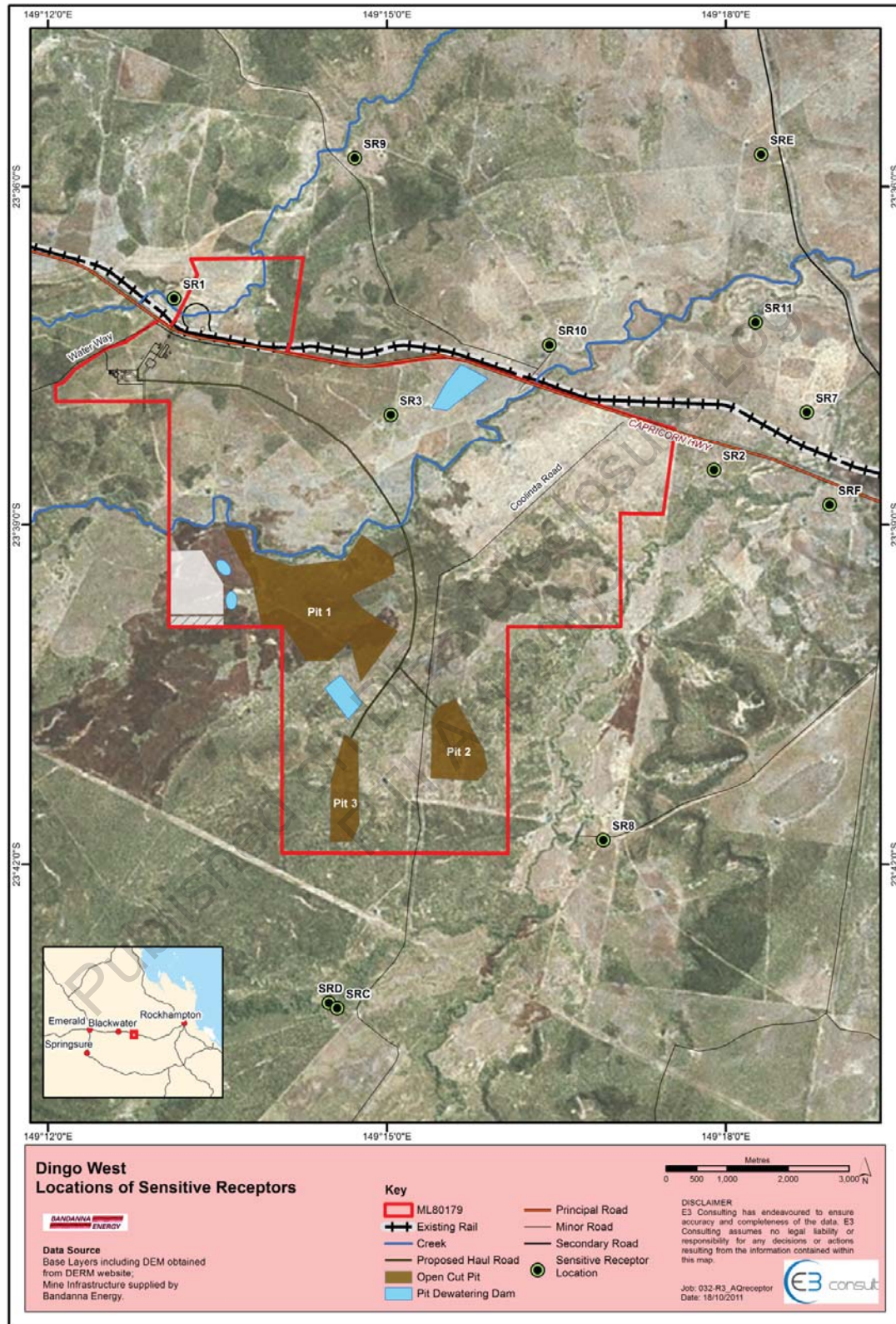
Table 15. Sensitive receptor locations within wider project area

Receptor	Location	
	Easting	Northing
SR 1	726355 m E	7386472 m S
SR 2	734439 m E	7383529 m S
SR 3	729588 m E	7384516 m S
SR 4	726371 m E	7385357 m S
SR 6	722416 m E	7384929 m S
SR 7	735853 m E	7384462 m S
SR 8	732679 m E	7377517 m S
SR 9	729114 m E	7388722 m S
SR 10	731994 m E	7385622 m S
SR 11	735106 m E	7385943 m S
SR A	721950 m E	7382119 m S
SR B	721379 m E	7386912 m S
SR C	728629 m E	7374813 m S
SR D	728504 m E	7374904 m S
SR E	735234 m E	7388685 m S
SR F	736170 m E	7382929 m S

Note: SR4-6 and SRA-B are not shown on Figure 26 due to their distance from the MLA area.

It is not expected that noise from the construction or operational phases will adversely affect the property owners in the vicinity of the mine or the Dingo township. Notwithstanding, a baseline noise assessment will be conducted as part of the EIS process. The results of the baseline assessment will be used to develop noise mitigation strategies and to form conditions in EA(ml).

Figure 26. Sensitive receptors



3.7 Air Quality

Similar to noise, impacts to air quality generated by the project are expected to be minimal. Regional air quality is typically influenced by grazing activities and climatic conditions. The construction and operation of the mine will result in dust emissions. Mine site emissions typically occur from mobile equipment movements, topsoil stripping, blasting activities, coal stockpiles and waste disposal stockpiles.

It is not expected that air quality in the region will be adversely affected by the construction and operation of the mine. A baseline air quality assessment will be conducted as part of the EM Plan process. The results of the baseline assessment will be used to develop air quality mitigation strategies and to form conditions in EA(ml). Mitigation measures that will be considered include the use of water trucks for road watering, progressive rehabilitation, water sprays on crushers and conveyor transfer points.

3.8 Waste Management

Construction and operation activities associated within the project will increase the volume of waste materials from the project area. Waste materials have the potential to impact the receiving environment through contaminating soil, habitat and water resources, in addition to having the potential to harm or injure neighbouring communities and fauna and flora species.

While waste produced during the construction phase will be of a relatively short duration (in comparison to the operational phase of the project), waste will continue to be produced during the operation and decommissioning phases of the Project. The management of wastes generated by the project will be addressed in the EIS. The EIS will identify controls, which target the reduction of generated wastes and ensure that onsite wastes do not enter the environment and minimise subsequent impacts.

To manage project related waste in accordance with Government Policies, the following measures will be put in place:

- A waste management strategy will be developed along with processes and procedures that form a suitable environmental management framework allowing the incorporation of waste management into daily operations and will develop efficient practices throughout the lifecycle of the project. These principles will ensure early identification of anticipated waste streams and quantities, and allow effective implementation of appropriate management and mitigation measures to reduce the potential for impacts to occur;
- Generated waste will be managed and disposed of by licenced contractors in accordance with the waste's classification i.e. regulated wastes (e.g. hydrocarbons, solvents, asbestos, contaminated soil) will be tracked and recorded prior to being removed from site; and
- A proactive rather than reactive approach to waste generation and minimisation will assist in reducing the volume of waste generated due to the project.

3.8.1 Potential Impacts

Wastes generated by the Project have the potential to impact on surface water and groundwater, quality, air quality, visual amenity and soil quality and visual amenity of Project area and the surrounding environment if they are not managed appropriately. Sensitive receptors including rural residences and ecological sensitive areas within and adjacent to the Project area could be negatively impacted if waste streams were to enter waterways and groundwater systems and migrate off-site. Likewise, air emissions have the potential to impact both on and off-site sensitive receptors.

Potential impacts from uncontrolled discharges of poor waste management practices during the construction and operation phases included:

- Decreased air quality in the form of odours and airborne contaminants;
- Contamination of soil land and impacts to current and existing land use practices;
- Contamination of surface or groundwater;
- Direct impacts to flora and/or fauna;
- Impacts to natural habitats and thus, indirectly impacting flora and/or fauna;
- Increased fire hazards and reduced visual amenity due to untidy or poorly managed waste storage;
- Increased pressure on existing waste infrastructure;
- Introduction and/or dispersal of pests and weed species;
- Anthropogenic and ecological health and hygiene issues, such as increased prevalence of pests, abundance in mosquito breeding areas and animal entanglement; and
- Reduction in visual amenity for surrounding community.

Waste will be managed to avoid negative impacts on the health and wellbeing of people and the ecological and ecosystems processes and both on and off-site.

3.9 Safety and Health

A Safety and Health Management System will be established for the project to ensure all activities that potentially have an impact on safety and health are carried out in a manner that complies with:

- Relevant legislation, standards and codes of practice; and
- Bandanna Energy standards.

Typical hazards expected at a mine site such as this one include:

- Fuel spills – spills and leaks during storage or handling;
- Transport – traffic accidents that may resulting in injury to workers, damage to vehicles or spillage of hazardous substances;
- Heavy machinery - the use of heavy machinery that may result in injury to workers and damage to equipment;
- Hazardous materials / substances / chemicals - the storage, handling and may result in spills and leaks;
- Adverse weather - undertake activities in adverse weather conditions such as cyclones, storms, winds or heat that may result in equipment damage or injury;
- Working at heights - injury associated with falls from heights and material falling from height;
- Confined space entry, excavation and trenching - injuries associated with working in confined spaces; slips, trips and falls - through every day construction activities;
- Dust exposure - exposure to long term dust (that may contain hazardous materials) resulting in injury or making the work place hazardous;
- Excessive noise exposure - impacts to hearing from prolonged noise exposure;

- Spontaneous combustion of coal stockpile -resulting in a fire risk at the site that may lead to injury or loss of life;
- Undertaking underground mining operations - resulting in injury through working in a highly energized and potentially gaseous work environment;
- Blasting and vibration - that may lead to injury to personnel or serious damage to equipment; and
- Electrical work - electrocution, injury and fires which may damage or cause injuries to personnel and equipment.

The lead construction contractor will implement a Safety and Health Management System (SHMS) that is consistent with the principals required by Dingo West Coal and fully complies with legislative obligations. A site specific construction safety and health management plan, work instructions, and permits to work will be completed prior to construction works commencing.

3.10 Visual Impacts

The project will include infrastructure that will be clearly visible from the road. In particular, the product coal stockpile, reclaim conveyor, trainload out facility and balloon loop will be clearly visible to users of the Capricorn Highway. The proposed rail infrastructure will be of similar nature to that used at the Yarrabee Siding. Where practicable, screening will be utilised to mitigate the adverse impacts to the aesthetic value of the area. Conversely, the proponent will consult with the CHRC in regard to designing observation platforms and interpretive signage that may be utilized as tourist vantage locations.

Due to the setback distance from the Capricorn Highway and the presence of screening vegetation in the road reserve, it is unlikely the mine and infrastructure area will create an adverse impact. Notwithstanding, the proponent will assess the need for additional roadside screening. Should additional screening be required, endemic tree species will be used and this will have an additional benefit of increasing endemic habitat and offsetting greenhouse gas emissions associated with the project.

3.11 Cultural and European Heritage

3.11.1 Cultural Heritage

Database searches identified no registered Aboriginal cultural heritage sites within the Project area. With the exception of field surveys associated with exploration activities, specific Indigenous cultural heritage field surveys for the Project have not been conducted. Although the survey reports are confidential in nature (and cannot be published with this current document), the field surveys have identified potential cultural heritage material in the vicinity of the Project area. Sites identified have included isolated artifacts and a stone artifact scatter.

Several cultural heritage studies have been previously conducted in the broader Project area to assess the presence of cultural heritage artifacts. Many recent surveys have been undertaken as per EIS requirements associated with coal mining projects in the region including:

- A comprehensive survey of both Indigenous European cultural heritage within the Bowen Basin (Scott L'Oste-Brown, Luke Godwin and Carl Porter, 1998);
- Cultural heritage study undertaken for the Coppabella mine (2001);
- Archaeological assessment undertaken for the Moorvale West mine (2006);and
- Surveys undertaken for the Washpool Coal mine (2011).

These studies indicate that stone artifacts - both as scatters and isolated finds - are the most common items found of cultural heritage significance; however scarred trees have also been located. Generally these sites have been identified around creeks and watercourses.

A detailed Indigenous cultural heritage field survey of the Project area will be undertaken in accordance with the requirements of the forthcoming Cultural Heritage Management Plan (CHMP) and prior to the commencement of works.

3.11.2 European Heritage

No areas containing European cultural heritage significance were identified from the desktop review of both the Commonwealth and National Heritage Register and Queensland Heritage Registers. Three sites of European cultural heritage significance were identified within the wider surrounding region and all sites are a significant distance from the Project area:

- Dawson Valley Colliery (former) approximately 80km's south-east from the Project;
- Lilyvale Stand Monument approximately 90km's away north-west from the Project; and
- Tieri War Memorial approximately 100km's north-west from the Project.

Several small graveyards believed to be of local families exist within the Project area at Lot 2 RP904099 and Lot 3 SP226576. Historic artifacts such as gravesites are protected under the provisions of QH Act and the graves are also protected under the provisions of *The Coroner's Act 2003*. In addition, Part 9 of the QH Act outlines provisions for the discovery of archaeological artifacts including strict penalties for not reporting the discovery of artifacts of potential state significance.

Further investigation of the gravesites will be undertaken during the EIS

3.12 Socio – Economics

The resource sector is the main employer in the immediate area of the proposed mine, with a number of mines already operating in the area. The majority of employees are expected to come from the nearby towns of Dingo, Blackwater and Emerald. A workers camp will be located within the mine to cater for employees, particularly those workers that utilize FIFO.

The Dingo West Project will positively contribute to the local and regional areas with increased direct employment opportunities and indirect opportunities through the ongoing requirement for services and support.

The Dingo West project will require the hiring of between 220 and 120 full time employees during the construction and operational phases respectively. Given the small scale of the project, and considering the majority of employees will be local it is not expected that adverse social impacts will arise from the Project. A Social Impact Management Strategy will be developed as part of the EIS process.

3.13 Traffic and Transportation

Transport and traffic issues associated with the project will include the transport of heavy and oversize loads, plant and equipment, construction materials and camp accommodation, together with workforce movements. The Capricorn Highway will be the major road utilised to transport materials to the project area; however, Local Authority roads will also be utilised to gain site access through the life of the mine.

At this stage of the project design, no estimates are available for the likely number and type of transport trips required for the project. Procedures for the movement and transport of vehicles and personnel during the construction and operation of the mine will be prepared to ensure that these traffic movements do not cause

unnecessary damage to local or regional roads. Traffic movement on regional and local roads will be minimised where practicable and restricted in areas of high sensitivity where practical.

The ability of the existing infrastructure in the region to meet project transport needs will be examined as part of future project design activities.

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4. Cumulative Impacts

At present, there are 15 coal mining projects that are either proposed or are currently operating within an approximate 40km radius of the Project (see **Figure 27**).

4.1 Impacts to environmental values

4.1.1 Land resources

The Project will result in the loss of approximately 34.8ha of Class C2 GQAL defined as “Pasture Land - Suitable for grazing native pastures with or without the addition of pasture species introduced without ground disturbance”. The Project area is used exclusively for cattle grazing rather than cropping due to existing soil quality and much of the Project area will revert to cattle grazing post-mining.

The cumulative effects of these operations will impact primarily on the percentage of GQAL and grazing land in the region. However, the soils within the Project area and the surrounding landscape are generally not regarded as high quality GQAL. Nevertheless, impacts associated with the loss of grazing land can be effectively addressed through consultation with tenure holders to ensure, where practicable, minimal disturbance to land outside of the mining footprint whilst maintaining safe and efficient operation and progressive rehabilitation of the Project. Impacts can further be reduced through effective consultation with regard to the timing and removal or relocation of existing property infrastructure such as fences, gates, dams and irrigation systems within the mine footprint.

4.1.2 Visual amenity

The Project site, while generally flat, is partially bisected by low ridge lines running south west to north east. In addition, areas of remnant vegetation remain within and surrounding the Project area and are mainly confined to riparian zones, roadsides and isolated patches. The natural variations in topography and the presence of native vegetation will assist in screening the various aspects of the proposed mining operation from the public view.

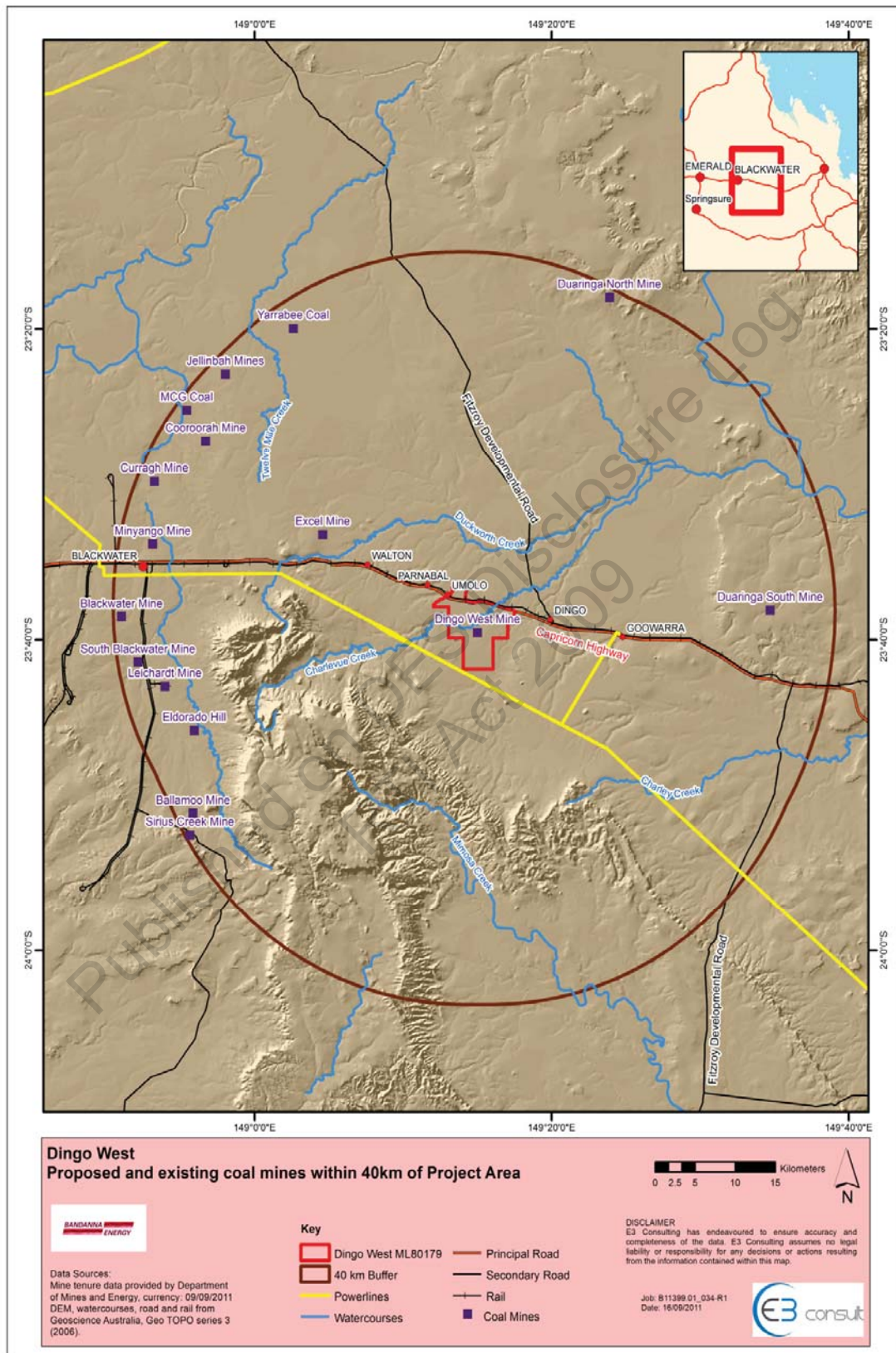
Where two or more project sites reside within the same locality, direct cumulative impacts may be experienced where both projects are visible from the same view point and indirect cumulative impacts may occur from incidental sightings of multiple mines such as through the use of the major transportation routes (e.g. the Capricorn Highway). No existing mines occur within the immediate vicinity of the Projects view shed. As such, direct cumulative impacts resulting from views of multiple mines within the local landscape or projects will not occur.

Although the over-road conveyor, rail loop and loaders will provide the main source of visual impacts along the Capricorn Highway, these structures are not uncommon in the region. While local impacts may result from these structures, regional impacts are expected to be low given their existing presence along the Capricorn Highway to the west.

4.1.3 Nature conservation

Broad-scale vegetation clearing has occurred in the Brigalow Belt Bioregion for many decades. Compared to clearing for agricultural purposes, mining projects have resulted in relatively smaller clearing footprints. In addition, from an Australia wide perspective, mining projects have contributed relatively minor roles to overall plant extinctions with the loss of only a single species attributed to mining (Lindenmayer, 2007).

Figure 27. Coal Mining Projects within the direct vicinity of the Project



Recognising the extent of historical clearing, Dingo West Coal has carefully considered locating infrastructure to either avoid or minimise clearing of remnant vegetation, particularly vegetation listed under Commonwealth and State legislation. Where clearing cannot be avoided, the overall impact footprint has been reduced.

The Project will result in the clearing of approximately 204.7h of remnant vegetation which represents less than 1% (approximately 0.53%) of the entire vegetation extent within a 10km buffer zone around the Project. Importantly, the Project will not adversely impact on the Brigalow TEC which has historically been heavily cleared throughout the wider Brigalow Belt. The remainder of the Projects' footprint comprises grasslands dominated by the introduced Buffel grass.

Significant remnant vegetation will be retained within the proposed mining lease area which has been maximised from re-arranging key infrastructure such as the haul road, dams and the CHPP and MIA to avoid, where possible remnant vegetation, particularly currently mapped Endangered REs. Minimising clearing also has the co-benefit of minimising adverse impacts to fauna species from removal of breeding habitat. As such, the Project is not expected to contribute to either localised or regional cumulative impacts and will not, directly or indirectly, impact negatively on any threatened fauna or flora species.

4.1.4 Surface water resources

Construction and ongoing operation of the mine has the potential to impact on existing watercourses in the region and similar activities associated with other existing and proposed projects are also likely to contribute to impacts on creek systems. These activities have the potential to result in cumulative impacts on the Mackenzie and Fitzroy River systems downstream of the mine areas.

Although local creek systems in the vicinity of each project ultimately flow into the Mackenzie River, the Project is located in an isolated local catchment. It is the intention of Dingo West Coal to retain water on-site and not discharge to receiving environments, hence further reducing the potential contribution to negative impacts downstream. Dingo West Coal has committed to multiple mitigation and control strategies pertaining to the control of dirty water from the mine, the diversion of clean water around disturbed areas and appropriately engineered designs for creek crossings that would effectively result in little to no impact outside of the immediate mine footprint on receiving environments. It is expected that other mining projects in the area will implement similar management regimes. Where the construction and ongoing operation of all projects are undertaken in accordance with similar management and control measures, the cumulative impacts to the Mackenzie and Fitzroy River systems would be low.

4.1.5 Groundwater Water Resources

Preliminary groundwater impacts were assessed through preliminary numerical modelling of groundwater drawdown and pit inflows resulting from mining activities. Modelling predicted drawdown would equate to 9.3m to 2.0m below current water levels and could be up to 5m at distances of up to 4km from the Project area. However the drawdown is likely to be low as water levels will still be accessible from adjacent bores. In addition, the existing groundwater has limited uses due to high salinity levels.

Although groundwater will be impacted to some degree throughout the development and operation of the respective coal mines the impacts are likely to be restricted to localised impacts which with suitable implementation of proposed management measures will be reduced to negligible levels.

The distance (approximately 30 – 40km) between the Project and existing and/or future proposed mines is unlikely to result in cumulative impacts of drawdown on local water tables. However, this impact will be determined in part by pit designs and production levels of new mining projects.

4.1.6 Air quality

The primary potential source of air emissions at Dingo West are ground-level particulate matter and dust deposition. Air emissions during the construction phase of the mine site will be primarily dust related from clearing of vegetation and topsoil stripping, excavation works, blasting, transportation movements, and construction activities. Cumulative air quality impacts may result from increased dust generation from the mining operations in the localised area, and also dust generated from the increased rail movements in the region.

Existing air quality levels and potential impacts have undergone preliminary assessment through predictive modelling based on existing background conditions at Red Rock Camp, the sensitive receptor closest to the TLO, MIA and CHPP. Numerical modelling predicted that dust concentrations and PM₁₀ are unlikely to exceed the ambient air quality goals in the EPP (Air).

Although the project will lead to some increase in dust, particulate matter and emissions over and above those already generated by existing sources, the air quality assessment predicts cumulative ground level concentrations (those generated by the proposed mining activities plus existing background levels). Hence, the assessment is in effect, a cumulative assessment. Further, the nearest operating mine is approximately 25km to the west near Blackwater. Therefore, the lack of mining activities in the vicinity of the Project, coupled with the cumulative ground level concentrations for PM₁₀ and dust deposition not exceeding DERM trigger criteria levels indicates the Project is unlikely to result in adverse cumulative impacts.

4.1.7 GHG Emissions

Total GHG Emissions for mining activities undertaken at Dingo West for the life of operations are estimated to be approximately 1,193,606 t CO₂-e. Transport fuel during operations is the largest contributor at 664,072 t CO₂-e, with open cut mining (306,000 t CO₂-e) and power generation (190,836 t CO₂-e) the next largest contributors.

The Project can most effectively reduce its emissions through improvements in energy efficiency and Dingo West Coal will explore options for cost-effective low-emission energy sources and technological, operational, and behavioural options for energy efficiency such as the potential use of biodiesel in generators and vehicles, and real-time monitoring of vehicle fuel-use efficiency. In addition to mandatory reporting under NGERS and the EEO Program, Dingo West Coal is committed to undertaking ongoing internal measurements and monitoring of emissions to identify sources with the greatest potential for emissions reductions. This may include offsetting emissions via carbon sequestrations and specific rehabilitation practices.

As GHG emissions are measured on a local, regional, national and international scale, cumulative impacts are likely to occur. However, compared to other larger mining operations in the region, Dingo West Coals overall contribution to world emissions is minimal.

4.1.8 Noise and vibration

Preliminary noise monitoring was undertaken to quantify the existing ambient noise environment within and surrounding the Project area and was used to determine noise limits for the Project. Modelling predicted that noise levels would likely be exceeded at five nearby receptors with the highest exceedence at Red Rock Camp. In contrast, sleep disturbance criteria was not exceeded at any of the receptors and localised impacts from blasting activities were also predicted to be minimal. The distal location of existing and proposed mining projects to Dingo West suggests cumulative noise and vibration impacts from these mines will not occur. Noise and vibration resulting from transport and export of coal from the Project will be the responsibility of QR National and WICET Pty Ltd. and are likely to be localised.

Dingo West Coal will examine mining operations with the aim of reducing noise and vibration emissions and resulting impacts to nearby dwellings. Where noise attenuation and vibration and air blast modification are

impractical, Dingo West Coal will consult with the affected property to negotiate favourable management outcomes.

4.1.9 Waste management

General wastes such as excess spoils and vegetative media during construction, operation wastes, and hazardous wastes will ultimately increase the volume and diversity of wastes disposed of at both a local and regional scale. Although waste produced during the construction works will be of relatively short duration, waste will continue to be produced during the operation and decommissioning phases of the Project. To minimise potential waste-related impact, the management, disposal and transportation of all waste material will be undertaken in accordance with the EP Regulation (Waste) and the EPP (Waste).

Despite an overall increase in waste, cumulative impacts of waste generation and disposal are considered to be relatively minor due to the implementation of best practice protocols and a responsible waste management approach. This will ensure the potential for harm to the environment and human health is minimised, and where possible, avoided completely.

4.1.10 Traffic and transport

The Project will result in increased traffic during both the construction and operation phases and are therefore, likely to result in some cumulative impacts. Although a formal traffic assessment has yet to be undertaken, larger projects in the wider area that used similar transport options to that expected at Dingo West were unlikely to generate significant adverse traffic impacts.

Any potential impacts are anticipated to peak during construction. These impacts are expected to be temporary and can be effectively managed through the implementation of appropriate mitigation works and management plans. It is likely that the additional construction traffic can be adequately accommodated in the existing state-controlled road network. However, some disruption to traffic during minor intersection works will occur.

By generally limiting construction traffic to well-defined transport corridors and the purpose-built internal service road, transport and traffic impacts can be more easily managed and mitigated. To further minimise traffic impacts on the Capricorn Highway from the construction of new intersections, the main access to MIA and CHPP has been located at a point on Charlevue Road / Water Way, approximately 600m from the Capricorn Highway intersection.

4.1.11 Cultural heritage

No registered Indigenous or European cultural heritage will be impacted by the planned mine development. However, there may be impacts on some cultural heritage material within the Project area. Any impacts to Indigenous cultural heritage values can be effectively mitigated by conducting dedicated field surveys by the relevant Aboriginal party as agreed in the CHMP implementing mitigation measures in accordance with approved CHMP.

Impact mitigation measures that may be required include avoiding certain highly sensitive areas, carrying out more field investigations including sub-surface testing, recovering datable occupation material, and collecting and relocating cultural heritage items.

Similarly, dedicated field surveys will be undertaken prior to construction to identify any unrecorded European cultural heritage values. Any identified values will be managed in accordance with the QH Act and a European Cultural Heritage Management Plan (that will be developed prior to construction).

4.1.12 Social impact assessment

The preliminary social impact assessment determined that while the Project in isolation is unlikely to have a significant adverse impact on the local community, the continued expansion of mining in the region may result larger cumulative impacts.

While the issues outlined may be intensified by the Project, none of the issues are likely to be unmanageable. However, proponents of proposed resource development projects, key stakeholder and local and State governments will need to avoid and minimise potential significant social impacts to surrounding communities.

4.1.13 Economic impact assessment

Queensland is Australia's largest coal exporter accounting for approximately 56% of coal produced and in the 2009/10 financial year, Queensland exported 183 Mt of coal to worldwide markets. In the financial year ending 30 June 2010, coal contributed significantly to the State economy by providing 88% of mining royalties which equated to \$1.8 billion in revenue. The cumulative economic impacts of the Project are positive and include increased export income, royalties and employment that will provide significant benefits the wider community.

4.1.14 Conclusion

Cumulative impacts on environmental, social and built values have been collectively assessed for the Project. The most significant potential impacts to existing environmental values are associated with surface water, groundwater, noise, traffic and transport and the loss of Indigenous and European cultural heritage artefacts. Dingo West Coal will manage and off-set these impacts by implementing the mitigation measures outlined for each environmental value. **Table 16** below provides a summary of the likely impact of each environmental value discussed above.

Table 16. Cumulative impact summary

Environmental Value	Likely Impact
Land	Low
Visual Assessment	Low
Terrestrial Ecology	Low - Medium
Groundwater Resource	Medium
Surface Water Resource	Medium
Air Quality and Green House Gases	Low
Noise and Vibration	Low - Medium
Waste	Low
Traffic and Transport	Low - Medium
Indigenous Heritage	Low - Medium
Non-Indigenous Heritage	Low - Medium
Social Impact Assessment	Low - Medium
Economic Impact Assessment	Low

5. Stakeholder Engagement

Dingo West Coal is committed to a consultation program as part of the project approvals process, which provides opportunities for active community involvement and education through an inclusive program.

The public consultation process would identify broad issues of concern to local community and interest groups at all stages including project planning, construction, commissioning, operations and final decommissioning.

The public consultation program would include public meetings, interest group meetings, production of regular summary information and updates and other consultation mechanisms for encouraging and facilitating active public consultation. A list of affected persons and interested stakeholders would be developed.

The key objectives of the developed consultation program will be to:

- Inform the different interest groups about the project proposal;
- Seek an understanding of interest group concerns about the proposal;
- Explain the environmental impact assessment process and indicate how public input might influence the final recommendations for the project;
- Provide an understanding of the regulatory approval process;
- Seek local information and input into the project; and
- Provide the community with a sense of ownership in the project.

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Initial Advice Statement

Dingo West Coal Mine Project

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1. Introduction

1.1 Background

Dingo West Coal Pty Ltd (the Proponent) proposes to develop the Dingo West Coal Mine (the Project). The Project site is located in central Queensland approximately 6 km west of Dingo and approximately 120 km to the east of Emerald (see **Figure 1**).

The Project involves the development and operation of a new open cut mine that will export pulverised coal injection (PCI) and high energy thermal coal to the international market via the existing Blackwater rail system and coal handling facilities and export terminal at Gladstone. Exploration to date has identified an inferred resource of 91.1 million tonnes (Mt) of coal (Bandanna Energy 2011 Annual Report) which will allow production of up to 1.4 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal and approximately 1.0Mtpa of product coal for approximately 30 years. The Project is expected to commence in construction 2012 and continue for approximately 30 years.

The Project area, defined by the Mining Lease Application (MLA80180) covers 4,649.7ha. The Project area includes the mine, haul road and rail load out facility and is wholly located within MLA80180.

1.2 Proponent

The Project will be developed and operated by Dingo West Coal Pty Ltd, a wholly owned subsidiary of Bandanna Energy. Bandanna Energy is an Australian owned public company which listed on the Australian Securities Exchange's in 2008. Bandanna Energy has been in operation since 2008 and has over 1,400 million tonnes of JORC compliant Resources and Reserves (Bandanna Energy 2011 Annual Report).

The contact details for Dingo West Coal are:

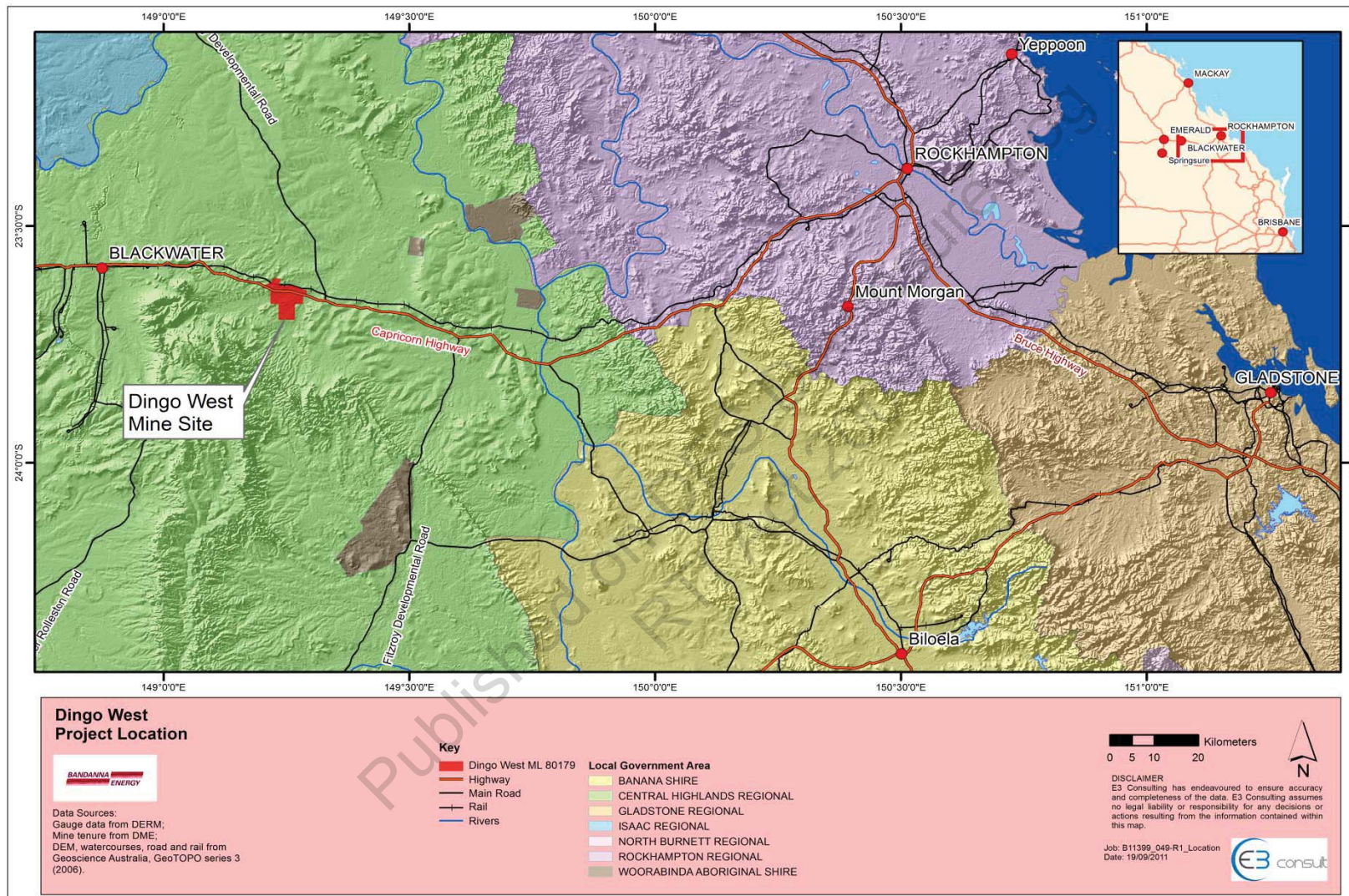
Dingo West Coal Pty Ltd
Level 12, 410 Queen Street
Brisbane Qld 4000.

1.3 Project Assessment

The Proponent is seeking to have the Dingo West project approved pursuant to the *Environmental Protection Act 1994* (EP Act) via an approved Environmental Impact Statement (EIS) and Environmental Authority (mining lease) (EA(ml)).

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Figure 1. Project Location



Pursuant to the EP Act, activities that will, or have the potential to, release contaminants into the environment and which may cause environmental harm are defined as Environmentally Relevant Activities (ERA).

The Dingo West Coal Mine proposes to undertake the following ERAs:

- ERA 8 Chemical storage – storing gas, liquid or solid chemicals classified as dangerous goods in containers;
- ERA 15 Fuel burning – using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour;
- ERA 18 Boilermaking or engineering – boilermaking, assembling, building or manufacturing a total of 200t or more of metal product a year;
- ERA 31 Mineral processing – processing in a year 1,000t or more of coke or mineral products;
- ERA 33 Crushing, Mining, grinding or screening – crushing, grinding, milling or screening more than 5000t of material in a year;
- ERA 56 Regulated waste storage – operating a facility for receiving and storing regulated waste for more than 24 hours; and
- ERA 63 Sewage treatment – operating no-release works with a total daily peak design capacity of at least 21 equivalent persons (EP).

Under the SP Act, ERAs are exempt development for mining activities as defined under the MR Act. The EA sought is an integrated authority that allows for the carrying out of separate ERAs that are to be managed in an integrated manner. The EA is expected to provide approval conditions for each of the required ERAs.

A referral under the *Environment Protection and Biodiversity Conservation 1999* (EPBC Act) has been made to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) to determine if there are any controlling provisions for the project. The Project was declared “Not a Controlled Action if Undertaken in a Controlled manner” (EPBC Referral 2010/5775) by DSEWPaC based on the minimal impact the Project would have on Matters of National Environmental Significance (MNES).

1.4 Purpose of the Initial Advice Statement

The purpose of this Initial Advice Statement (IAS) is to provide sufficient information to the Queensland Government Department of Environment and Resource Management (DERM) to assist the proponents Mining Lease Application (MLA).

2. Project Description

2.1 Overview

The Project is located within one of the principal geological structural units of the Bowen Basin, the Dawson Fold Zone, which overlays part of the western extent of the Taroom Trough. The area comprises sediments from the Rewan, Rangal, Burngrove and Fairhill Formations, and is bound in the west by the Yarrabee Fault.

The Dingo West coal deposit contains the Aries, Castor, Pollux, Orion and Pisces seams of the Rangal Coal Measures. Recoverable coal with these seams will primarily come from within the Rangal Coal measures but also the Upper Burngrove formation. At present, the Dingo West Mine has an initial inferred raw, low-volatile thermal coal resource of 92.2Mt. However, this resource estimate will be confirmed during the upcoming future planned exploration program and the definitive feasibility study.

The coal is described as low-volatile bituminous coal with moderate ash, sulphur and phosphorus. Coal quality across the deposit is variable but typically indicative of a high specific energy thermal coal. It is considered that selective mining and blending and washing of many of the intersected seams would provide a potential PCI product. Current assumptions indicate the coal handling and preparation plant (CHPP) will wash part or all raw coal to a PCI Coal. Consideration will also be given to in-pit crushing to produce PCI and bypass the CHPP during the early stage of the mine operation.

Key features of the Project include:

- Development of a green field open cut coal mine within the proposed MLA80180;
- A mine life of approximately 30 years;
- Construction will include site access roads and haul roads, train load out (TLO) facility, CHPP, mine infrastructure area (MIA), construction of clean water dam and pit dewatering dam, flood protection levees particularly around infrastructure in close proximity to existing waterways, raw water and co-disposal/tailings dams (final tailings options will be determined during a detailed options analysis scheduled for Q1 2012) and mine surface water management systems;
- Mining to occur in three main pit areas: Pit one will be exclusively mined in the first 11 years. It is expected that concurrent mining will then follow in pits two and three for remainder of the mine life and this will be determined during the definitive feasibility study due for completion in 2012;
- Total ROM output is expected to remain relatively stable at approximately 1.4Mtpa for the life of the mine;
- 20 hours a day, seven days a week operation excavating to depths of 96m;
- The predominant mining method used will be blasting of overburden and overburden, interburden and coal removal using a combination of shovels, excavators, frontend loaders and trucks;
- Overburden and interburden will initially be used for construction activities with the remainder stored in an out-of-pit dump. Overburden and interburden generated past year one will be back-filled into the pit;
- Progressive rehabilitation of disturbed areas with minimal voids expected following mining activities;
- Development of a works accommodation camp designed to house up to a maximum of 220 persons during construction and 120 during operation; and
- Installation of a package potable water treatment plant and a sewage treatment plant.

Dingo West Coal will contract the mining operation to a mining contractor and the construction of the mining and associated infrastructure (e.g. CHPP, MIA, conveyors, accommodation camp). Dingo West Coal will maintain a management team to manage the construction and operation contractors.

2.2 The Resource

The Dingo West area is contained within the Dawson Fold Zone, which overlays part of western extent of the Taroom Trough (see **Figure 2**). The Dawson Fold Zone is located west of the Gogango Overfold Zone and east of Comet Ridge morphotectonic zone. To date Dingo West Coal has identified total resources of 91.1 million tonnes.

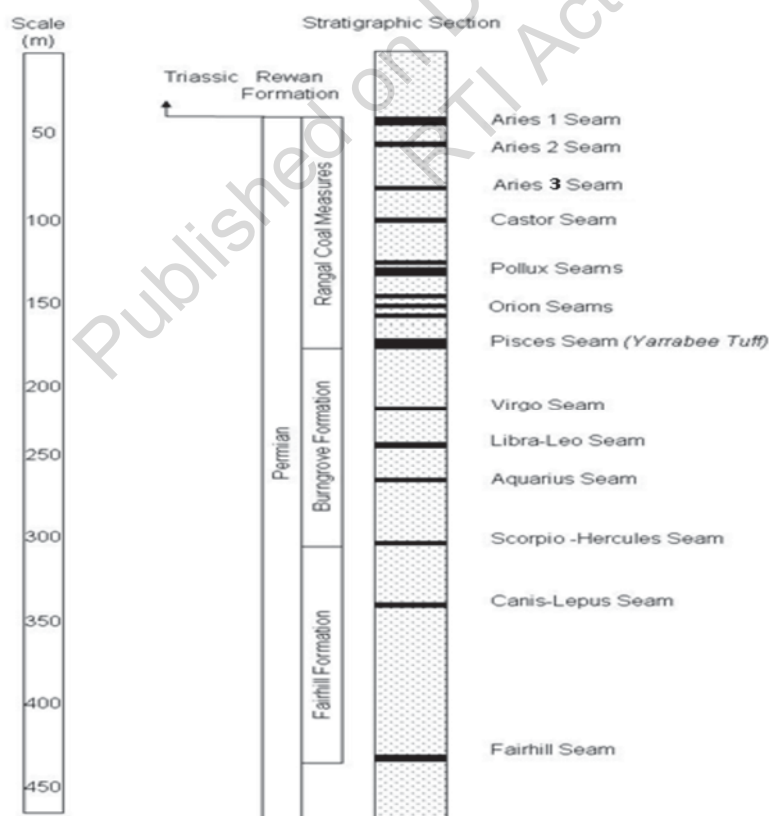
The area comprises sediments from the Rewan, Rangal, Burngrove and Fairhill formations, and is bound in the west by the Yarrabee fault. The hanging wall of the Yarrabee fault exhibits approximately 300 m of deformation to the west, on a series of shallowly ramping decollement surfaces.

The Yarrabee Fault defines the western boundary of MLA80180. The structural geology of the deposit is complex with isolated dips of up to 70° having been observed in recent exploration core drilling.

The Dingo West coal deposit contains target seams within the Rangal Coal Measures, correlated with the Aries, Castor, Pollux, Orion and Pisces seams from the Blackwater area and Upper Burngrove Formation.

The deposit area is structurally complex with significant faulting (both minor and major) and folding occurring throughout the lease area. A significant proportion of the folding appears to be directly related to the major faulting (Yarrabee fault and other major faults) of the deposit area, with the exception of the more significant anticline structure in the south of the lease, which is responsible for a proportion of the faulting in that area.

Figure 2. Representative stratigraphic column for MLA80180



2.3 Land Tenure

The Project is situated in the rural zone of the CHRC – Duaringa Shire. The current Duaringa Shire Planning Scheme lists the agricultural land classification of the Project area as Class C2 – “Pasture land suitable for grazing native pastures with or without the addition of pasture species introduced without ground disturbance”. The land is typically used for low density cattle grazing with rural homesteads located on properties surrounding the Project area.

The mining lease area incorporates nine separate allotments comprising freehold, leasehold and state owned land. Land tenure and ownership details for these properties within the mining lease are shown in **Table 1**. **Figure 3** shows land tenures within and surrounding the Project area.

Table 1. Land tenure and ownership details

Real property description	Tenure	Primary land use
Lot 1 HT424	Freehold	Cattle breeding and fattening
Lot 2 HT138	Freehold	Cattle breeding and fattening
Lot 3 RP801280	Freehold	Cattle grazing and breeding
Lot 4 RP801280		
Lot 13 HT63	State Land	Reserved for cemetery
Lot 3 SP226576	Freehold	Cattle grazing and breeding
Lot 100 RP882349		
Lot 643 SP226575	State Land	Queensland rail easement

There are several coal and petroleum tenements within the immediate surrounding area of the wider MLA. Six Exploration Permits for Coal (including Bandanna Energy’s current EPC 881) adjoin the Project area and two Petroleum Exploration Permits and one Petroleum Survey Licence intersect the current mining lease. Two existing gas exploration wells are located within the mining lease area; however, these do not interfere with the proposed mining operation. The future development objectives of coal seam gas (CSG) proponents are yet to be determined; however, future consultation will need to be undertaken by these proponents and Dingo West Coal. These tenements are shown in **Table 2**. Refer to **Figure 4** and **Figure 5** for spatial locations of coal and petroleum tenements respectively.

Figure 3. Land tenure

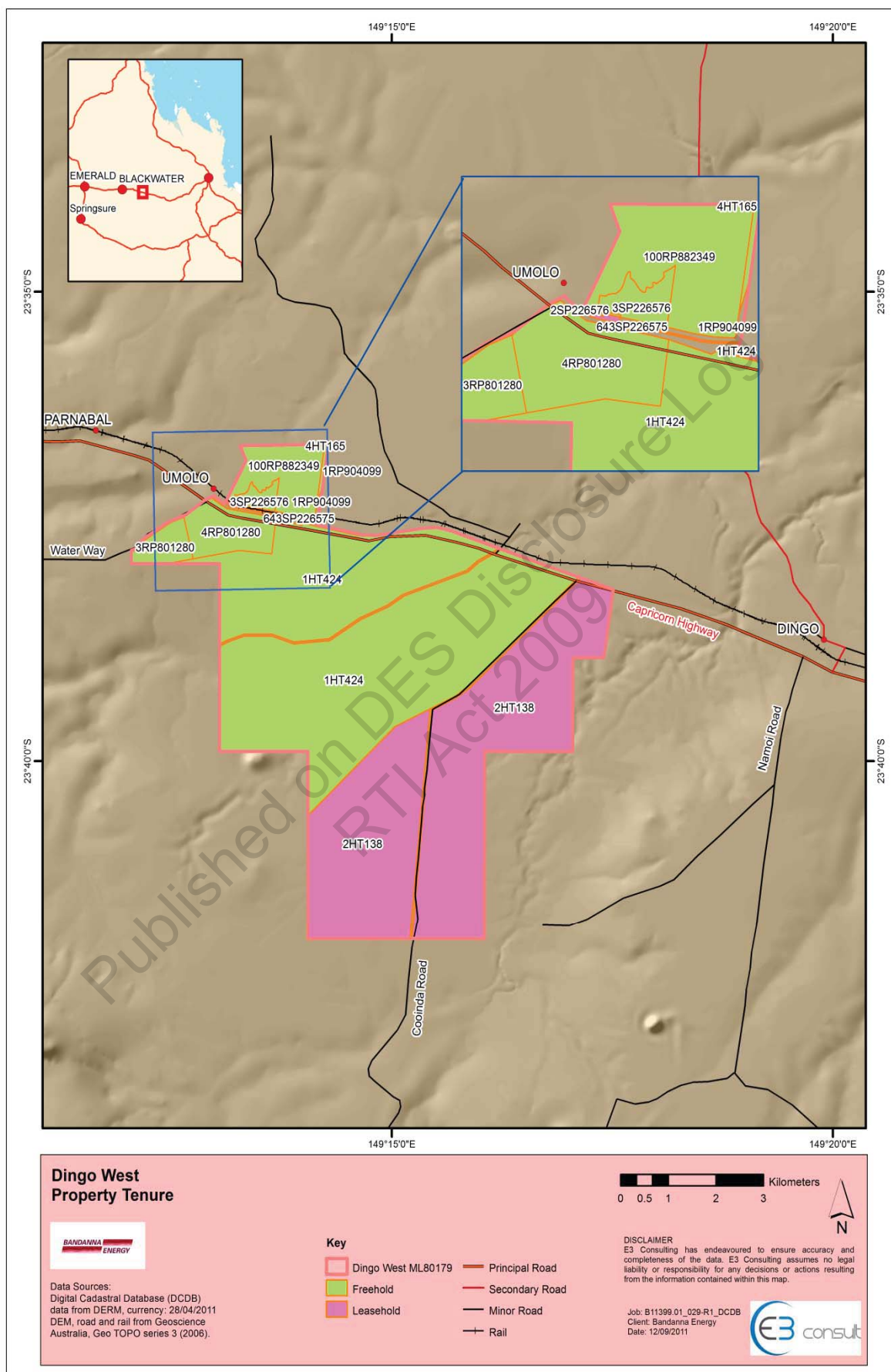


Figure 4. Coal tenements

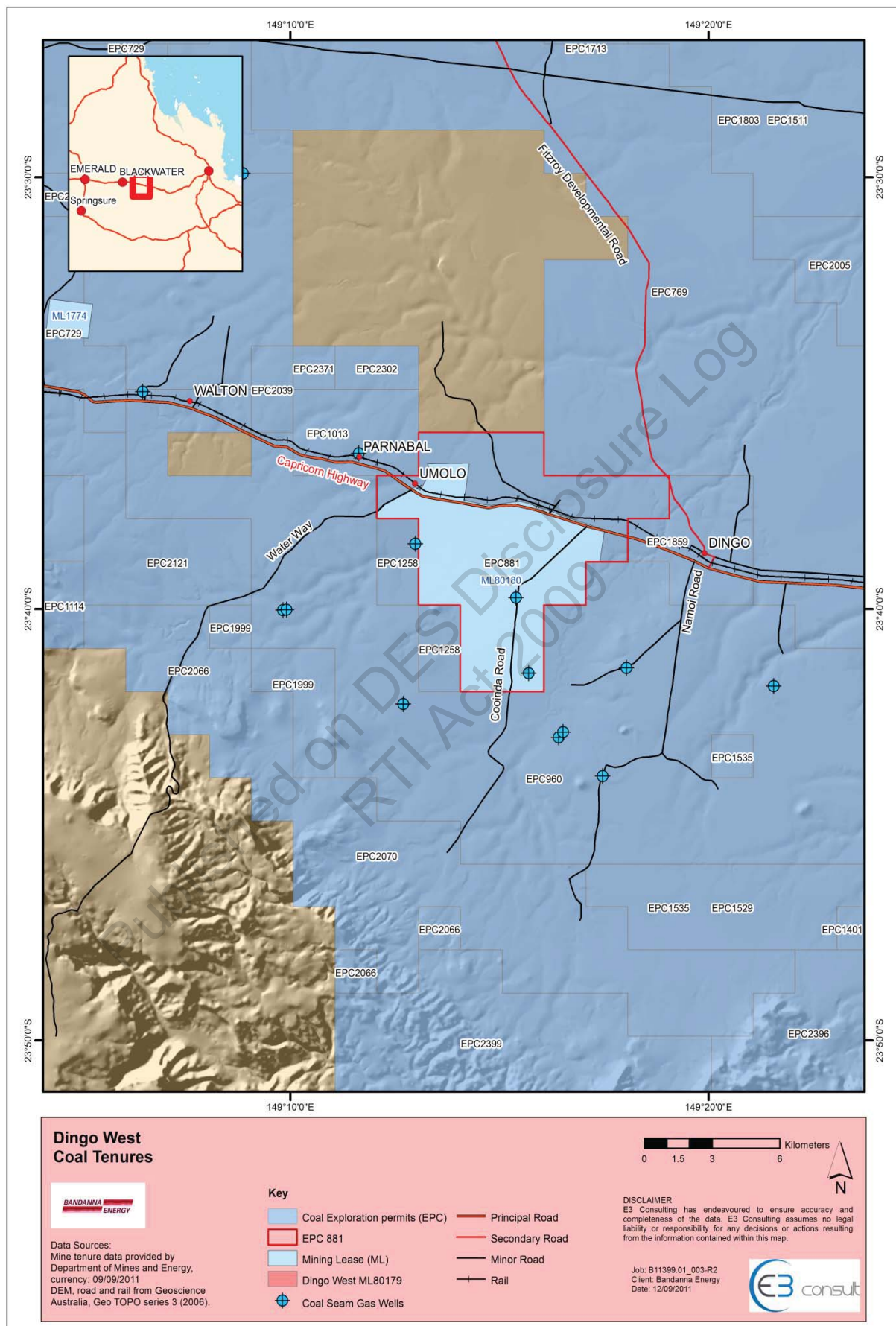


Figure 5. Petroleum tenements

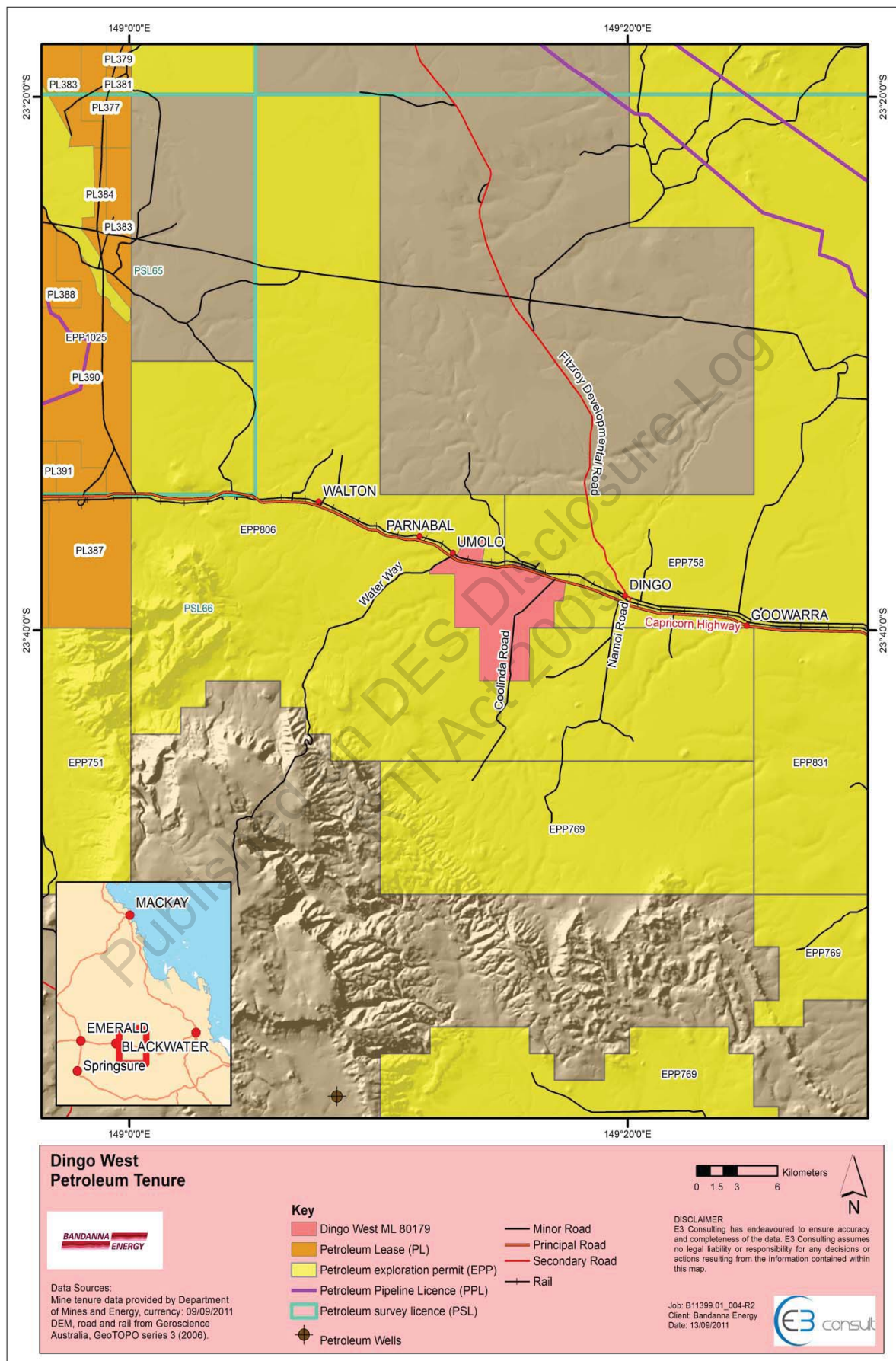


Table 2. Mining and petroleum tenements in the immediate vicinity of the mining lease

Tenure	Tenure holder	Granted	Expires
Coal			
EPC 1013	Argos Pty Ltd	3 October 2005	15 December 2011
EPC 1258	MCG Resources Pty Ltd	26 October 2008	21 October 2013
EPC 960	Argos Pty Ltd	30 May 2005	29 May 2011 (renewal lodged)
EPC 1859	Area Coal Pty Ltd	31 May 2011	30 May 2016
EPC 769	Capricorn Coal Pty Ltd	3 September 2002	2 September 2011
Petroleum			
PSL 66	BOW Energy Pty Ltd	12 May 2011	n/a
EPP 806 (ATP)	OME Resources Pty Ltd	30 April 2007	30 April 2019
EPP 758	OME Resources Pty Ltd	19 October 2004	31 October 2008 (renewal lodged)

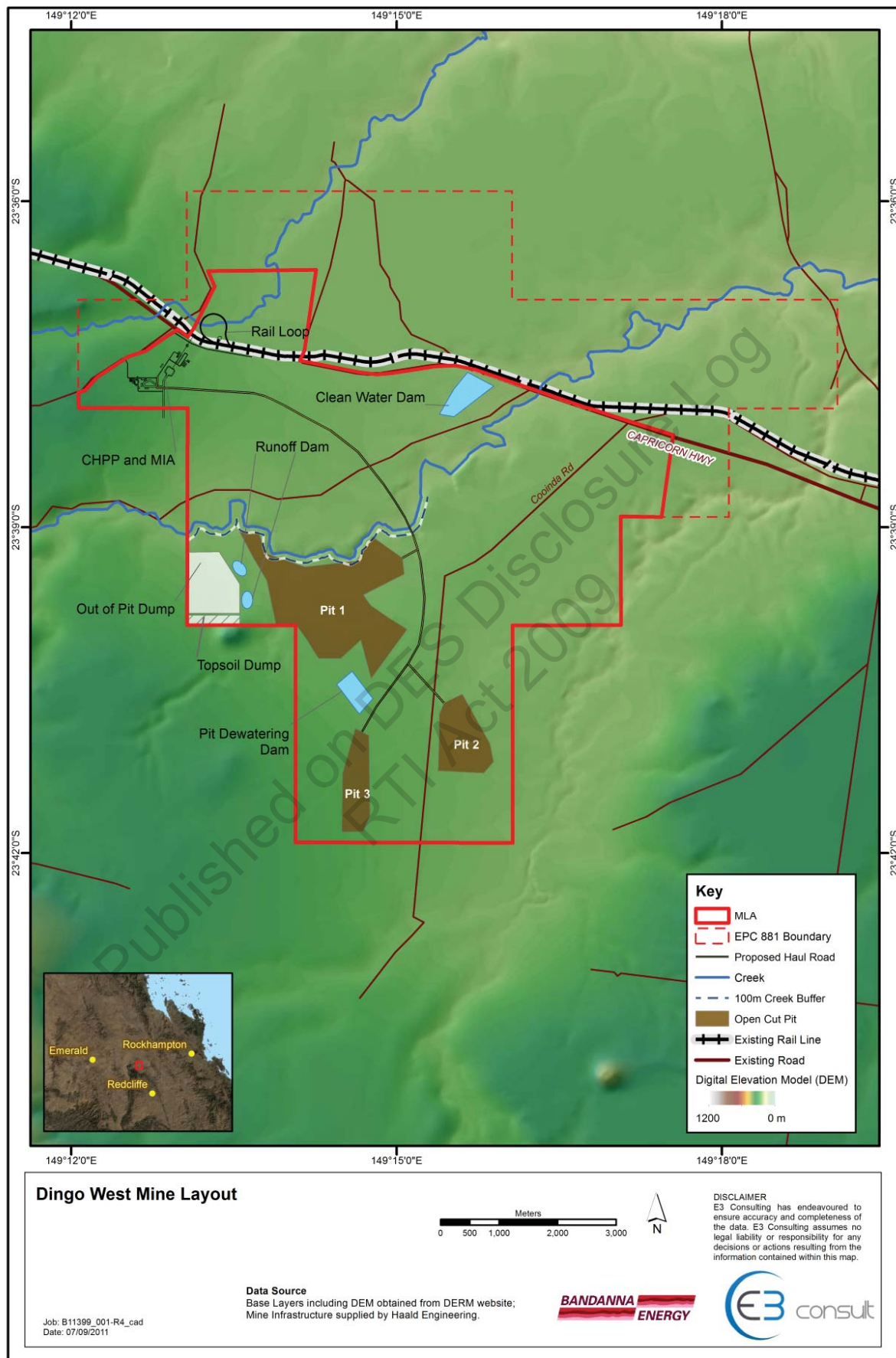
2.4 Mining Process

Margin rank analyses identified seven main areas of interest within the area of MLA80180. From these areas, three open cut pits in the southern portion of the MLA80180 area and wholly within the proposed mining lease, have been identified as the most probable locations based on a range of factors including coal seam thickness, quantity of overburden and interburden, cost of extraction and environmental considerations. Indicative locations of these pits are shown in **Figure 6**. These locations will be finalised following results from ongoing and future planned exploration drilling to be completed during the definitive feasibility study due for completion in 2012.

It is anticipated that mining will only be undertaken in these pit areas for the life of the mine – exploration drilling indicates that mining in the area to the north of pit one is unlikely due to poor resource recovery estimates. Pit one, which lies immediately to the south of Charlevue Creek, is expected to be mined exclusively for the first 11 years. Mining in the area of pits two and three is expected to commence following cessation of mining in pit one.

The relatively shallow depth of the targeted seams – pit depth range from 96m to 85.1m – and the coal seam cumulative thickness of 3.5m to 4.5m from the Pollux and above seams make the Dingo West area ideal for open cut mining. Seam depth and orientation have been used to develop a mining strip layout suitable for truck and shovel mining and is typically based on mining strips approximately 100m wide.

Figure 6. Mine layout



Although pit one will be mined for at least 11 years, detailed production estimates have initially been undertaken for the first five years only. Mining schedules for the remainder of pit one and for pits two and three will be developed following completion of the current and future planned exploration operations. Production at Dingo West is unlikely to increase significantly beyond 1.4Mtpa of ROM coal due to the complex geological faulting which prohibits high tonnage outputs. An indicative mine schedule and strip plan for years 1-5 within pit one are provided in **Figure 7**.

Approximately 103 million bank cubic metres (Mbcm) of overburden and interburden will be generated during the first five years of operation ranging from 29Mbcm in year one to 14.8Mbcm in year three. It is the intention of Dingo West Coal to avoid where possible, the use of an out of pit dump and use overburden to construct haul roads, levees/bunds and infrastructure pads with excess overburden back-filled into the pit(s). Only excess outside of these activities will be stored in an out of pit dump. Production estimates for the corresponding period are provided in **Table 3**.

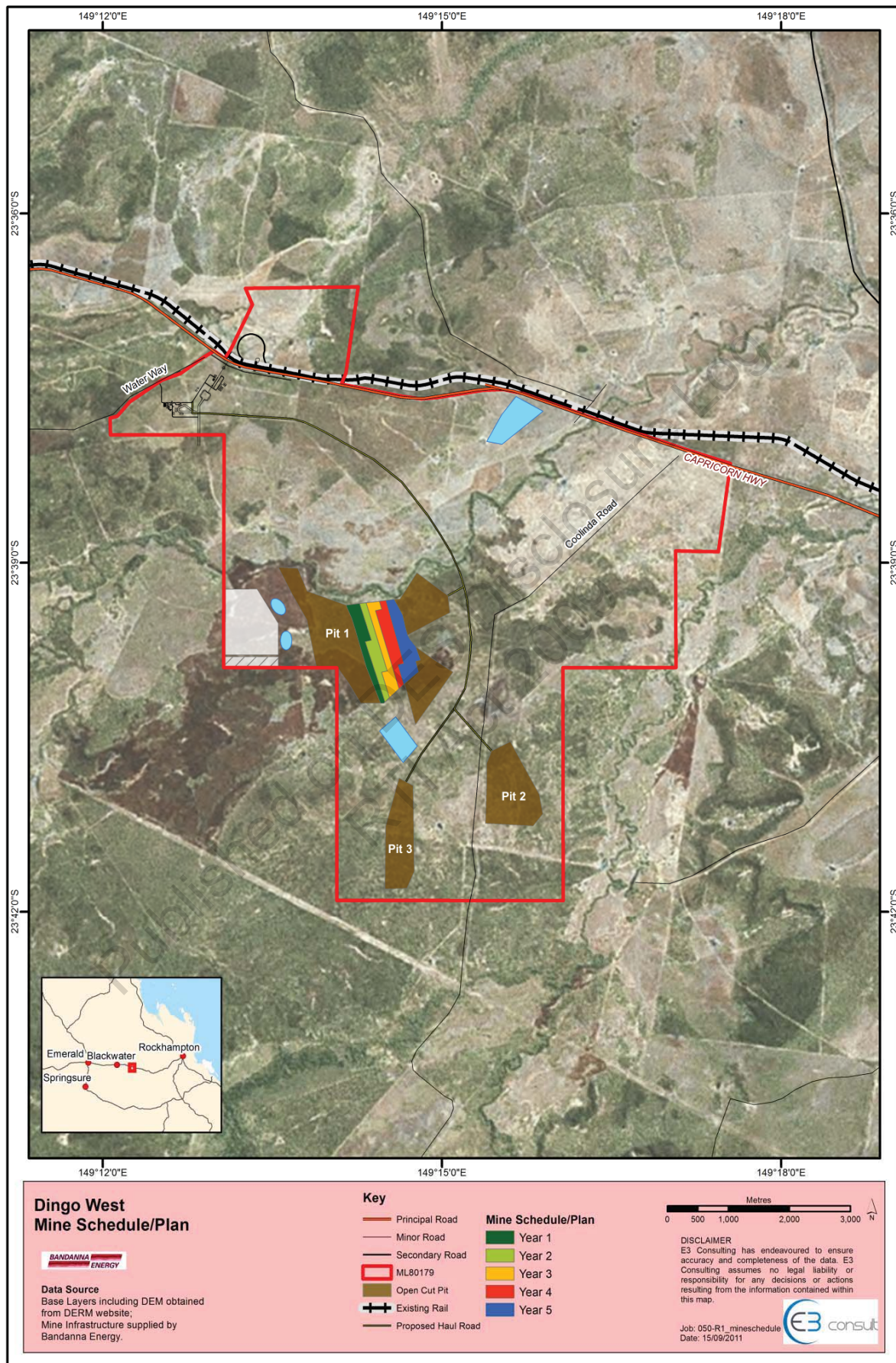
Table 3. Annualised schedule of production

Year	1	2	3	4	5
Total Waste (bcm)	29,004,860	16,331,424	14,879,126	18,526,696	24,338,529
ROM Coal (t)	1,430,000	1,430,000	1,430,000	1,430,000	1,430,000
Product Coal (t)	999,565	1,001,000	1,001,000	1,001,000	994,521
Pit Depth (m)	96.0	85.1	90.9	93.8	95.3

Main features of the mining sequence are outlined below:

- Vegetation clearing, topsoil stripping and stockpiling;
- Blasting of overburden. Blasting will be conducted between 9am and 3pm Monday to Friday and if required, 9am to 1pm on Saturdays. Blasting will not be undertaken on Sundays or public holidays;
- Removal of overburden by shovels, excavators and trucks;
- Extraction of coal by frontend loaders, excavators and trucks;
- Removal of interburden by shovels, excavators and trucks;
- Overburden and interburden disposal to the out-of-pit dump ;
- Delivery of ROM coal to the ROM stockpile adjacent to the CHPP using rear dump trucks;
- Transference of ROM coal to the CHPP for processing;
- ROM coal will be processed through the CHPP to produce PCI product coal;
- Coarse and fine rejects will be co-disposed in a co-disposal dam and returned to the mining void after drying;
- Product coal will be transported to the TLO via an over-road conveyor;
- Product coal will be transported to the port via rail for export; and

Figure 7. Mine schedule



- Water management including:
 - Supply and storage of raw water;
 - Potable water;
 - Sewage treatment;
 - Recycling of reject water for re-use in the CHPP;
 - Use of pit water for dust suppression;
 - Erosion and sediment control;
 - Flood protection;
 - Landform re-profiling and revegetation; and
 - Decommissioning and rehabilitation.

2.5 Mine Layout

The pits will be accessed by a purpose built coal haul road which will be used by both heavy and light vehicles. The main haul road extends in a south-east direction from the MIA and CHPP in the north-western section of the MLA to the pit locations in the southern section. The main haul road will be approximately 5km in length to pit one and constructed from compacted overburden material taken during the development and excavation of pit one.

It is expected the main haul road will also connect to pit two whereas access to pit three will be via a shorter additional road that branches off the main haul road. However, the final boundaries of these pits won't be finalised until Q2 2012. An indicative cumulative distance of the haul road from pit two to the MIA and CHPP is approximately 8km and approximately 2km further to pit three. Indicative pit and mining infrastructure locations are shown in **Figure 6**.

2.6 Coal Handling and Preparation Plant

The available in situ raw coal quality data suggests that the CHPP will wash the raw coal feed to a PCI product. A dense medium cyclone plant with spirals for fine coal treatment has been chosen, being typical of existing CHPPs treating similar coals. With Hardgrove Grindability Index (HGI) of 85, the raw coal is soft and additional fines will be generated during handling and sizing operations. Additional spirals will be required to process these fines. Coarse and fine rejects will be co-disposed and returned to the mining void after drying. Water drained from the co-disposal dam will be returned to the plant.

A thermal product can be produced by either bypassing the CHPP or washing all or part of the raw coal feed. The product conveyor tail end has been extended and a modulating flop gate installed to allow raw coal bypass. With only one stockpile and a single stacking conveyor, campaign washing of thermal coals from selected seams would be required to prevent contamination of PCI product on the stockpile.

With some seams exhibiting coking products, an additional rewash dense medium cyclone circuit would need to be installed to produce a coking coal and a PCI/thermal coal simultaneously. The existing product coal stacking conveyor will need to be replaced by two product conveyors feeding mobile stackers operating on two product stockpiles. A second reclaim tunnel, coal valves and reclaim conveyor will be installed to feed onto the existing product reclaim and TLO conveyor. The additional conveying and stacking equipment will negate the need to campaign wash when producing a thermal coal product.

2.6.1 Operating capacities

Initial throughput capacity of the CHPP is 1.4 Mtpa ROM coal. With a two shift, seven day roster and the plant producing for 20 hours per day for 50 weeks per year, the total operating hours annually is approximately 7,000 hours. This requires an average feed rate of 200tph (tonnes per hour).

A conservative CHPP name plate feed rate was chosen at 250tph for initial planning studies. This allows for regular maintenance and one campaign shutdown period for maintenance and repairs each year.

2.6.1.1 ROM receival

The ROM pad will be approximately 100m by 100m in size and has the capacity to store in excess of 10,000t of ROM coal with the ability to push out to 40,000t when the plant is shut down. A single front end loader will manage the coal supply from the stockpile to the ROM bin, while a dozer will be used to push coal out during the shutdown periods. This dozer will be taken from the existing mining fleet or the product coal stockpile.

2.6.1.2 Raw coal management

The ROM coal will pass through a grizzly at the top of the bin and onto a feeder breaker which will size the coal to $\leq 150\text{mm}$. The feeder breaker will feed onto a conveyor on which the coal will be transported to the sizing tower and the surge bin. The feeder on the bin discharge will deliver coal to a secondary sizer followed by a tertiary sizer. The output of the tertiary sizer, sized to $\leq 50\text{mm}$, will then be delivered to a flop gate which will direct coal to the CPP feed conveyor or the product coal conveyor. The required number of sizing stages will be finalised prior to construction.

2.6.1.3 Co-disposal

The prefeasibility study for the Dingo West plant has acknowledged that there are a number of options for disposal of tailings / rejects. These options will be further investigated during the Definitive Feasibility Study. Further coal washability testing will be undertaken to assist in the selection of the tailings / rejects management option.

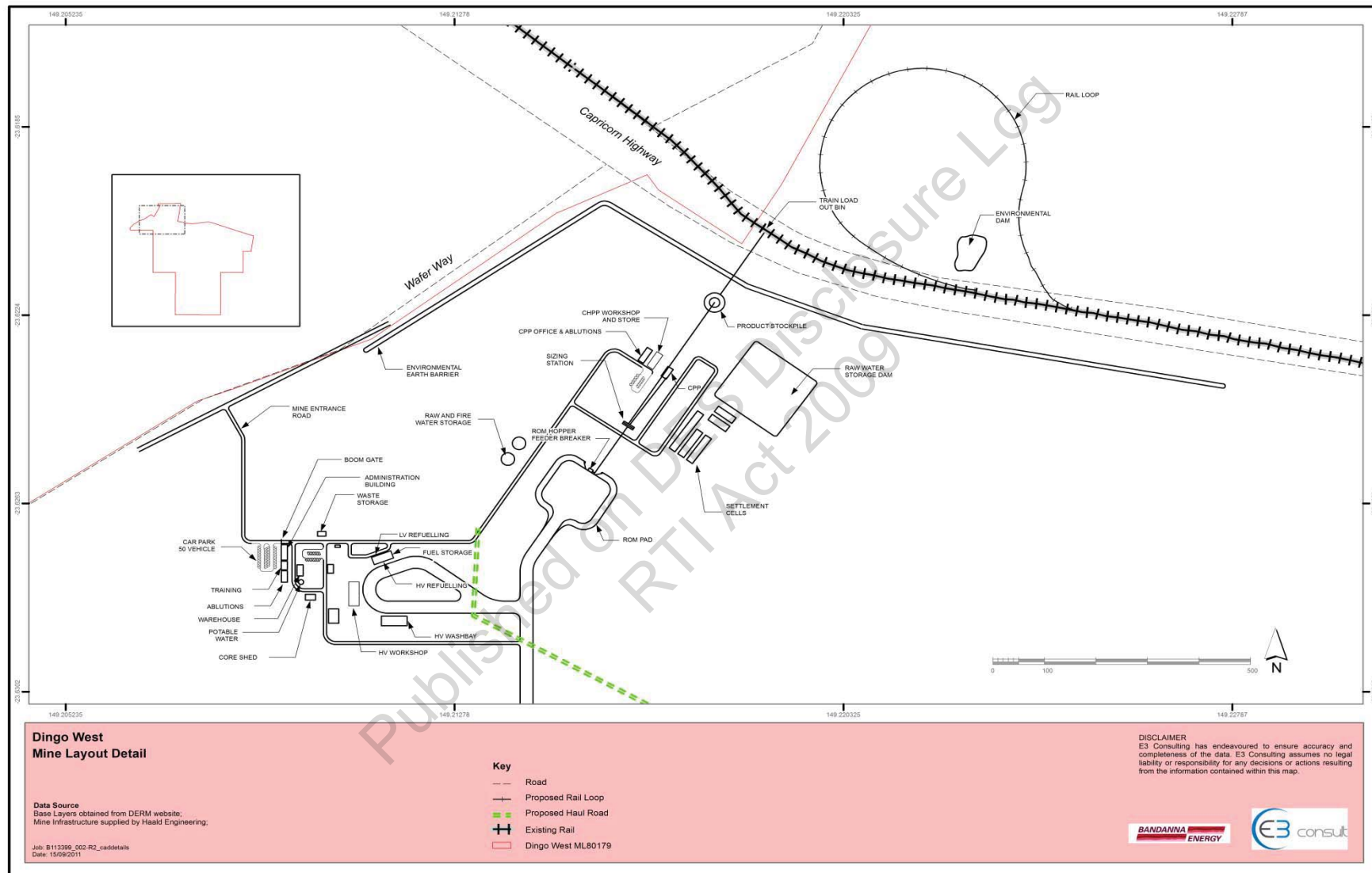
The preferred option based on expected coal washability data is to use co-disposal methods for rejects management. Coarse rejects from the plant (separated with the use dense medium cyclones and screens) will be stockpiled whilst fine rejects will be pumped to fine coal management cells (as shown on **Figure 8**). The fine coal management cells will allow for the solids to form a fines "beach" with water to be recovered through two settlement dams, a polishing dam and then returned to the plant for re-use. Bunds (refer to as the environmental earth barrier on **Figure 8**) will essentially surround the MIA, CHPP and the settlement cells and prohibit discharge from the cells to the wider receiving environment.

Coarse and fine rejects will then be co-disposed and returned to the mining void after drying.

2.6.1.4 Product coal handling

Product coal from the CHPP and bypassed coal will be transported to the product stockpile. The stockpile will be a single conical stockpile with 20,000t free fall. The total capacity of the stockpile will be 50,000t using dozer push out.

Figure 8. Mine layout general arrangement



2.7 Product Coal Reclaim and Train Load Out

The product coal will be reclaimed by coal valves onto the reclaim conveyor located in a reclaim tunnel. The reclaim conveyor will transport coal to the TLO on the northern side of the Capricorn Highway. The TLO will be a flask loader incorporating a 300t surge bin with a 50t weigh bin for train loading. The reclaim and TLO system has an operating capacity of 4,250tph to ensure that a single 8,500t nominal capacity train can be filled within the two hour time frame specified by QR National Pty Ltd.

A typical TLO and general arrangement of this is provided in **Figure 9**, **Figure 10** and **Figure 8**.

Figure 9. Existing Blackwater reclaim conveyor – Capricorn Highway



Figure 10. Existing Blackwater train load out facility – Capricorn Highway



2.8 Mining Equipment

An indicative list of the equipment anticipated for mining is shown at **Table 4**. The number of equipment are based on the mine plan and proposed mining operations currently under consideration.

Table 4. Estimated construction equipment fleet

Type of Equipment	Indicative Number in Construction Fleet
Haul truck (180t)	5
Drill Rig	1
Front End loader	1
Tracked dozer	2
Excavator	1
Grader	1
Fuel Truck	1
Water Truck	1

2.9 Onsite Mine Infrastructure

This section outlines the anticipated locations, size and general specifications of all on-site infrastructure excluding mining pits, haul roads, CHPP and TLO.

Infrastructure within the site layout includes:

- Light vehicle roads including access roads and car parks;
- Water management including storage and reticulation of raw water, potable water, firewater, sewage, and drainage;
- Power and communications;
- MIA including administration, ablutions, workshops, stores, tanks and ancillary buildings and surrounds; and any fuelling, wash-down, and service bays; and
- Waste management including all waste handling, storage and disposal other than that generated by the mine or CHPP (spoil and rejects).

2.9.1 Light vehicle roads

Current estimates require approximately 2km of sealed, dual lane roads for access around the MIA and CHPP. Unpaved tracks for accessing remote infrastructure elements (e.g. dam pumps) will be identified and established during the construction phase of the project. It is envisaged that approximately 5km of tracks will be required.

2.9.2 Site water management

2.9.2.1 Water supply

Security of water supply is one of the biggest risks to the Dingo West project. The most probable solution for securing long-term water supplies is via an allocation from the water grid from the proposed SunWater pipeline to be constructed in 2013 that will run from Duaringa to Blackwater along the Capricorn Highway

(across the proposed mining lease area) that will be fed by treated CSG surplus water. Discussions with SunWater are ongoing and a 2 Gigalitre (GL) to 3GL allocation from this pipeline, which is enough to cover the annual water usage expected, is likely to be available.

At present, underground water allocations are currently being examined for the Project. DERM activated a Moratorium on Water Usage from the Fitzroy Basin on 14 December 2010. This moratorium prevents the use of bore or creek water in the region unless the Project is declared significant under s.26 of the *State Development and Public Works Organisation Act 1971*. The Project is not declared significant under that Act.

Several options have been explored for top-up water during operation and possibly for construction as follows:

- Amend current irrigation permits to mining use. Medium priority allocations can be converted to high priority allocations at a rate of around one-third the allocation. A pipeline would need to be constructed from either the Mackenzie or Dawson River to take this allocation. However, these water allocations cannot be guaranteed during prolonged dry spells;
- Apply for underground water use and sink bores holes. However, as the Moratorium states that for the project must be declared significant by the State potential issues may arise. In addition, exploratory drilling will be required to determine if water is present to adequate levels;
- Contact existing mining companies in close proximity to Dingo West to seek permission to treat and pump excess water from their sites. All necessary legislative approvals would need to be obtained prior to pumping; and
- Capture and re-use as much on-site water as possible including:
 - Re-use of water recovered from fine and coarse rejects;
 - Capture and re-use of runoff water from the plant and MIA area;
 - Capture and re-use of runoff water from the out of pit dump; and
 - Dewatering of the pits will be sent to a dewatering dam for use as dust suppression water on the pit roads.

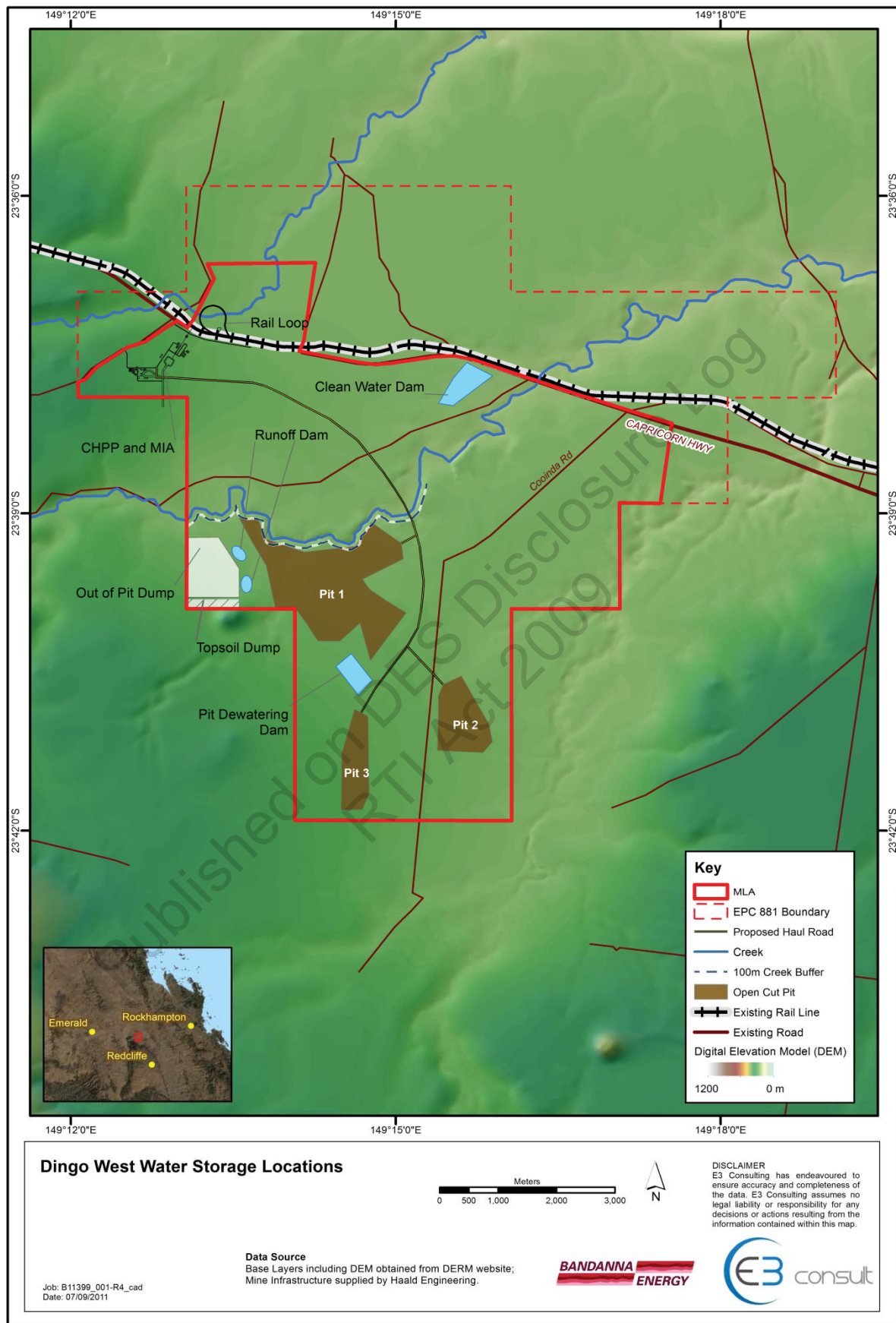
2.9.2.2 Water storage and drainage

The current mine layout has been designed to avoid any watercourse diversions and all dam locations and erosion and sediment control devices have been chosen to minimise potential runoff into receiving environments (refer to **Figure 11**).

A number of dams and associated drainage systems have been conceptually designed for the Dingo West Project as follows:

- A clean water dam supplied by overland flow will be located immediately west of Charlevue Creek and bounded by the Capricorn Highway to the north. Run-off in the undisturbed portion of the Project area to the west of Charlevue Creek and to the east of the MIA will be captured in this dam;
- Cut and fill contoured pads will be constructed at the MIA and CHPP, which will direct water flows to two runoff catchment dams. Water will then be directed from these dams to the settlement and polishing dams for use in the plant;
- The raw water dam of approximately 40 ML is filled with water pumped from the clean water dam. Two 600,000L tanks will be installed at the MIA and filled with water from the raw water dam. Water from one of these tanks will be used exclusively for fire fighting;
- A mine de-watering dam will be located between the proposed first two pits on high ground to avoid inundation during floods. Water from this dam will be pumped into water trucks and used for pit and haul road dust suppression;

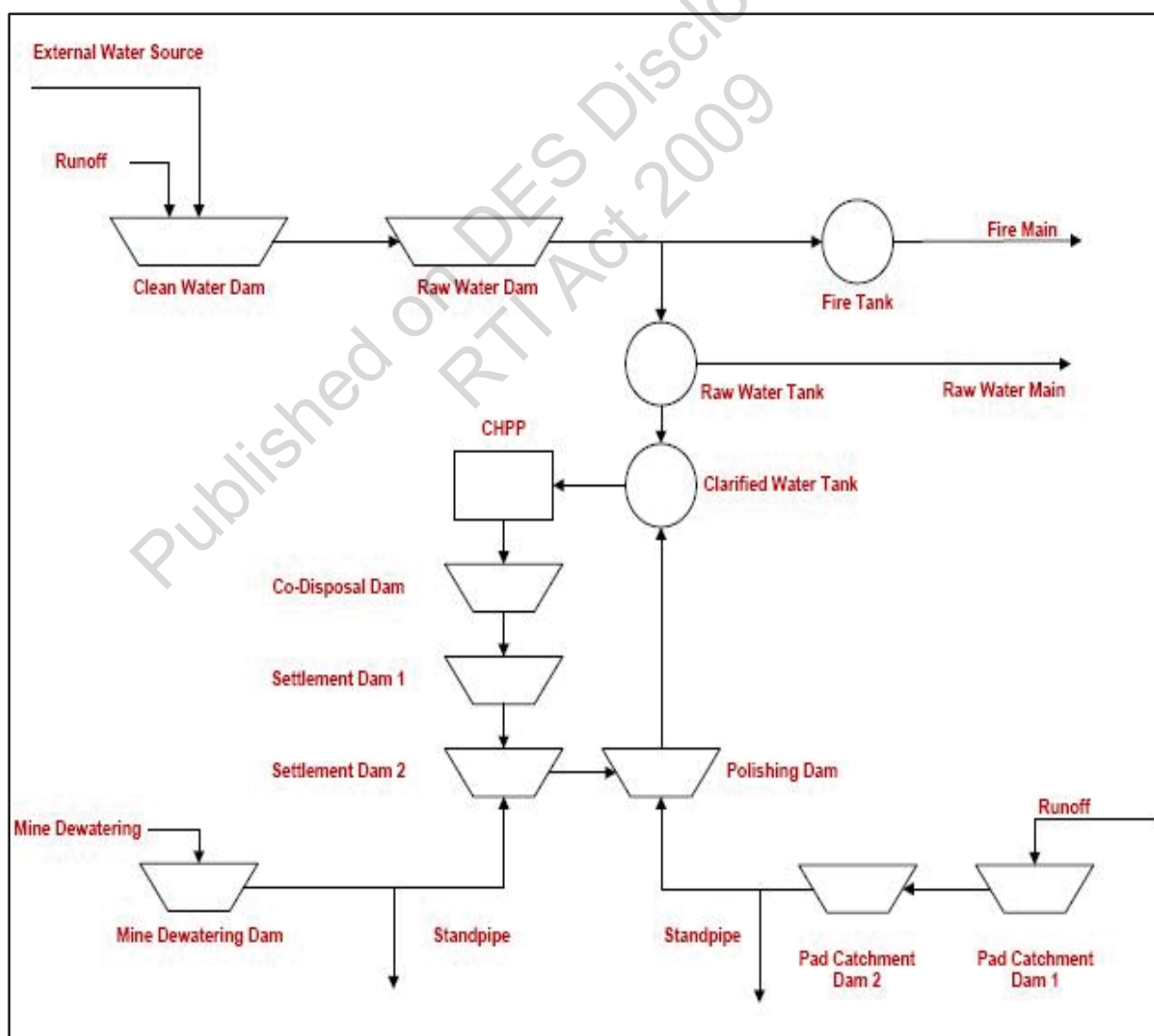
Figure 11. Water storages



- Out of pit spoil (if required) and topsoil stockpiles will be positioned near the pit(s) once mining begins. Where out of pit dumps are required, runoff control dams will be provided down slope of the dumps to intercept and contain stormwater runoff from the dumps. Stormwater runoff from out of pit dumps will be pumped back into the mine water management system for meeting site water demands;
- With pit one located adjacent to Charlevue Creek, a levee will be constructed to ensure the pit can remain safe from inundation (and hence avoid dewatering) during high rainfall events. As part of the definitive feasibility study a 1:1000 flood study will be conducted with designs developed to avoid inundation. The flood protection levee will be designed in accordance with the DERM *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*. The mine flood study will be used to determine the levee height and flood velocities for design of suitable scour protection. The flood study will also assess the impacts of the flood protection levee on upstream and downstream flooding conditions and the need for compensatory channel earthworks to mitigate any adverse impacts on flooding conditions outside of the proposed mining lease; and
- A detailed water balance model will also be undertaken during the definitive feasibility study.

A preliminary site water flow is shown in **Figure 12** (potable water is not included in this diagram).

Figure 12. Site water flow block diagram



2.9.2.3 Potable water

Currently, the potable Water Treatment Plant (WTP) will be located at the proposed accommodation camp. Water will be trucked to a 200,000l tank positioned north of the main access road near at the MIA.

DERM have confirmed that a permit will be required for extracting groundwater for potable usage. However, approval applications for drinking and ablution usage should be a routine approval. In the event that underground flow is insufficient, discussions will be undertaken with one of the larger towns (Emerald or Rockhampton) water supply authority for purchasing potable water.

2.9.3 Mine Infrastructure Area

The MIA includes the following infrastructure:

- Administration and training facilities;
- Bathhouse;
- Communication facilities;
- Crib facilities;
- Drill core storage facilities;
- Equipment storage facilities;
- Fire fighting system;
- Fuel and lubrication facilities;
- Hazardous materials storage facilities;
- Laydown areas;
- Maintenance workshop;
- Medical facilities;
- Power facilities;
- Security office and boom gate;
- Sewage treatment plant;
- Temporary accommodation, services and offices;
- Vehicle wash down bays; and
- Waste station.

The MIA layout was selected to optimise traffic flows on the site and keep heavy vehicle/light vehicle interactions to a minimum, with logical separations around the fuel system and workshop areas.

2.9.4 Sewage treatment and disposal

The sewage treatment and disposal comprises collection, intermediate storage, and treatment capacity required to service the demands of the site and accommodation camp. The sewerage treatment plant (STP) for the Project will be located at the accommodation camp. Being outside of the proposed mining lease, the camp will require separate legislative approvals.

Sewage from the site ablutions will be collected from on-lease gravity collection storages and trucked to the STP. The plant will be sized to cater for the construction personnel load and specified to efficiently manage any turn-down required for the reduced operational demands. This approach will not place additional demand on the local council sewage treatment infrastructure.

2.9.5 Power supply

The power supply for the mine site will be provided by 415V, three-phase diesel generators, installed at the MIA and the CHPP.

2.9.5.1 MIA

The MIA Substation consists of two 300KVA 415V diesel generator sets mounted in a fully bunded area adjacent to the MIA 415V Switchroom. The normal mode of operation for the generators is synchronised and connected to the load through a bus tie. However, they have been sized to provide redundancy with each generator capable of carrying the total load.

The generators are complete with their own diesel day tanks capable of holding sufficient diesel for a minimum of seven days operation on full load. The generators will be hired to minimise initial capital costs and the hire company will be responsible for all repairs and maintenance.

The MIA 415V Switchroom houses the main 415V Distribution Board. Sub-main circuits are distributed to each of the MIA buildings, service points and area lighting. The area lighting consists of hinged lighting towers fitted with 1,000W floodlights.

2.9.5.2 CHPP

The CHPP area is serviced by two substations, one at raw coal area and the other at the CHPP. The raw coal substation consists of one 500KVA 415V diesel generator set mounted in a fully bunded area adjacent to the Raw Coal 415V Switchroom. The CHPP substation has three 500KVA 415V diesel generator sets mounted in a fully bunded area adjacent to the CHPP 415V Switchroom. The normal mode of operation for the four generators is synchronised and connected to the load through bus ties with an interconnecting cable installed between the two substations. The generators have been sized to provide redundancy with three generators capable of carrying the total load.

Similar to the generators used at the MIS, each have their own diesel tanks capable of holding sufficient diesel for a minimum of seven days operation on full load.

The Switchrooms house the motor control centres (MCC), programmable logic controls (PLC) and instrumentation equipment, as well as the 415V Distribution Board which supply light and power. The area lighting consists of hinged lighting towers fitted with 1,000W floodlights.

2.9.6 Communications

2.9.6.1 LAN and data communications

A Site LAN and temporary servers will be installed to service voice and data requirements during construction phase. A permanent air conditioned computer and communications room will be constructed as part of the administration building at the MIA. Equipment associated with all site communications such as the satellite system, radio system and servers for voice and data transmission will be installed here. An optical fibre (OF) backbone will be installed between this room and all offices, switch rooms and buildings at the MIA, CHPP and TLO. The CHPP SCADA control system will be interfaced by the OF backbone to provide a site wide control system with nodes at the control room, administration office and security office and gate, workshops and other authorised users as required. CCTV cameras at the security office and gate, the CHPP, TLO and ROM pad will be installed and connected to the LAN using the FO backbone cabling.

A computerised log on system, also connected to the LAN using the OF backbone, will be used by employees, contractors and visitors for recording personnel on site. This system is used for contractor management, fatigue management and identification of onsite personnel during emergency evacuations.

2.9.6.2 *Radio communications*

A digital trunked radio communication system (based on TETRA technology) will be installed in stages commencing with communications for the construction phase. This initial installation will provide coverage over the entire tenement, the township of Dingo, the accommodation camp site and the highway road access for response to calls for assistance when travelling to and from site.

The initial installation will consist of a 26m cyclonic concrete pole mast, located at the construction site, with easy access to the construction site LAN and mains power. An air conditioned relocatable building will house the electronic equipment with provision to install a microwave backbone radio LAN system at a later date when mining commences. This installation will be relocated to the MIA when construction is complete.

The second stage is an upgrade of the system to provide illumination of any working pit areas. A radio trailer with stabilised legs, a mast to ensure adequate coverage over the pit, and housing a TETRA base station will be positioned in the mining area to provide a full duplex microwave link backbone between the original site LAN at the MIA and the trailer. Power for the equipment will be provided by solar panels recharging a battery system. The system supports full duplex communications to provide full duplex private one on one and telephony calls and embraces IP technology and interfaces with the site LAN and fixed voice systems.

Further upgrades will be performed at a future date to encompass all Bandanna Energy mine sites in the region. Each site will operate individually, or for management and operational purposes, as a multi station, multi site wide area network.

2.9.6.3 *Fixed voice communications*

Fixed phones using IP telephony will be connected to the LAN for integration with the satellite and radio systems.

2.9.7 Maintenance workshops

The Project will require two maintenance workshop facilities. It is envisaged they will be low cost without fixed overhead cranes and will rely on hired mobile cranes as required as well as off-site maintenance for larger or more complex jobs.

2.9.7.1 *CHPP workshop*

The CHPP Workshop will be an 18 x 12m building with two small offices, a dual purpose crib room/meeting room with room for 10 employees, and toilets. Outside will be an area designed and bunded for lubricant and solvents storage both clean and dirty.

2.9.7.2 *Heavy vehicle workshop*

The Heavy Vehicle Workshop will be a 30 x 15 x 12m building with a floor capable of withstanding maintenance activities on mine trucks with an empty operating machine weight of 120 t. The building will contain two offices and a dual purpose crib room/meeting room large enough for 12 employees, and toilets.

2.9.8 First aid / medical room

The First Aid centre will be located in the administration building, occupying the northern end of the building with the security office. The centre will have suitable access from both east and west sides of the building for any medical supplies or persons that may require access in the case of an emergency. It will open onto the emergency vehicle park on the western side. It will be designed to have adequate space for a private examination room and a bathroom.

2.9.9 Bath house

It is proposed a bath house of 12 x 24m be included on site to cater for up to 40 employees. It will have a dirty side and a clean side with showers and toilets down the middle. A separate section for female staff will be included.

2.9.10 Vehicle wash-down bays

Washdown bays for both heavy and light vehicles are required for cleaning prior to maintenance and for adequate cleaning and wash-down of vehicles and equipment before leaving site.

The heavy vehicle wash-down bay will be designed to allow 200t payload capacity mine trucks to be cleaned. Nominal dimensions will be 25 x 12m and it will contain a means of removing waste oil and reusing water. An oil-water parallel-plate separator system including storages for dirty and clean water will be installed and will be sized to strip vehicle wash-down effluent and oily-water sourced from other areas of the MIA, mine, CHPP and TLO.

The light vehicle wash-down bay will be designed to allow vehicles up to Toyota troop carrier size to be cleaned. Nominal dimensions will be 10 x 5m. This wash-down bay will contain a means of transferring the waste water to the heavy vehicle wash-down way for stripping using the installed oil-water separator facility.

2.9.11 Fuel and lubricants installation

The fuel and lubricant bay will store and dispense diesel and lubricating oils and refuel heavy and light vehicles as well as mine service vehicles. The installation will be configured to store waste oils returned from servicing of mobile equipment prior to collection for disposal.

The bulk storage capacity for diesel fuel will be 300,000l which equates to five days supply. Estimates are based on three self-bunded storage tanks with pumping equipment capable of supplying separate light and heavy vehicle fuelling points. B-Double vehicles with an average load of 50,000l will deliver fuel to the installation. It is envisaged that local storages serving fixed diesel generating units at the camp and on site will be fuelled by the site mine service vehicle. Bulk storages and filling areas will be bunded to contain spillages, with liquid waste contained for pump-out and processing through an oil-water parallel-plate separator system.

Bulk lubricant delivery will be by road tanker with compartment sizes varying between 5,000l and 8,000l. Storage tanks have been sized for this requirement. Total lubricant consumption averages around 5,500l per week. Tanks and fill areas will be bunded to contain spillages, with liquid waste contained for pump-out and processing through an oil-water parallel-plate separator system.

2.9.12 Waste station

A purpose-built waste station will be built consisting of a bunded concrete pad with concrete wing walls to allow segregation of dry waste types for collection. Waste will be kept in skips or bins for transfer and disposal off-lease. Waste storage and its disposal will be managed in accordance with DERM administered policies on Waste Management and the enabling Waste Regulations.

2.9.13 Car parks

The main site car park will be adjacent to the administration building and be nominally 36 x 50m with 50 parking spaces with a sealed surface. Smaller vehicle parking bays will be located outside all MIA installations as required.

2.9.14 Hazardous materials storage

Small volume hazardous materials (e.g. some adhesives, coatings, cleaners, etc.) will be kept in purpose-built containment cupboards in accordance with the relevant material safety data sheets (MSDS) and statutory

requirements. Purpose-built containment cupboards will be located in the vicinity of the workshops and stores they serve.

Larger volume hazardous materials will be managed according to their respective MSDS and in line with current industry standards. The design for the fuel and lubricant installation will incorporate all necessary aspects for the safe storage and delivery of diesel and oils. Other hazardous items, such as any radioactive metering products, will be managed in accordance with industry guidelines and manufacturers' recommendations.

2.9.15 Drill core storage

All core analysis will be performed off site. On site storage will be in an enclosed shed with a concrete floor and forklift access to store the drill cores as they are produced. If required, this shed will also be used to store product samples from the CHPP before they are taken off site for analysis.

2.9.16 Crib facilities

Crib facilities similar to current mine practice will be included in the administration building, CHPP Office, HV (heavy vehicle) Workshop and Mine Office.

2.9.17 Gate

The mine site will have a boom gate situated at the security office on the northern end of the administration building controlling access to the mine, CHPP, TLO and key MIA elements. This will be the only point of access to the site.

2.9.18 Security office

The purpose of the security office is to control access of personnel and vehicles to operational areas. The security office will be a single office located at the northern end of the Administration Building.

2.9.19 Mine store

A warehouse with laydown yard will house mining consumables and spares. The warehouse will consist of a lockable shed of 12 x 12m with a concrete floor and lighting with a 50 x 50m yard attached.

2.9.20 Laydown areas

Future design will allocate suitable space in specified locations as laydown areas.

2.9.21 Administration building

The administration building will be located at the eastern side of the MIA car park. Nominal dimensions are 32 x 12m. This single storey building will contain a reception area, four offices, a meeting room, a kitchenette, rest rooms, the first-aid room and the security office.

2.9.22 Training room

The training room will be nominally 18 x 12m, designed to seat 40 personnel and located south of the administration building.

2.9.23 Fire fighting systems

Installations that require specialised fire fighting systems, such as the fuel and lubricants bay, will have a proprietary system incorporated into their design. A water cart will be included in the mining contractor's fleet fitted with a water monitor, foam generator and fire extinguishers to fight fires that may ignite in the Mine, MIA, CHPP or on haul roads.

The CHPP and MIA will have the aforementioned 600,000l fire water tank and associated pumping and reticulation systems.

2.9.24 Temporary services

Principal temporary services required will include power, potable water, ablutions and communications. For the temporary site office and works:

- Power will be supplied by diesel generators with diesel fuel being delivered by local contractor. A suitably sized diesel tank serving the needs of generator day tanks and vehicle refuelling will be located on lease;
- Potable water will be stored in a suitably sized tank served by a pump and replenished from a local council facility by contract; and
- Mobile phones will be used for communication utilising existing networks.

2.9.25 Temporary accommodation

Temporary accommodation will be required for personnel performing initial site works. It is envisaged that the administration centre during initial works will be located close to the homestead (Red Rock Camp) nearest the proposed rail loop. Several portable buildings are already located at Red Rock Camp but in the event additional buildings are required, these will be located adjacent to the existing accommodation facilities.

Temporary offices and work spaces will be managed using demountable buildings located between the proposed sites of the MIA and CHPP.

2.9.26 Rail spur and loop

The preferred balloon loop location is located immediately north of the Capricorn Highway opposite the CHPP as shown in **Figure 8**. The proposed loop is 600m in diameter and a minimum 4km in length.

2.9.27 Existing infrastructure

The only existing infrastructure associated with the Project is the Blackwater Railway System and the Capricorn Highway. On 5 September 2011, Bandanna Energy entered into the Wiggins Island Rail Project (WIRP) agreement with QR Network Pty Ltd. This agreement ensures construction of the necessary rail infrastructure and connection for source mines of the Stage 1 WICET project and provides Bandanna Energy with capacity to export Dingo West coal to either WICET or the existing RG Tanna export facility.

2.10 Offsite Mine Infrastructure

The following infrastructure described below is either not contained within the proposed mining lease or will be delivered to the site via an outside source and include:

- Logistics and transport;
- Off-lease communications infrastructure;
- Off-lease power infrastructure;
- Off-lease roads that influence or are influenced by the proposed site;
- Potable water plant;
- Sewerage treatment plant;
- The export facility; and

- Workforce accommodation.

2.10.1 Roads

Off-lease roads include the turnoff requirements from the Capricorn Highway into Charlevue Road (also referred to as Water Way) and the turnoff requirements from Charlevue Road onto the lease and the upgrade of 600m of Charlevue Road between the two turnoffs.

Development approvals will be required from the CHRC for the Charlevue Road/Water Way upgrade and turnoff onto the proposed mining lease and from Queensland's Department of Transport and Main Roads (DTMR) for any upgrades required for the Capricorn Highway turnoff into Charlevue Road/Water Way or the turnoff into Cooinda Road.

2.10.2 Communications

A leased remote satellite terminal will be installed at the mine site to provide telecommunications access, voice, data and messaging services via the Iridium satellite network. Seamless connectivity will be provided for the mine site radio and communication systems.

A similar leased remote satellite terminal will be installed at the camp. Seamless connectivity will be provided with the camp's distributed communications and data system which is being delivered as part of the camp contracted package.

2.10.3 Potable water

All potable water will be supplied, under licence, from treated underground water. A WTP will be located in the accommodation camp and supply both the accommodation camp and operational requirements. Operational requirements will be transported by road for storage at the MIA.

2.10.4 Sewage

A STP will be located at the camp and will process both camp sewage and sewage from the mining lease. Sewage from the lease will be transported by road to the camp STP for treatment. The liquid waste discharged from the STP will be Class A+ recycled water, suitable for general surface irrigation of plants and gardens and dust suppression.

2.10.5 Workforce accommodation

A camp to accommodate construction, operations and occasional contract and visitor personnel will be located in the vicinity of the Dingo Township. The camp will be sized to accommodate up to a maximum 220 temporary construction personnel and up to 120 operations personnel.

The camp will utilise diesel generators for power supply and will have its own potable water treatment plant and sewerage treatment plant. Personnel will be bussed between camp and site at shift commencement and completion.

The camp will be constructed to a high level of amenity to enhance its appeal to suitability skilled personnel for the mine, given the level of competing construction and operations activity in Queensland and locally. The camp will be operated by a specialist camp supplier and a "take or pay" agreement established for numbers of man-nights occupied during the construction and operation phases

The camp infrastructure will be supplied, constructed and managed as a single package and will include:

- All catering and cleaning services;
- An all-weather assembly point;
- BBQ areas;

- Current accommodation standards being offered in the industry / region;
- Dining Room;
- Fire fighting capability;
- Games room;
- Gymnasium;
- Potable water treatment plant;
- Power supplied by generating sets;
- Security infrastructure;
- Sewage treatment plant;
- Shop covering basic personal needs;
- Single person accommodation units; and
- Smoking areas.

2.10.6 Export facility

It is anticipated that Dingo West coal will be exported via the WICET, which is located to the west of the existing RG Tanna Coal Terminal in Gladstone Harbour and is due for completion in 2014. WICET Pty Ltd is owned and currently being developed by a consortium of 16 coal companies including Bandanna Energy and Bandanna Energy has secured an initial 4.0Mtpa allocation that can be filled from any of its proposed mining projects, including Dingo West. Discussions have also been undertaken with Gladstone Ports Corporation (GPC) in regard to utilising the existing RG Tanna terminal as an export avenue for Dingo West coal.

2.11 Activities Potentially Causing Environmental Harm

Mining operations have the potential to cause environmental harm unless effective management programs are developed and implemented to mitigate, remediate and rehabilitate the associated impacts. Activities associated with the construction and operation of the Dingo West mine include:

- Vegetation and topsoil removal;
- Earthmoving associated with construction and development of surface facilities;
- Drilling and blasting;
- Removing and relocating overburden;
- Extracting, transporting, stockpiling and loading coal for rail transport; and
- Operation of surface facilities:
 - Administration offices;
 - Workshop and warehouse;
 - Fuel facilities;
 - Laydown pads and vehicle wash facilities;
 - Mine water supply and storage and wastewater treatment system; and
 - Diesel powered generators.

2.12 Rehabilitation and Decommissioning

Remediation, decommissioning and closure activities will be a part of the overall rehabilitation strategy for the Project. Rehabilitation will be used to achieve multiple environmental objectives where possible, including for water and sewage management, enhancement of habitat for biodiversity, carbon offsets and increasing landscape resilience to drought and flooding.

The Project area will be progressively rehabilitated during operations and, upon decommissioning; the area will be returned to a condition that it:

- Is safe for humans and wildlife, as far as is practical;
- Is non polluting of surface or ground water;
- Is stable and not prone to subsidence, slippage, or erosion;
- Is suitable for low intensity cattle grazing where practical; and
- Enhances the environment for native species and communities.

On the completion of mining, pit voids, tailings dumps, dams and other infrastructure will be treated as follows:

- Pit voids will be backfilled where possible, with the slope of the remaining void reduced to 1 in 6 (>17%) to reduce risk of slope failure, and competent rock armouring used where there are stability risks;
- Waste rock piles will be contoured to low relief to conform with the surrounding landscape, covered with topsoil and organic material where possible, and revegetated;
- Mine roads will either be left for use of subsequent land holders or deep ripped and rehabilitated;
- Water storage dams will be retained if requested by subsequent land holders and approved by regulators; otherwise the dam walls will be breached and the area rehabilitated;
- All buildings, plant including the CHPP, and equipment will be removed and surfaces rehabilitated; and
- Concrete pads will be broken up and covered with benign spoil and topsoil, and then revegetated.

2.13 Workforce

The Project is expected to employ approximately 220 employees during construction and 120 employees during operations.

It is expected that the Project workforce will include a combination of personnel that live locally and a fly-in / fly-out contingent where vacancies cannot be filled by local personnel.

Options for transporting the workforce to and from the site are currently being considered. The most likely method will be transporting the workforce to the site via coaches from Emerald and Blackwater. It is expected that Senior management will drive to and from the site daily by car.

2.14 Native Title

Native Title is extinguished over the subject land; however, at present; there is an unregistered native title claim over the Project area by the Kangoolu People.

3. Existing Environment and Potential Impacts

The following sections summarise the existing environment within the proposed study area.

3.1 Climate

Climate data was sourced from several of the closest Bureau of Meteorology (BOM) weather stations in order to obtain a meaningful representation of the climatic conditions within and surrounding Project area. The main data sources were the weather stations at the Blackwater Water Treatment Plant (station # 035290; 23.60 °S, 148.87 °E; elevation 187m) located approximately 40km to the west of the Project and the Baralaba Post Office (station # 039004; 24.18 °S, 149.81 °E; elevation 100m) approximately 80km to the south-east. The Dingo West Post Office recording station only provided rainfall data. However, this data was considered given the data spans 115 years (1896 – 2010) and the close proximity of this station to the Project area.

Climate data from the BOM weather stations are provided in **Table 5**, **Table 6** and **Table 7**. Data from Blackwater and Baralaba show the mean values calculated from the historical data for rainfall, temperature, relative humidity and wind speed. Only mean monthly rainfall data is shown for the Dingo Post Office.

Table 5. Rainfall data from the Dingo Post Office (1896 - 2010)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm)	111.9	109.1	73.8	37.0	33.8	35.9	27.2	21.8	24.5	46.5	64.0	103.3

Source: Climate data from Dingo Post Office (BoM, 2011a).

Table 6. Climate data from Blackwater to the west of the Project area (1995 - 2010)

Month	Rainfall	Temperature (°C)		Relative Humidity (%)		Mean wind speed (m/h)	
	Mean	Mean Min	Mean Max	9.00am	3.00pm	9.00am	3.00pm
January	68.2	22.4	34.1	65	45	11.4	n/a
February	78.8	22.3	33.3	66	48	12.4	n/a
March	30.5	20.8	32.6	63	41	11.2	n/a
April	28.6	17.9	29.9	60	41	9	n/a
May	21.4	13.1	26.5	59	39	8.1	n/a
June	42.1	10.7	23.6	66	45	7.7	n/a
July	15.1	8.5	23.4	63	37	7.1	n/a
August	25.9	10.6	24.9	60	35	10.6	n/a
September	19.3	14.1	29	55	30	11.1	n/a
October	61.6	17.8	31.7	58	33	12.6	n/a
November	66.3	19.5	32.4	58	37	11.8	n/a
December	79.5	21.6	34.1	61	39	10.9	n/a
Annual	542.8	16.6	29.6	61	39	10.3	n/a

Source: Climate data from the Blackwater Water Treatment Plant weather station (BoM, 2011b).

Table 7. Climate data from Baralaba to south-east of the Project area (1926 - 2010)

Month	Rainfall	Temperature (°C)		Relative Humidity (%)		Mean wind speed (m/h)	
	Mean	Mean Min	Mean Max	9.00am	3.00pm	9.00am	3.00pm
January	92.9	21.4	34.3	65	43	7	7.7
February	115.8	21.2	33.4	69	46	6.9	7.8
March	72.9	19.4	32.6	67	41	7.1	7.6
April	45.1	16	30.4	67	42	7.5	7.6
May	41.8	12.3	26.6	69	42	7.2	7.4
June	34.7	8.9	23.6	74	46	7.1	8.2
July	28.8	7.4	23.1	70	40	7.2	8.5
August	21.8	8.7	25.2	66	38	6.9	8
September	25.9	11.9	28.4	62	34	8.2	8.6
October	55.4	15.6	31.2	60	35	8.5	8.5
November	76.9	18.4	32.8	60	38	7.9	7.8
December	103.9	20.3	34.1	62	40	7.9	8.1
Annual	715.8	15.1	29.6	66	40	7.5	8

Source: Climate data from the Baralaba Post Office (BoM, 2011c).

3.1.1 Rainfall and evaporation

Historical climate data, particularly from the Dingo and Baralaba stations, shows there is a distinct wet-season with the highest rainfall occurring during the summer months with drier periods predominating in the winter months. Rainfall appears to decrease significantly at Blackwater where mean summer rainfall is approximately 40mm/month lower than at Dingo which is only 40km to the east. Average monthly rainfall ranged from lows in winter of 15.1mm to 21.8mm to highs in summer of 79.5mm to 115.8mm. Annual mean rainfall is relatively high and ranges from 542.8mm in Blackwater to 715.8mm in Baralaba.

Initial assessments indicate that total annual evaporation for the Project area is approximately 2,000 – 2,400mm. This equates to approximately three to four times the average annual rainfall for the area.

3.1.2 Air temperature

Temperature in Central Queensland is characteristic of a sub-tropical climate, with cool winters and hot summers. Similar minimum and maximum temperatures are evident at both Blackwater and Baralaba with the coolest temperatures recorded in July and the warmest in January. Mean minimum and maximum temperatures ranged from 7.4°C to 8.5°C and 21.4°C to 22.4°C in winter and 23.1°C to 23.4°C and 34.1°C to 34.3°C in summer.

3.1.3 Humidity

Relative humidity patterns are similar for both Blackwater and Baralaba and reach their highest levels in late summer (February) and their lowest levels in late winter/early spring (September, October and November). Comparison between 9am and 3pm humidity levels indicates mornings are typically more humid than afternoons (refer to **Table 6** and **Table 7**).

3.1.4 Wind conditions

Wind conditions measured at Blackwater and Baralaba represent mean wind speed and direction data obtained over the last 15 years at Blackwater and 35 years at Baralaba. Wind direction is somewhat similar at both locations with the primary wind direction coming from the east at Blackwater and the south and southeast at Baralaba (**Figure 13**, **Figure 14** and **Figure 15**). As shown in **Table 6** and **Table 7**, the average morning and afternoon wind speed from Baralaba were similar in magnitude. Morning wind speeds at Blackwater however, were significantly higher relative Baralaba (note: afternoon wind conditions at Blackwater were unavailable).

Average annual wind speeds ranged from 7.5km/h to 10.3km/h depending on location and time of day. The cooler winter and autumn months generally had lower wind speeds relative to the summer and spring months and this was irrespective of location or time of day (refer to **Table 6** and **Table 7**).

Figure 13. Annual 9am wind rose for the Blackwater Water Treatment Plant weather station (BOM, 2011d)

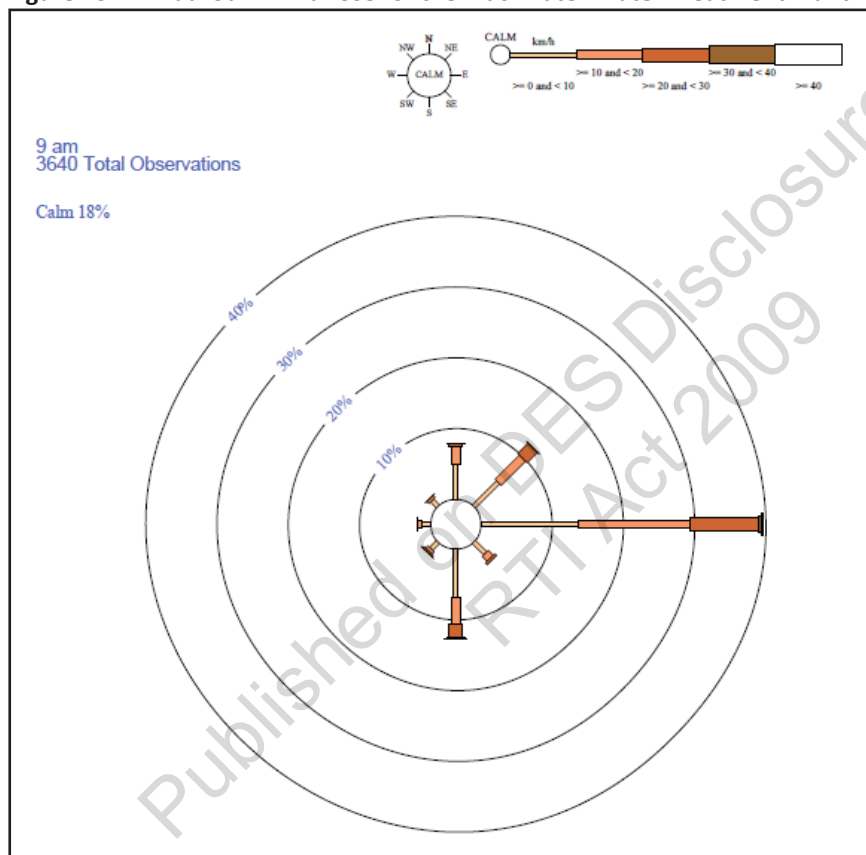


Figure 14. Annual 9am wind rose for the Baralaba Post Office weather station (BOM, 2011e)

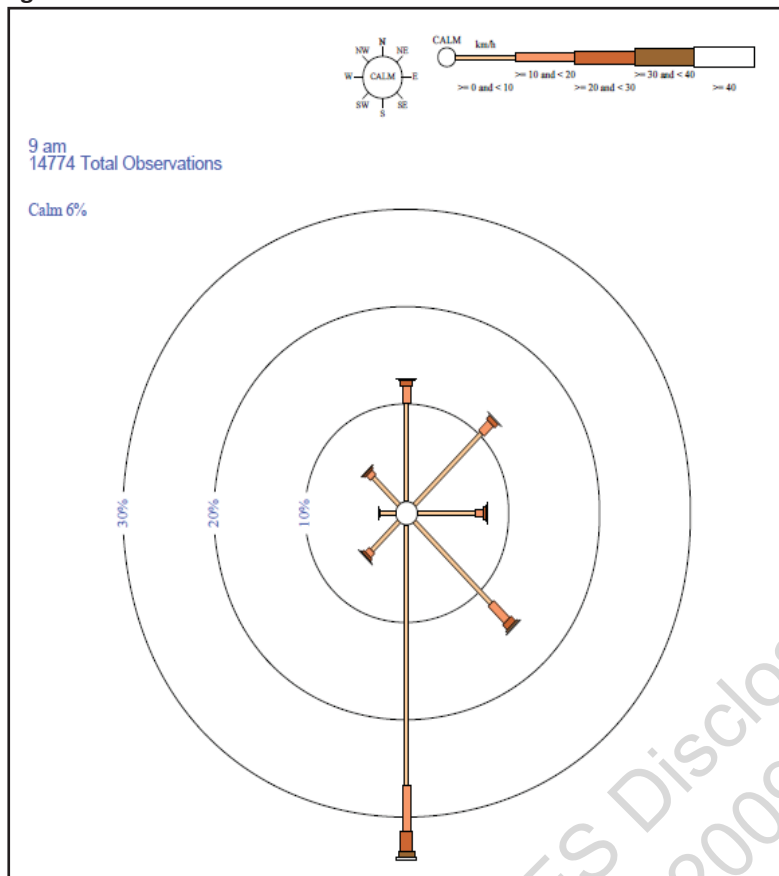
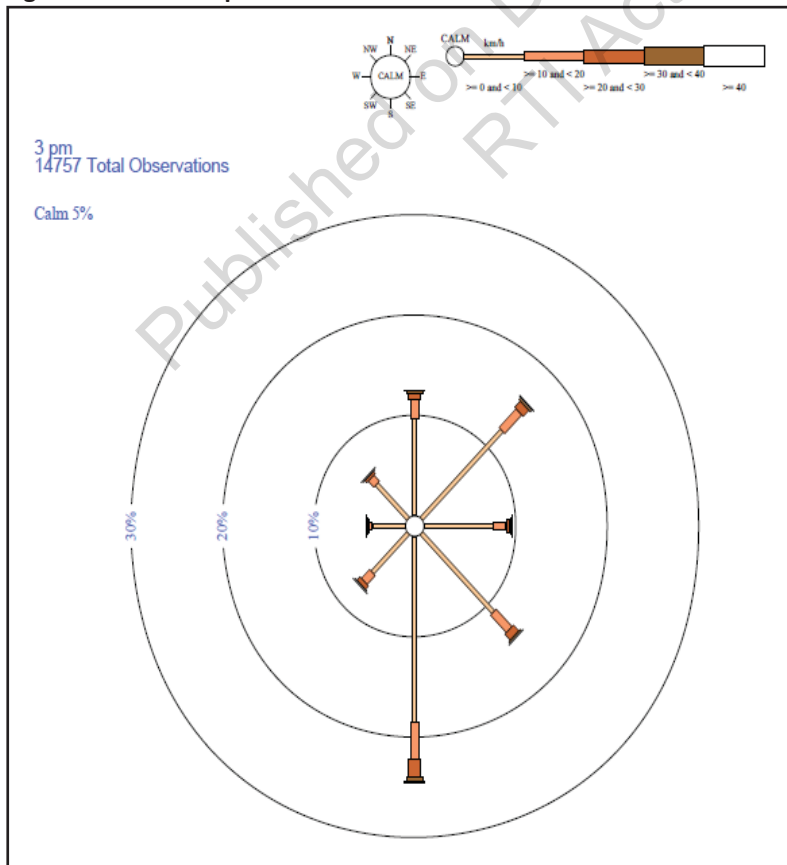


Figure 15. Annual 3pm wind rose for the Baralaba Post Office weather station (BOM, 2011f)



3.1.5 Natural or induced hazards in the region

3.1.5.1 Storms

Severe thunderstorms cause more damage than any other natural hazard in Australia and can result in flash flooding, large hailstones and destructive wind gusts (Emergency Management in Australia (EMA), 2011). In Queensland, the most severe storms occur between September and March and coincide with increased solar energy (EMA, 2011).

The average number of lightning strikes per km² per year for the Project area is approximately two as shown in **Figure 16**. The average number of days per year that thunder was recorded within the Project area is approximately 20 (see **Figure 17**). Severe storms are generally confined to small localised areas and primarily occur along the coast.

Hence, the potential for severe storms to occur within the Project area is considered to be low.

Figure 16. Average annual lightning strikes (BOM 2011g)

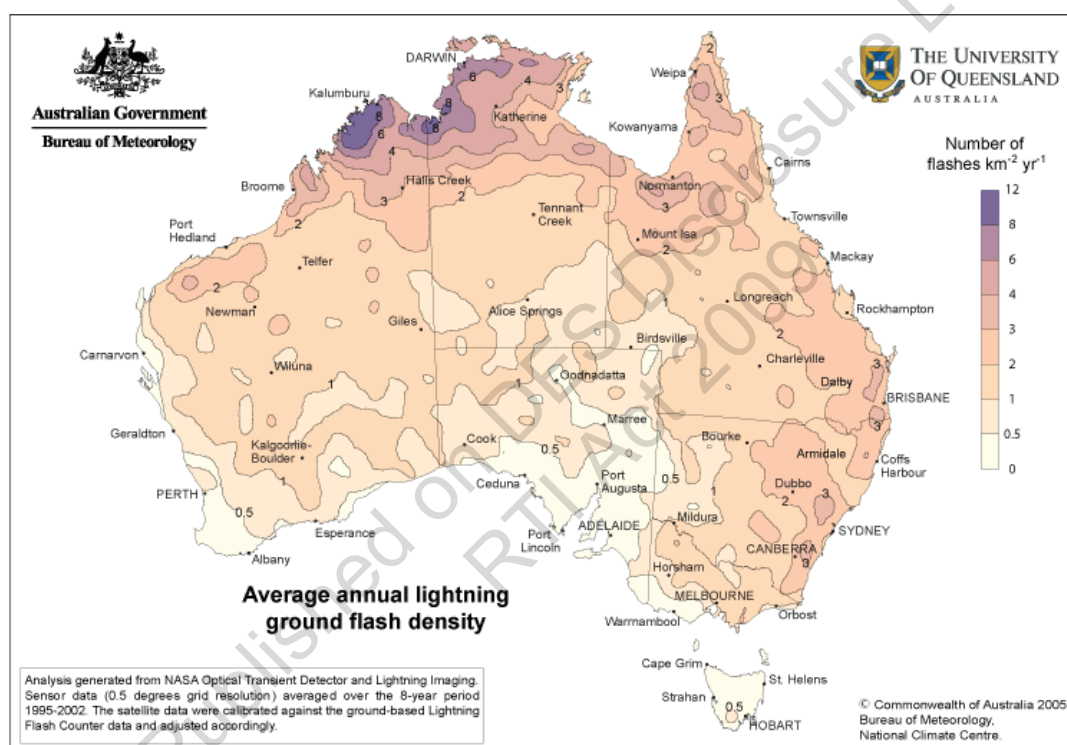
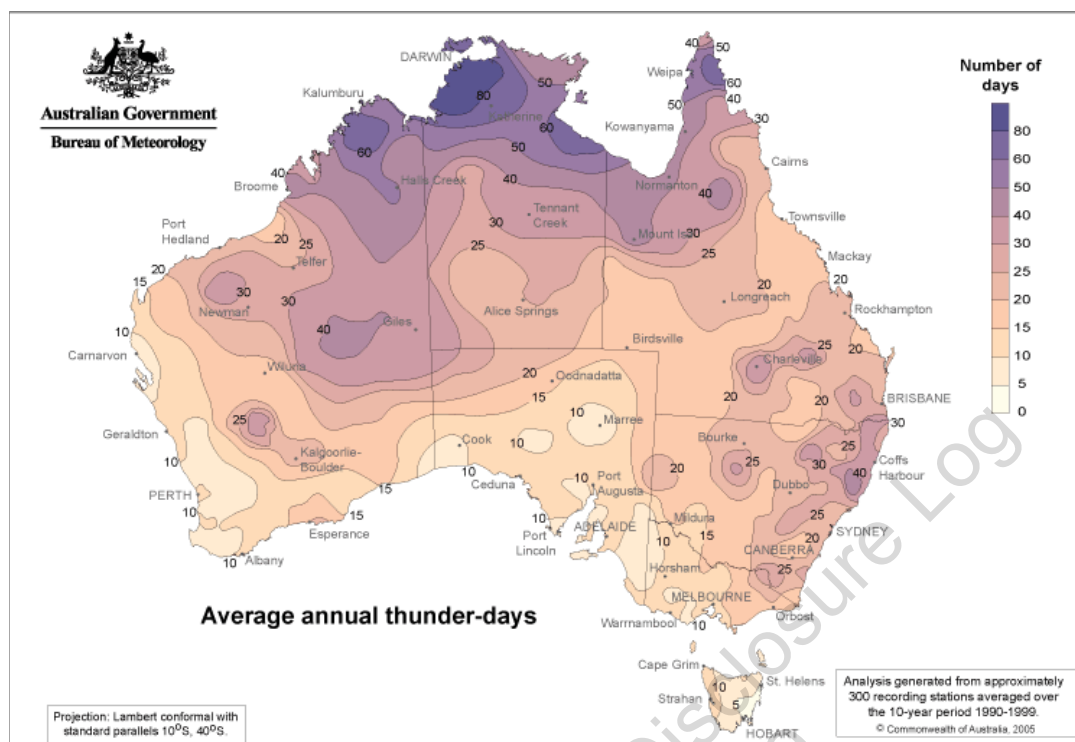


Figure 17. Average annual thunder days (BOM, 2011h)



3.1.5.2 Cyclones

Tropical cyclones in Queensland primarily occur in the northern part of the state between November and April. However, cyclones have occurred along the southeast Queensland coast and tracked inland where they subsequently reduce in intensity.

The average number of cyclones per year that have the potential to occur in the Project area is 0.2 as shown in **Figure 18**. As shown on **Figure 19**, over the last 105 years only four cyclones have been recorded within 100km of Emerald and one within 50km (cyclone Una) as outline below:

- Tropical cyclone un-named (#4): February 1911 (red line);
- Tropical cyclone un-named (#1): January 1913 (blue line);
- Tropical cyclone un-named (#3): January - February 1934 (green line); and
- Tropical cyclone Una: December 1973 (pink line);

The Project area's inland location and the low probability for cyclones to develop in the area suggest that the potential for the Project to be directly impacted by cyclones and cyclonic conditions is low. However, indirect impacts such as flooding are more likely to impact the Project.

Figure 18. Average number of cyclones per year (BOM 2011i)

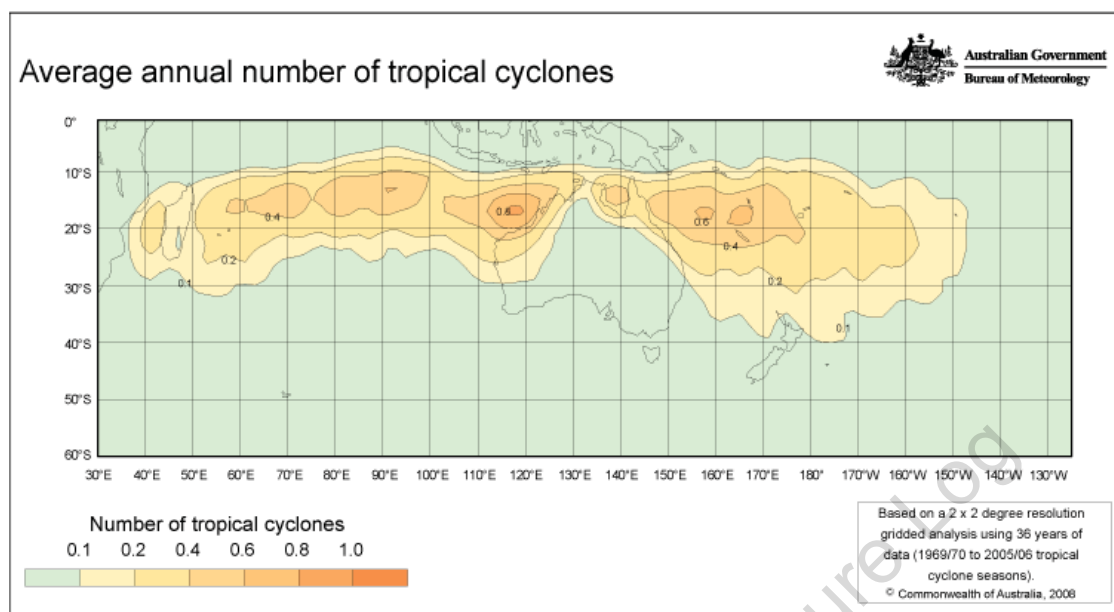
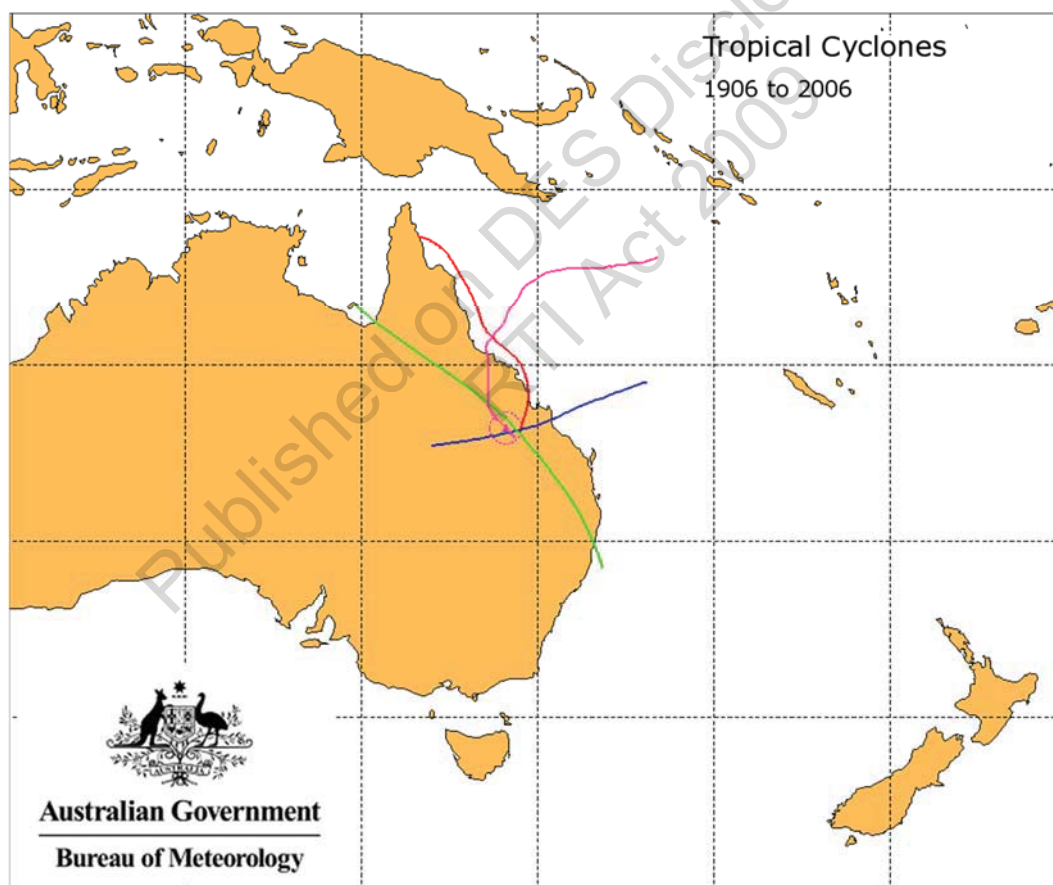


Figure 19. Occurrences of tropical cyclones within 100km of Emerald between 1906 and 2006 (BOM, 2011j)



3.1.5.3 Floods

The Project area has a localised catchment area of approximately 640km² that is located within the Isaac Connors Mackenzie subregion of the Fitzroy River Basin. Three tributaries of the Mackenzie River traverse the Project area. All three are ephemeral and generally only flow following high rainfall events that primarily occur from November to March.

During the extreme rainfall events of late 2010 to early 2011, the Central Highlands region received significant rainfall that resulted in widespread major flooding within all major river catchments including the Comet, Isaac, Mackenzie and Fitzroy Rivers. During this time there were four main flood events. However, flooding within the Project area was localised and primarily restricted to riparian zones and topographical depressions.

Although the Fitzroy River catchment has the potential for severe flooding, the potential for flooding in the Project area is considered relatively low due to the Project being located in the upper reaches of the catchment and the small catchment size of the Project area.

3.1.5.4 Bushfires

A review of the Queensland Fire and Rescue Services bushfire risk mapping for the Central Highlands indicates that the project site is located in a low to medium area of bushfire risk. In addition, the Duaringa Shire Planning Scheme Bushfire Prone Land overlay map shows the proposed MLA occurs primarily in an area of Low Bushfire Severity with small areas of Moderate Bushfire Severity interspersed throughout the MLA.

The risk of bushfires occurring during the life of the Project is moderate. All efforts will be undertaken to firstly, minimise the potential for a bushfire to occur and secondly, manage bushfires via specific management procedures that will be outlined in the Emergency Management and Response Plan. This Plan will be developed in association with the Construction and Operations Environmental Management Plans.

3.1.5.5 Landslips

Topography of the Project area is flat to very gently undulating and is characterised by very long slope lengths and gradients of generally less than 5%. These factors in concert with the meandering drainage lines suggest the landscape within the Project area is geologically stable. As such, no landslips have been recorded in the project area within the last 60 years (Geoscience Australia (GA) 2011a) and landslip risks in the future are considered low.

3.1.5.6 Earthquakes

Australia is typically considered to be a tectonically stable continent (GA, 2011b). Nevertheless between 1977 and 2000, 110 earthquakes per year on average have been recorded by the Queensland seismic network (Earth Systems Science Computational Centre (ESSCC), 2011). Most however, are of very low magnitude. Over the last century, there have been 17 earthquakes of magnitude six or greater including one in Central Queensland in 1918 that caused property damage in Rockhampton (ESSCC, 2011).

Only one minor earthquake has occurred within the wider Project area in the last 60 years. The estimated epicentre of the earthquake was located approximately 30km to the northeast of Dingo. No damage or disturbance was recorded from the 2.7 magnitude earthquake.

As the area is considered geologically stable, it is unlikely that an earthquake of a magnitude that could adversely impact the Project would occur.

3.1.5.7 Droughts

In July 2011, no areas of Queensland were drought declared which contrasts significantly with the same period in 2007 when over 60% of the State was drought declared (DEEDI, 2011). Heavy rains between late 2009 and early 2011 contributed to 2010 being Queensland's wettest year on record (BOM, 2011k).

Due to Australia's location under the sub-tropical belt of high pressure, low and variable rainfall is the norm. Queensland is particularly vulnerable to this variability and several severe droughts have occurred in the last 20 years (DEEDI, 2011). The risk of drought impacting the Project is moderate to high but can be minimised if raw water for the operation is supplied from a reliable and sustainable source.

3.1.6 Potential impacts and mitigation measures

The climatic conditions of the Project area are typical of locations within Central Queensland and are not significantly different from the other regional locations of Blackwater and Baralaba.

Based on historical data, average annual rainfall for the Project area is moderate and impacts from normal rainfall patterns are likely to be low. Severe storms events may however, adversely affect the Project and impact on pit operations, water management systems including dams waste, containment systems and soil erosion.

The potential for excessive wind and cyclonic events to occur is low and unlikely to be a risk for the Project. However, other natural hazards including bushfires have the potential to adversely impact the Project. An Emergency Management and Response Plan will be developed to address all foreseeable site-specific risks including bushfires, earthquakes, droughts and floods.

3.2 Land Resources

3.2.1 Soils

The underlying geology of the proposed Dingo West mine lease area is dominated by conglomerate sandstone and clay, lithic and feldspathic sandstone, and alluvium. The predominant soil types within the proposed Dingo West mine lease area are Kandosols and Sodosols.

Sodosols are soils with a strong texture contrast between the A horizon and sodic B horizon within the soil profile. The B horizon is the layer of soil within a soil profile with characteristics different to the surface layer (A Horizon). An abrupt textural change occurs at the B horizon in which most of the upper part of the B2 horizon is sodic and not strongly acidic. Sodosols have a high percentage of exchangeable sodium and are prone to dispersion and erosion. These soils are predominantly red, brown, yellow, grey or black in the B horizon and may have hardpans or calcrete. Sodosols also exist in predominantly flat to undulating topography and on alluvial and colluvial sediments.

Mapped landscape units within the MLA indicate that the dominant soils are sandy to loamy surfaced duplex soils and areas of Loamy red and yellow earths. This supports the dominant soils mapping.

3.2.2 Topography

The topography of the Project area reflects the mapped landscape units being flat to gently undulating and is intersected by the Charlevue, Springton and Stanley Creeks. The topography is classified as:

- Ub68 – gently undulating lands; and
- SI7 – very gently undulating or level alluvial plains.

3.2.3 Land Suitability

The entire area of the Project site is mapped as GQAL **Class C2 Pasture Land**.

The four class system that is described by DPI/DHLGP (1993) identifies **Class C** Agricultural Land as pasture land, being land suitable for improved or native pastures but with limitations which preclude continuous cultivation for crop production. The Duaringa Shire Planning Scheme divides the Agricultural Land Class C further, as follows:

- **Class C1:** Pasture Land - Suitable for grazing high quality pastures, either sown pastures where ground disturbance is possible for pasture establishment or native pastures on higher fertility soils;
- **Class C2:** Pasture Land - Suitable for grazing native pastures with or without the addition of pasture species introduced without ground disturbance; and

- **Class C3:** Pasture Land - Suitable for light grazing of native pastures in accessible areas, otherwise very steep land more suited to forestry, conservation or catchment protection.

For the Project area, the above is interpreted to mean that some areas may tolerate short-term cultivation for improved pasture and forage crop establishment. Other areas are primarily suited to grazing of native pastures, with or without the addition of improved pasture species without ground disturbance. Elsewhere, the land is suited to restricted light grazing of native pastures in accessible areas, otherwise very steep hilly lands more suited for forestry, conservation or catchment protection.

3.2.3.1 Land use

The existing land use at within the Project area is classed as livestock grazing, as shown in **Figure 20**. This reflects the predominant land uses in the vicinity of the Daringa Shire. In addition, protected areas and forestry occur within 10km to the Project site. The Project is also in the vicinity of Dingo and as such, various land uses including residential, manufacturing and commercial services exist in close proximity (see **Figure 21**). Major transport corridors including the Capricorn Highway, the Blackwater coal rail line and stock routes (along these transport corridors) intersect the Project area directly North of the proposed mine infrastructure area.

3.2.3.2 Land use suitability

The Land Use Suitability guidelines (DME, 1995) provide advice on the applicability and use of land suitability assessment techniques to determine pre-mining land suitability and post-mining land use potential. The objectives of the guidelines are to achieve acceptable post-mining disturbance land use suitability and/or capability through the use of appropriate land resource assessment techniques at the pre-mining stage.

Existing land suitability studies indicate the Project area is broadly composed of three types of land resource areas (1:500,000 scale) (Shields *et al.* 1991). The land at the Project site is predominately suitable for grazing, though areas suitable for irrigated and rainfed cropping also exist (see **Table 8**).

Table 8. Land suitability within the Project site

Land Resource Area ¹	Major Agricultural management Units	Land Suitability
Alluvial Plains (1)	Dee, Retro, Callide, Dawson	Rainfed cropping, irrigated cropping, grazing
Mixed Brigalow Plains (2)	Rolleston, Greycliffe, Oombabeer, Mungabunda	Rainfed cropping, grazing and limited irrigated cropping
Eucalypt Duplex Uplands (5)	Rhyddings, Dawes	Grazing

The mapped dominant soil types within and surrounding the Project area are presented in **Figure 22**, and confirm the dominant presence in the proposed mining lease of Kandosols, while Sodosols are present along the northern and southern boundaries of the extended Project area. Field observations have verified the presence of Kandosols, Chromosols and Sodosols within and surrounding the Project area.

Characteristics for each of the three soil types are as described in the Australian Natural Resources Atlas (DSEWPac, 2007), and are summarised in **Table 9**.

Figure 20. Existing landuse

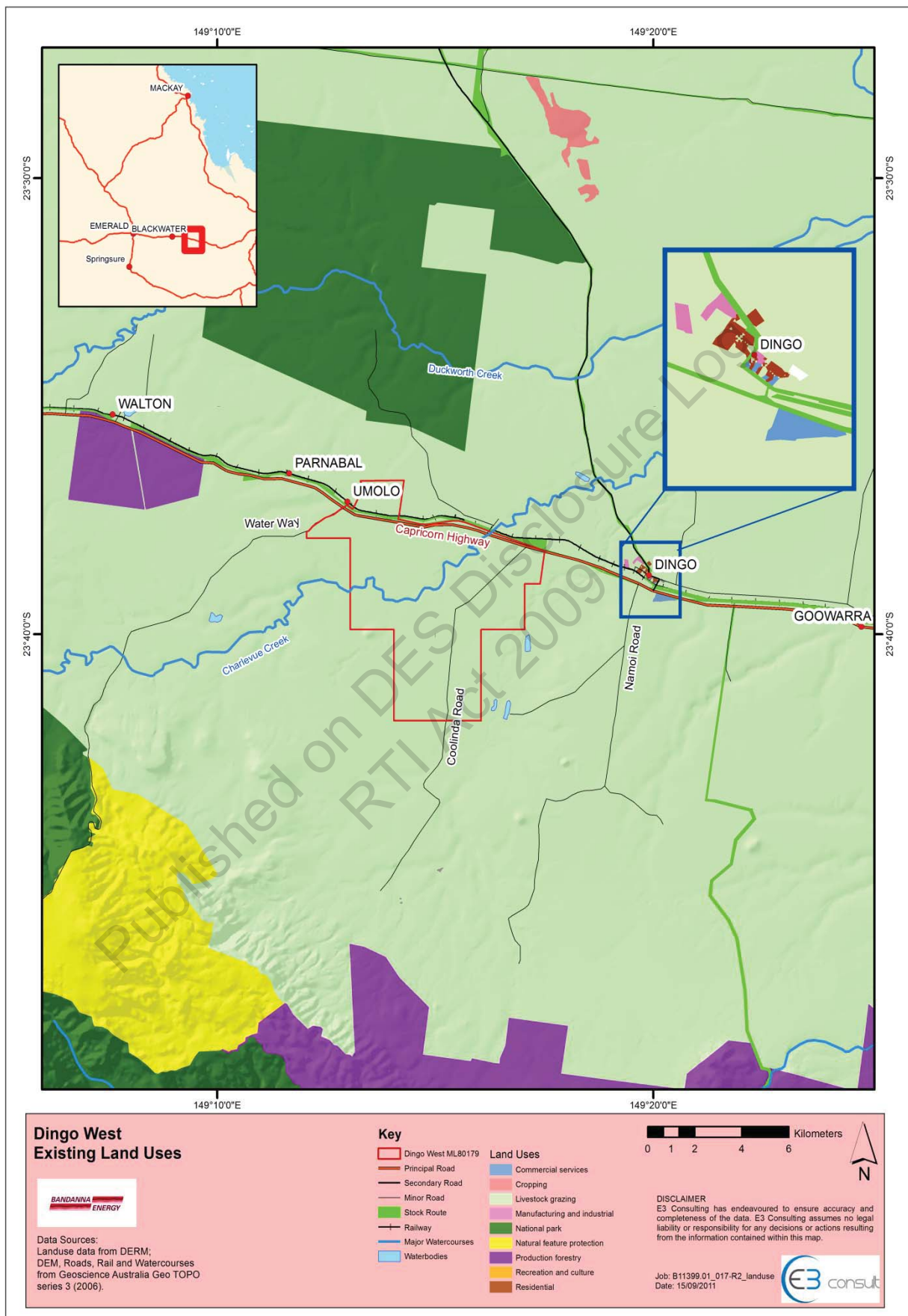


Figure 21. Land use infrastructure

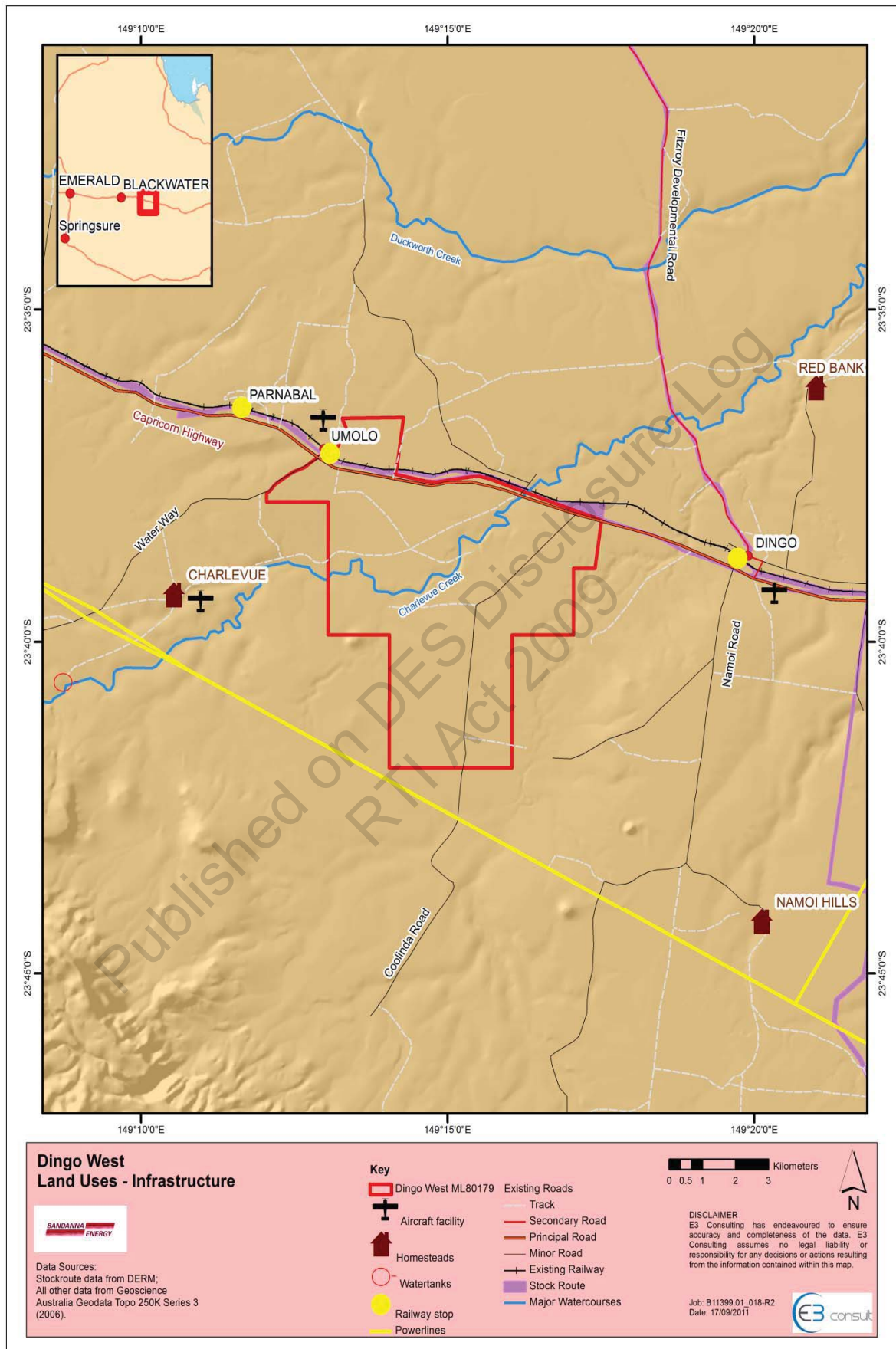


Figure 22. Mapped dominant soils

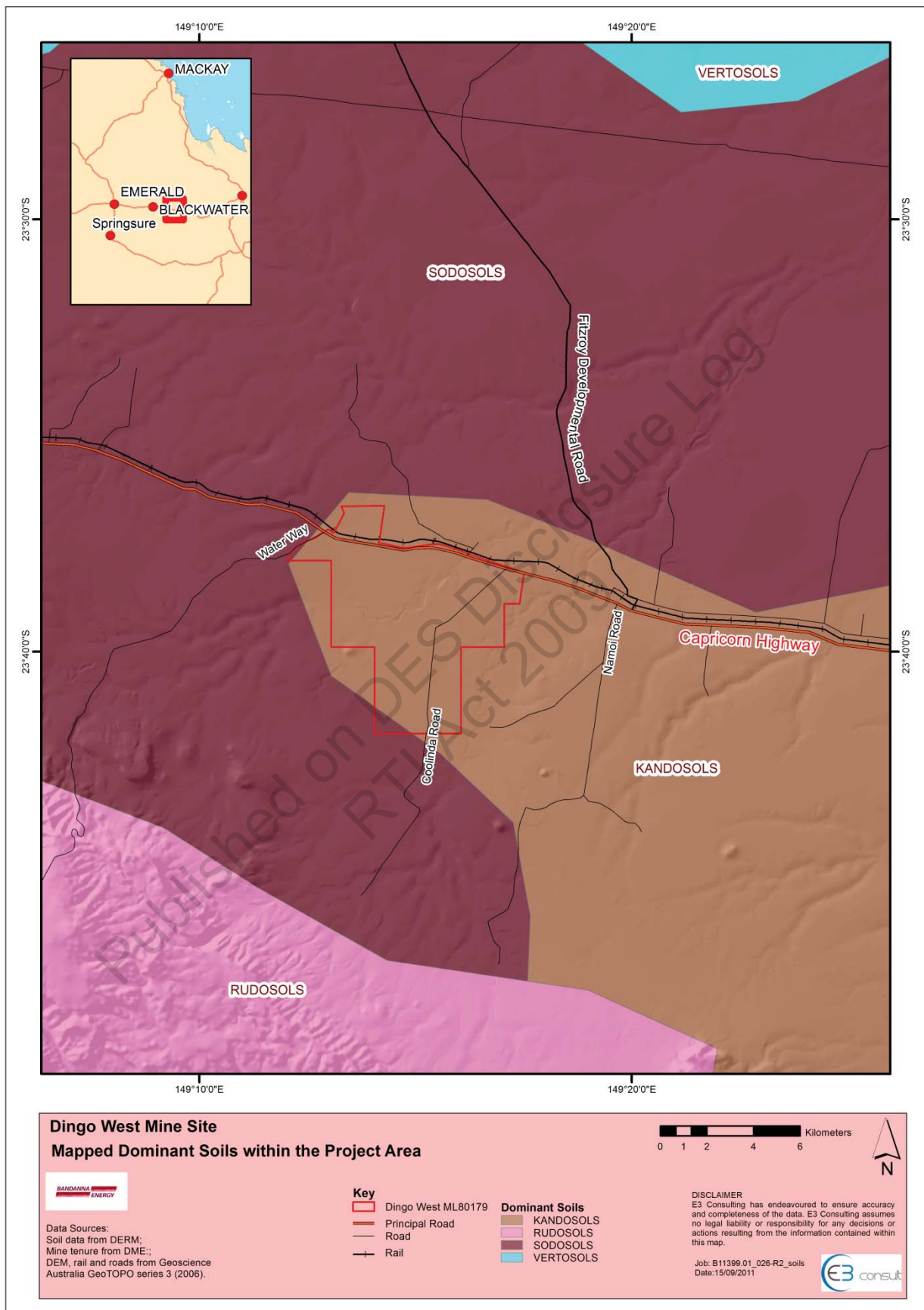


Table 9. Typical characteristics of the three soil types identified in the Project area

Soil Type	Water Availability	Drainage	Aeration	Physical root limitations	Erosion Hazard	Nutrient Availability	Toxicities	Workability
Kandosol	Moderate to High (150-350 mm) less in shallower soils (<1.5m)	Most are well drained	Well aerated	There are few restrictions to root growth	Severe on slopes in high intensity rainfall areas	Usually low in nitrogen and phosphorus	Uncommon	Surface soil subject to crusting and hard setting
Sodosol	Moderate to very low depending on the thickness of the A horizon.	Imperfectly drained. Soil may remain saturated for several weeks. Sandy surface soils are commonly water repellent	Poor aeration in the A2 horizon.	Dense clay subsoil may restrict roots	High when exposed by cultivation or over grazing. Sandy surface soils are subject to wind erosion and dispersive subsoils are prone to gully erosion.	Low organic matter. Most likely to be deficient in phosphorus, nitrogen, copper and zinc.	Moderate salinity in the lower subsoil horizons and possible boron toxicity.	Wide variation but good for loose, soft surfaces ranging to poor for hard setting surfaces

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Soil Type	Water Availability	Drainage	Aeration	Physical root limitations	Erosion Hazard	Nutrient Availability	Toxicities	Workability
Chromosol	Storage varies greatly but usually adequate and between 100 - 200 mm	Imperfectly to well drained but the B horizons can be an impediment	Generally adequate although temporary saturation can occur in bleached A2 horizons if present	Main restrictions are caused by strong and dense B horizons and structurally degraded surface layers	Low to moderate depending on slope but increasing with degradation of the A horizons. Susceptible to surface slaking upon rapid wetting, resulting in hard setting if organic matter is low	Low contents of phosphorus and nitrogen with good responses to fertilizer	Boron in areas of Western Australia, South Australia and Victoria. Less commonly, aluminium associated with induced acidification	Degraded, hard setting surfaces have poor workability but this can usually be overcome with increased organic matter

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3.3 Surface Water

Three main creek systems intersect the Project area and are a potential source of drinking water for stock and local wildlife (see **Figure 23**). They also provide habitat for native flora and fauna, and may provide farmers with irrigation water for surrounding vegetation in dry areas. It is unlikely that water from the creeks would be a major source of water for farmers as they are ephemeral and as such would not provide a reliable, year round water source. A significant amount of the waterways were observed to be dry during the June 2011 surveying period, even though the Central Queensland region was subjected to a heavy rainfall period and significant flooding during the first quarter of 2011.

3.3.1 Charlevue Creek

Charlevue Creek is a major watercourse that runs in a north-easterly direction through the middle of the proposed mine lease. It originates south-west of the Project area at an elevation of 760m and joins with Springton Creek approximately 10km the north-east of the Project area. Although water was present within the Creek during site investigations in June 2011, no running water was observed and all water was restricted to isolated pools. Riparian vegetation was highly disturbed, and in some cases nonexistent. A high abundance of non native plants were present on the upper and fallen trees and debris was common. Pit one will border a section of Charlevue Creek, but will not physically change the location of the watercourse or its features. Charlevue Creek is an ephemeral creek with deeply incised banks that depends heavily on consistent rainfall for flow.

3.3.2 Springton Creek

Springton Creek originates at an elevation (above sea level) of 139m and ends at 62.3m at the confluence with Charlevue Creek. Springton Creek bisects the south easterly section of the Project area, flowing in a north easterly direction. On-site investigations in June of 2011 identified Springton Creek as the only Creek system containing flowing water. However, it is likely this Creek system is ephemeral and the higher water levels most probably due to unseasonably high level of rainfall that the region received in previous months (December 2010-March 2011). Similar to the other Creeks, significant bank erosion was evident and the upper banks were dominated by native riparian vegetation.

3.3.3 Stanley Creek

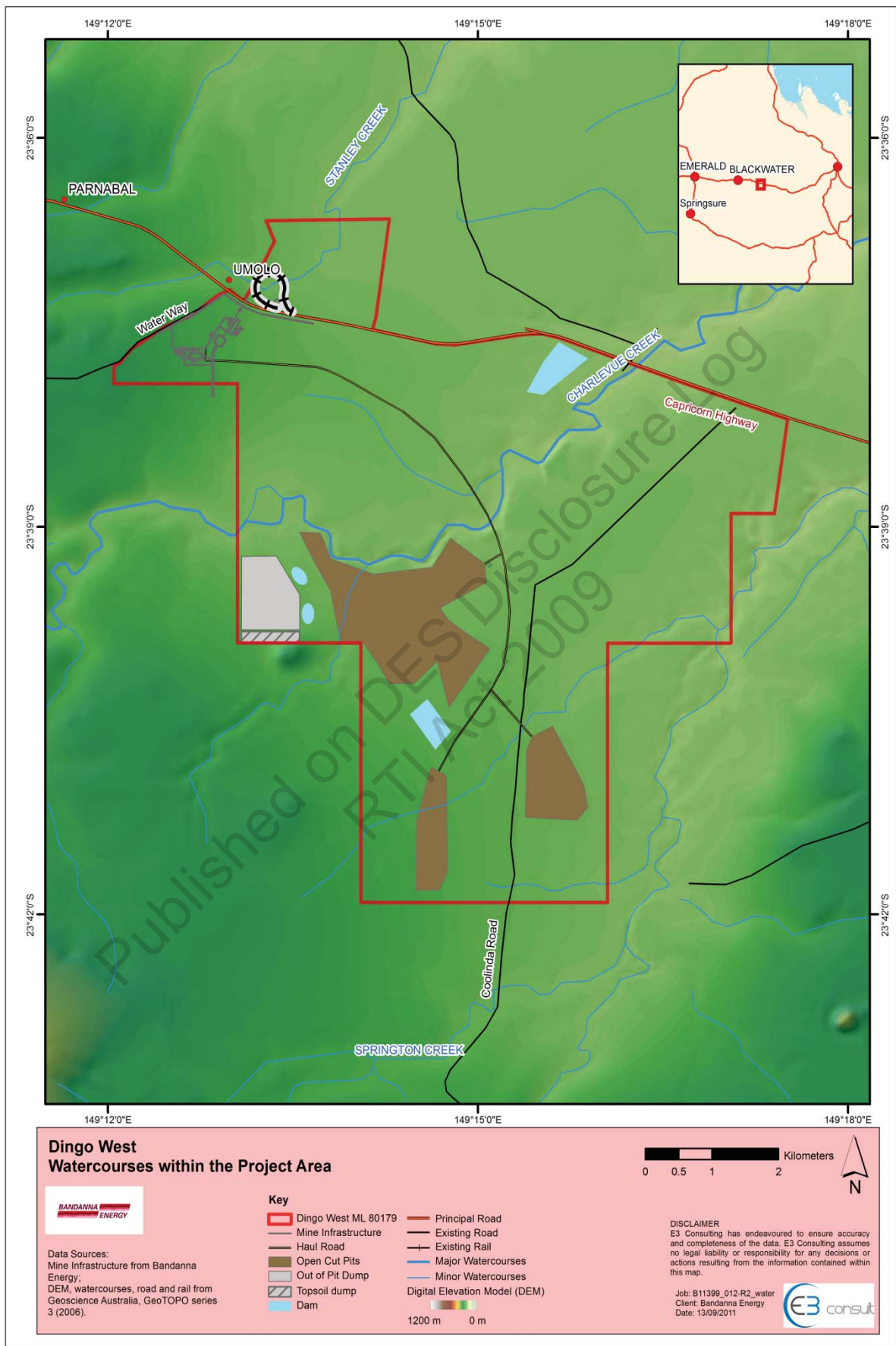
Stanley Creek is a small creek system bisecting the north westerly corner of the site and flows in a north easterly direction to the confluence of Duckworth Creek approximately 20km downstream. Similar to the other watercourses in the Project area, Stanley Creek is an ephemeral system that intermittently flows following high rainfall events. This creek system is heavily eroded with significant bank scouring and the majority of this creek system was completely dry during the June 2011 sampling period.

3.3.4 Hydrology

The Project area has a contributing catchment area of approximately 640km² predominantly associated with Charlevue Creek. All the major and minor waterways influencing the area are described as ephemeral and generally only flow during intense or prolonged periods of rainfall.

The minimum elevation (above sea level) at the catchment outlet is approximately 100m with an average slope through the majority of the mid to lower catchment of 0.67%. Steeper catchments located in the upper highlands have catchment slopes of approximately 4.1%.

Figure 23. Watercourses



3.3.5 Potential Impacts to Surface Water Environmental Values

According to the EPP (Water), the surface water environmental values that may potentially be impacted as a result of the Project include the:

- Biological integrity of the water course;
- Suitability of the water for agricultural uses;
- Suitability of the water for supply as drinking water;
- Suitability of the water for recreational use;
- Suitability of the water for industrial use; and
- Cultural and spiritual values.

The Project has the potential to impact on the water quality of Stanley, Charlevue and Springton Creeks through the following interactions:

- Potential contamination of surface water and/or sediment from:
 - Runoff or seepage from stockpiles (soil, rock, ore, other sediment that may contain concentrated levels of metals or other contaminants) areas cleared of vegetation or tailings;
 - Overflows from dams or flooding of pits;
 - Construction of a haul road crossing over Charlevue Creek;
 - Run-off and spills associated with mining activities and hydrocarbon/ chemical storage areas;
 - Accidental release of effluent (from workers camp or mine infrastructure) and grey water; and
 - Sediment laden run-off from disturbed surfaces.
- Altered flow regime or catchment hydrology due to infrastructure requirements or stream diversions.

3.4 Groundwater

The Project is located within the Bowen Basin in Central Queensland. The groundwater flow directions within the Bowen basin are likely to loosely follow topographic gradients and generally flow from west to east. The aquifer lithology underlying the area is dominated by sedimentary strata including sandstone, shale, and conglomerates. Bore yields are typically low (<5 L/s), and range in salinity from 1,500 – 5,000 mg/L Total Dissolved Ions. These waters can be considered generally suitable for stock water and irrigation purposes, albeit saline in areas.

The proponent will undertake detailed studies and modeling to define the groundwater at the site as part of the EIS and the detailed feasibility assessment. These studies will look at the baseline environment and various options for the mine development. This will assist the proponent in predicting potential localised and regional impacts to current and potential groundwater users. In addition the detailed assessments will be used to develop mitigation measures to minimize potential impacts associated with groundwater extraction associated with mine development and operations.

3.4.1 Potential Impacts to Groundwater

Mining will occur below the regional water table and it will be necessary to dewater the mine in advance of operations to allow mining to occur safely to the intended depth. Mine dewatering will be required for geotechnical reasons (i.e. to depressurise behind the pit walls and below the floor of the mine, to prevent

slope failure and floor heave) and for operational reasons (to prevent uncontrolled inflows to the mine, which would result in wet digging, equipment wear, and potential safety issues).

Mine dewatering has the potential to impact on:

- Groundwater levels;
- Groundwater flow direction;
- Groundwater chemistry; and
- Recharge and discharge mechanisms.

Detailed field investigations and numerical baseline groundwater modelling will be undertaken to assess the long-term groundwater impacts of the operation.

3.5 Nature Conservation

3.5.1 Flora

The Project area is located in the Isaac-Comet Downs subregion, which is one of 13 subregions of the Brigalow Belt North bioregion that covers an area of 59,824 km². Vegetation within the Isaac-Comet Downs subregion includes woodlands and open forest characterised by species including, Brigalow (*Acacia harpophylla*), Bendee (*A. Catenulate*) or Lancewood (*A. Shirleyi*), Narrow-leaved Ironbark (*Eucalyptus crebra*), Blackbutt (*E. Cambageana*) and Coolabah (*E. Coolabah*). Large sections of the Brigalow Belt North bioregion have been cleared of remnant native vegetation for grazing, agriculture and mining. Remaining vegetation is generally confined to rockier hilly areas, linear strips of roadside vegetation and riparian vegetation and relatively small isolated remnants.

Typical land use in the wider area includes mining and agriculture. Several dams have been previously constructed within the area to supply water for irrigation, urban, stock and industrial uses. Native vegetation has been disturbed by agricultural and mining activities over the past 150 years resulting in a highly fragmented landscape with large expanses of cleared land separating vegetation patches.

Vegetation within the proposed ML is representative of the wider Isaac-Comet Downs subregion and comprises heavily disturbed habitats that have previously undergone significant clearing for agricultural pastures and for cattle production. Remaining vegetation is heavily fragmented and generally associated with rocky outcrops and alluvial floodplains associated with Charlevue Creek, Springton Creek and their tributaries and have limited ecological values due to fragmentation and edge effects.

3.5.2 Regional Ecosystems

The northern portion of the Project area has been largely cleared for grazing. The central and southern portion of the Project area still contains fragmented areas of relatively undisturbed remnant vegetation.

Current RE Mapping (Version 6, November 2009) identified six Regional Ecosystems (REs) within the project area including two Endangered communities and one Of Concern community spread over three main land zone types in (refer to **Table 10** and **Figure 24**). A number of these REs comprise mixed polygons and are not located in isolated patches of single REs due to the dispersed nature of descriptor species inhibiting clear polygon delineations.

Table 10. Currently mapped regional ecosystems within the Project area

RE code	RE description	VM Act status	EPA Biodiversity status	EPBC Act status
11.3.1	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on alluvial plains	Endangered	Endangered	Endangered
11.3.2	<i>Eucalyptus populnea</i> woodland on alluvial plains	Of concern	Of concern	Not listed
11.3.25	<i>E. tereticornis</i> or <i>E. camaldulensis</i> woodland fringing drainage lines	Least concern	Of concern	Not listed
11.5.2	<i>E. crebra</i> , <i>Corymbia</i> spp., with <i>E. moluccana</i> on lower slopes of Cainozoic sand plains/remnant surfaces	Least concern	No concern at present	Not listed
11.5.9b	<i>E. crebra</i> and other <i>Eucalyptus</i> spp. and <i>Corymbia</i> spp. woodland on Cainozoic sand plains/remnant surfaces. Plateaus and broad crests	Least concern	No concern at present	Not listed
11.7.2	<i>Acacia</i> spp. woodland on lateritic duricrust. Scarp retreat zone	Least concern	No concern at present	Not listed

3.5.3 Regulated regrowth

In 2009, regulated regrowth laws came into effect under the *Vegetation Management Act 2009* (VM Act) that protects regulated regrowth vegetation which is defined as native vegetation that has been previously cleared but is less mature than remnant vegetation. Four small areas of high value Endangered regrowth occur within the Project area as identified on DERMs regrowth vegetation mapping, version 2 (November, 2009). None of these areas; however, occur within the proposed MLA.

3.5.4 Environmentally sensitive areas

Environmentally sensitive area (ESA) mapping of the wider MLA area identified three ESA within the broader study area. One Category 'A' ESA (National Park) and one Category C ESA (Nature refuge) occur to the north and outside of the proposed ML boundary. One category B ESA (Endangered RE) is mapped within the ML boundary and includes two small areas, one in the northern portion and one linear strip to the north of Charlevue Creek (refer to **Figure 25**).

Preliminary field surveys did not identify any unmapped areas likely to be considered ESAs.

3.5.5 Essential habitat

Essential Habitat under the VM Act is remnant RE vegetation that an 'endangered', 'vulnerable', 'rare' or 'near threatened' fauna species is known to inhabit. Current RE mapping did not identify any essential habitat as occurring within the Project area.

Figure 24. Regional Ecosystems within and surrounding the project area

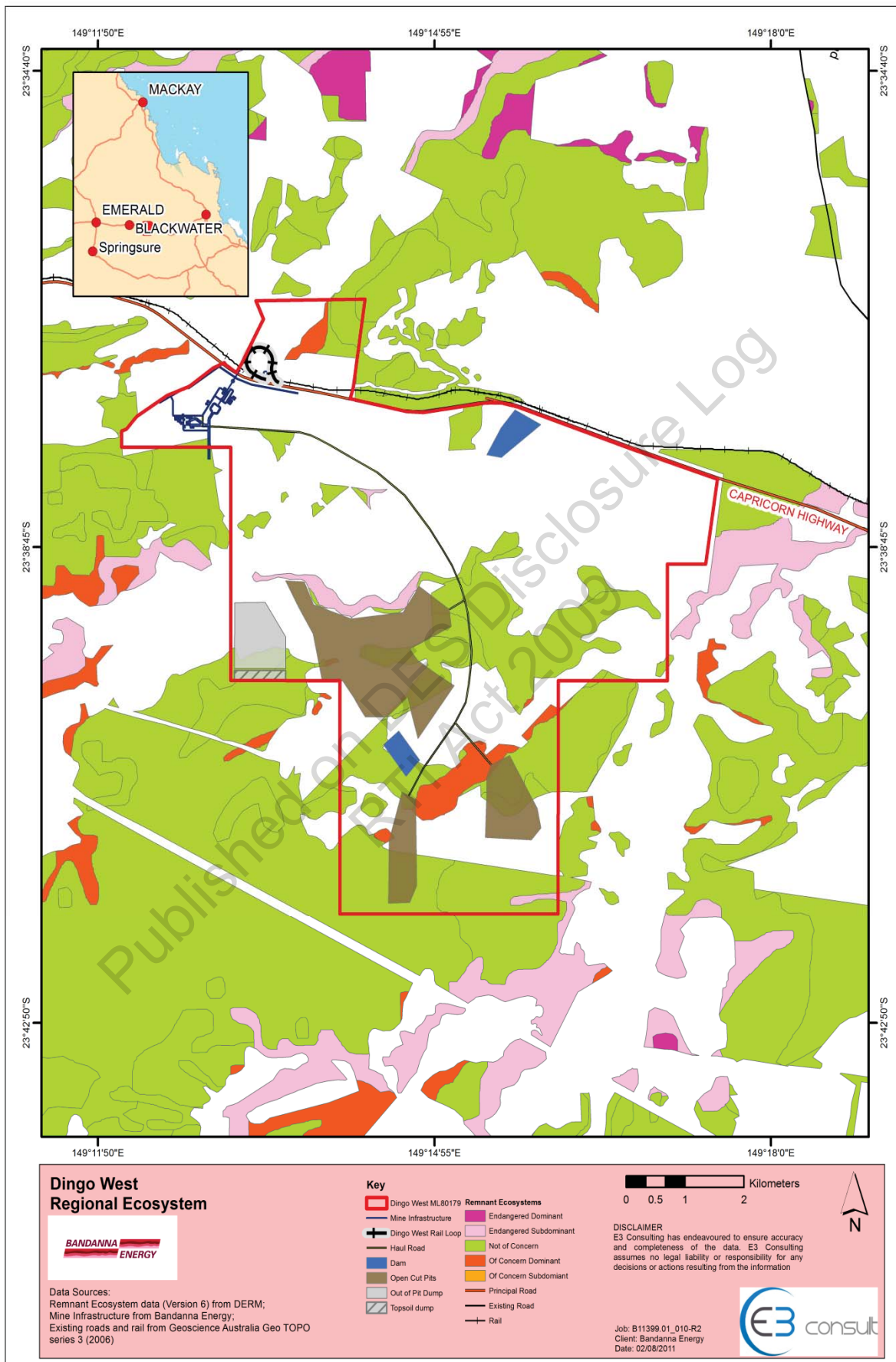
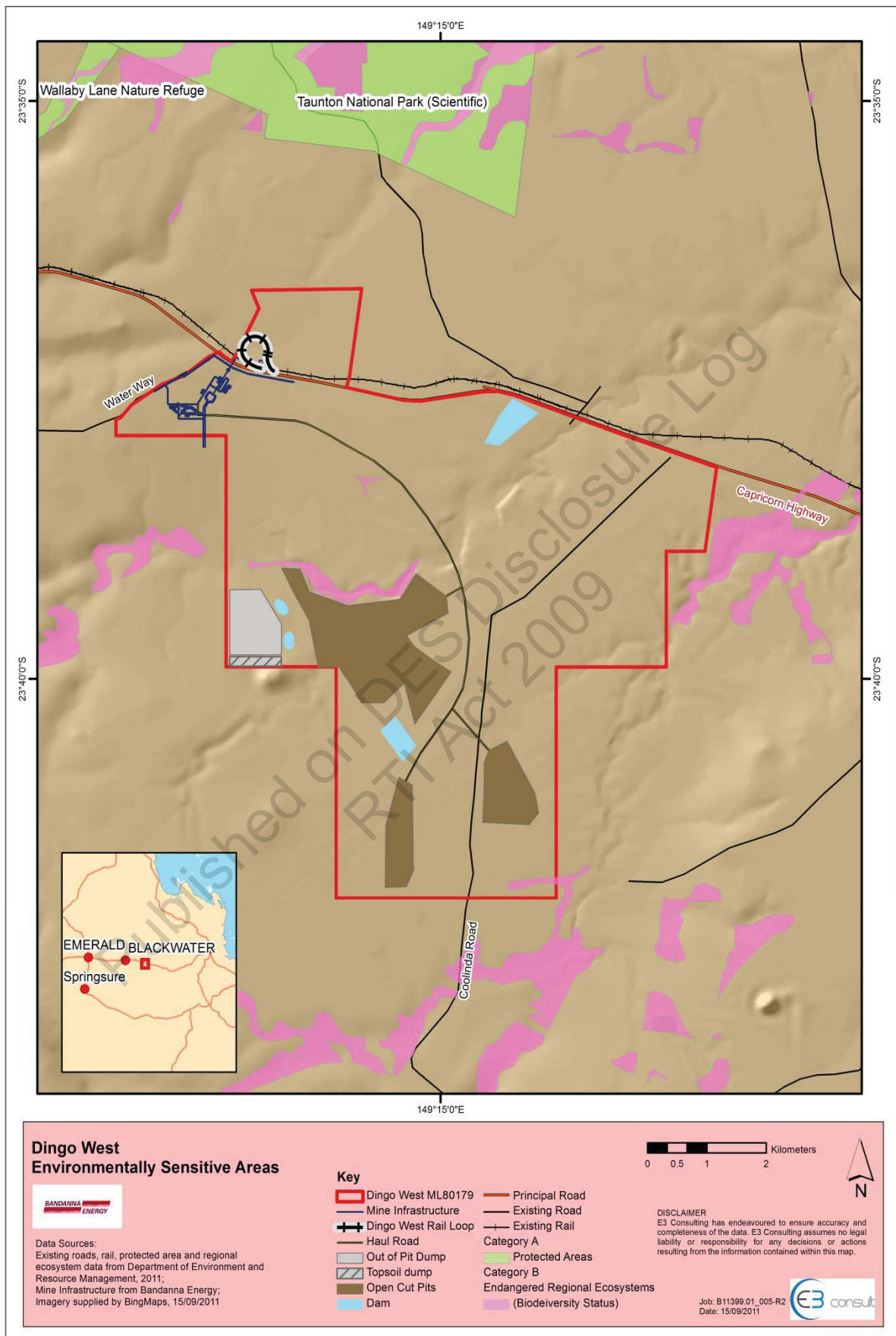


Figure 25. Environmentally Sensitive Areas within the Project area



3.5.6 Protected species and Threatened Ecological Communities

Searches of the EPBC Act protected matters and DERM's Wildlife Online databases were conducted around the Project area. Searches revealed three Threatened Ecological Communities and four plant species as potentially occurring within a 10km radius of the Project area (refer to **Table 11** and **Table 12**).

Table 11. Listed plant species potentially occurring in the Project area

Botanical name	Scientific name	Status	
		NC Act	EPBC Act
<i>Solanum adenophorum</i>	-	Endangered	-
<i>Solanum elachophyllum</i>	-	Endangered	-
<i>Dichanthium setosum</i>	-	Near threatened	-
<i>Cadellia pentastylis</i>	Ooline	Vulnerable	Vulnerable

Table 12. Listed TECs potentially occurring in the Project area

TEC	Status	Potential to occur
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)	Endangered	Community known to occur within area
Natural Grasslands of the Queensland Central Highlands and the northern Fitzroy Basin	Endangered	Community may occur within area
Weeping Myall Wetlands	Endangered	Community likely to occur within area

3.5.7 Fauna

Database searches returned 55 conservation significant fauna species within a 100km radius of the Project area. These species are comprised of 18 listed as Endangered or Vulnerable under the EPBC Act (16 of which are also listed as Endangered or Vulnerable under the *Nature Conservation Act 1992* (NC Act), 28 additional species listed as Endangered, Vulnerable or Near Threatened under the NC Act, and 11 species listed as Migratory under the EPBC Act (one Migratory species also listed as Near Threatened).

Field surveys identified 178 species at the study area; six of these species are of conservation significance or are migratory. These species included the Great Egret (*Ardea alba*) (migratory), Cattle Egret (*Bubulcus ibis*) (migratory), Squatter Pigeon (*Geophaps scripta scripta*) (listed under the EPBC Act and NC Act), Rainbow Bee-eater (*Merops ornatus*) (migratory), White-throated Needletail (*Hirundapus caudacutus*) (migratory) and Little Pied Bat (*Chalinolobus picatus*) (listed under the NC Act).

Species comments and details of relevant EPBC and/or NC Act status is detailed in **Table 13**.

Table 13. Conservation significant and Migratory Fauna recorded within the study area

Common Name	Scientific Name	Status		Comments on species
		EPBC Act	NC Act	
Great Egret	<i>Ardea alba</i>	M	S	This wide-spread and common species was observed utilising flooded pastures and waterways. The proposed actions will not remove any significant or critical wetland habitats, and there is no breeding colony in the study area. It has ability to move large distances and the local landscape provides a range of suitable habitats, many of which are outside of the disturbance area. Overall there is little to no potential for any significant impact on this species from proposed actions.
Cattle Egret	<i>Ardea ibis</i>	M	S	This introduced and common species was recorded in low numbers in association with domestic stock. There is no breeding colony in the study area. There is no potential for significant impact on this species or its long term security in the local landscape.
Squatter Pigeon	<i>Geophaps scripta scripta</i>	V	V	A relatively common resident in the study area. The Squatter Pigeon occurs mainly in grassy woodlands and open forests that are dominated by eucalypts. It also occurs in sown grasslands with scattered remnant trees, disturbed habitats (i.e. around stockyards, along roads and railways, and around settlements) and acacia growth, and remains relatively common in heavily-grazed country north of the Tropic of Capricorn, particularly in habitats located close to permanent water. The proposed actions will remove some habitat and result in increased threats (increased vehicular movements), but are not expected to have a significant impact on the survival of the species in the local landscape.
Rainbow Bee-eater	<i>Merops ornatus</i>	M	-	A common visitor to the study area. This common and widespread aerial insectivore is unlikely to be reliant or dependant on habitats within the study area. The species may use some of the study area for breeding, particularly eroded creek banks, and detailed surveys over seasons would be required to establish the actual level of presence and its habitat partitioning. Overall, the proposed actions are not expected to have a significant impact on the species or its occurrence in the local landscape.
White-throated Needletail	<i>Hirundapus caudacutus</i>	M	-	A wide-ranging aerial insectivore. The proposed actions will not have a significant impact on this species or its ability to traverse the landscape.
Little Pied Bat	<i>Chalinolobus</i>	-	NT	Occurs in dry habitats including open forests, woodland, mulga woodlands, chenopod scrublands, <i>Callitris</i>

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Common Name	Scientific Name	Status		Comments on species
		EPBC Act	NC Act	
	<i>picatus</i>			forest, mallee and notophyll vine forest gullies, particularly in riparian areas. Roosts in caves, tunnels, disused buildings and tree hollows (Hall and Richards, 1979). The proposed actions will remove some potential habitat for the species. However, the proposed disturbance area is small relative to the availability of potential habitat in the broader landscape, so no significant impact on the long-term survival of the species is expected.

M = Migratory; V = Vulnerable; NT = Near Threatened; S = Of Special Concern.

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In addition to the observed species, an additional 17 conservation significant species listed as Endangered or Vulnerable under the EPBC Act (all of which are also listed under the NC Act), eight Migratory Species (seven listed as special least concern and one as near threatened under the NC Act) and 25 species listed solely under the NC Act may potentially occur within the study area. However, based on habitat preferences and previous sightings, the potential for these species to occur in the Project area is low.

3.5.8 Exotic fauna species

The EPBC protected matters search identified five terrestrial feral animals as having the potential to occur within the Project area. Field assessments identified eight introduced fauna species within the Project area. Of these, three are declared as a Class 2 pest species under the *Land Protections (Pest and Stock Route Management) Act 2002* (LP Act):

- Dingo (*Canis lupus dingo*);
- Feral cat (*Felis catus*); and
- Rabbit (*Oryctolagus cuniculus*).

3.5.9 Great Barrier Reef Wetlands

No Great Barrier Reef wetlands are located within the Project area. Therefore the Temporary State Planning Policy for wetlands is not relevant to future activities associated with the Dingo West Mine.

3.5.10 Potential Impacts

The majority of the Project area has been heavily fragmented and highly disturbed by historical agricultural activities. These impacts can be seen across much of the project area which is dominated by Buffel Grass (*Cenchrus ciliaris*) interspersed with scattered patches of remnant and regrowth vegetation.

Without appropriate mitigation measures the proposed mining activities have potential impacts including the generation of dust, noise and light, introduction of weed species, wildlife mortality through collisions with vehicles, accidental release of pollutants and inadvertent clearing for temporary facilities or lay down areas storage.

3.5.10.1 EPBC listed TECs

No TECs are located within the proposed mine footprint area, as such no impacts to TECs are expected from construction and operation of the mine. Due to the high level of disturbance associated with agricultural activities it is unlikely that any TECs are present within the wider landscape surrounding the Project area. The proposed mining activity is not expected to impact any TECs.

3.5.10.2 REs

The proposed mine footprint, which includes open cut pits, water management dams, haul routes and other supporting infrastructure is located where possible, within disturbed areas of the Project area. Clearing of remnant vegetation has been limited to approximately 90ha and the majority of these areas are severely impacted by grazing and weed infestation and having limited habitat value.

Table 14 outlines the RE types within the Project area, their quantities based on current DERM RE mapping and an estimate of the amount of each RE that will be cleared for the Project. Note that the majority of clearing is located in the southern section of the Project area and associated with the open cut pit areas and the haul road (exact clearing quantities won't be known until detail design).

The amount of remnant vegetation to be cleared for the proposed mining activities is a small proportion of what will remain in the wider area and demonstrates the mining activities will have minimal impact on REs in

the wider Project area and region. Thus, cumulative impacts on clearing from this Project are expected to be low.

Table 14. Regional ecosystem to be cleared within ML

RE	Total area within the MLA (ha)	Total area within a 10km radius of the MLA (ha)	Area cleared for propose mine (ha)
11.5.2 (Least Concern)	141.6	1,073,583	16.2 (<0.01%)
11.7.2 (Least Concern)	442.8	6563.7	63.6 (0.97%)
11.3.25/11.3.1 (Of Concern/Endangered)	46.3	442	0.0 (0%)
11.5.2/11.5.9b (Least Concern)	432.3	4123.9	120.0 (2.9%)
11.3.2/11.3.25 (Of Concern)	103.1	681.6	4.9 (0.7%)

Note: The extents of REs are based on current DERM mapping and in the case of 11.3.1 (Brigalow) is a significant overestimate based on observations made during flora surveys. Areas within brackets are the percentage of the RE within a 10km radius of the MLA to be cleared as a result of from the proposed mine infrastructure.

3.5.10.3 Threatened flora species

No listed species were observed during field surveys and no habitat for threatened flora species listed under the EPBC Act or NC Act was encountered during field assessments. Therefore impacts to threatened flora species is expected to be low.

3.5.10.4 General impacts on flora

Weed abundance was found to vary greatly throughout the Project area with some areas presenting low weed infestations 5-10% to other areas with moderate to high levels 70-90%.

Six environmental weeds classified as class two under the LP Act were identified. A class 2 pest is one that has, or could have a substantial adverse economic, environmental or social impact. Landowners are required to take reasonable step to keep land free of Class 2 pests.

Mining activities may increase weed abundance through earthworks, movement of soil and attachment of seed to vehicles and machinery. The proposed activities have the potential to disperse weeds into areas of remnant vegetation where weed species are currently limited. A detailed weed management plan will be developed with the aim of minimising dispersal but also reducing overall weed abundance.

Edge effects refer to disturbance associated with an edge or boundary between retained vegetated habitats and cleared areas such as mining areas or infrastructure. Effects could include loss of soil moisture, increased wind, dust and noise impacts, changes to species composition and abundance, increased predation and competition and particularly increased weed invasion.

The vegetation on site is already highly fragmented and will already be subject to significant edge effects. Therefore, it is unlikely that the Project would significantly increase the overall extent of edge effect in the area.

Management measures such as fences and vegetation health monitoring programs will be employed during construction and operations to minimise the potential for impacts to occur to high.

3.5.10.5 Impacts on fauna values

The Project is likely to remove some habitat and result in increased threats through increased vehicular movements. However the threatened fauna observed are bird and bat species, all of which are all highly

mobile and often observed foraging around disturbed areas adjoining road and rail lines. Overall the mining operation is unlikely to have a significant impact on this species or its long term presence in the local landscape.

No wetlands or large permanent water bodies exist within the Project area. The waterways (creeks) within the area are situated in the upper catchment and are therefore ephemeral and only flow during intense periods of rainfall, which is primarily constrained to the wet season. These waterways rapidly drain following rain events leaving limited areas of standing water within the landscape.

Furthermore, the proposed mine footprint will not result in the disturbance of large areas of permanent or semi-permanent water. The small water bodies such as farm dams present within the vicinity of the Project area provide limited habitat value to significant populations of migratory wetland species. Due to the limited availability of large permanent water bodies within the area and little to no disturbance to existing water sources, the potential impact to migratory species is considered as low.

3.5.10.6 *Impacts on fauna values*

Eight introduced terrestrial vertebrate species were recorded within the Project area, three of which are declared as Class two under the LP Act. The proposed mining activities are not expected to result in an increase in exotic fauna within the region. However, a pest management plan will be developed as part of the overarching construction management plan.

Artificial lighting has the potential to alter foraging regimes of some nocturnal native mammals and birds and potentially make some species more vulnerable to predation. Artificial lighting could impact local fauna; however the potential impacts are not expected to be major.

Dust and emission generated from mining vehicles and equipment used during the construction stage and operation is expected to be low. However, if not properly managed may impact both flora and fauna within the Project area. Sediment runoff into water bodies also has the potential to adversely impact water quality which may in turn, impact fauna.

Clearing and disturbance of remnant vegetation can lead to increased fragmentation, reduction in habitat connectivity and overall habitat value. These actions have the potential to place increased stress on fauna species, particularly those that are less mobile and/or tolerant of disturbance. The mine footprint is primarily located within areas which have undergone extensive clearing and/or disturbance from current agricultural practices. In addition, vegetation to be cleared is generally of limited habitat value and is unlikely to support significant populations of conservation significant species.

Barrier effects occur when a particular species is unwilling or unable to travel between fragmented habitats. Barrier effects can reduce genetic continuity within populations, effectively reducing its population size. Fencing, road infrastructure and areas largely cleared of vegetation associated with the mining has the potential to increase barrier effects. It is anticipated that more mobile species within the project area such as birds and some mammals species will be less impacted by barrier effects relative to species that are less mobile, habitat specialists or vulnerable to predation.

3.6 Noise

The area within and surrounding the Project is rural with the primary sources of noise and vibration being:

- Traffic travelling on the nearby State and local government roads;
- Coal trains travelling along the Blackwater rail system;
- Cattle;
- Farm activities; and

- Natural influences such as vegetation and native fauna.

3.6.1 Sensitive receptors

The proposed mine lease area incorporates land from nine separate land owners. Sixteen sensitive receptor locations surrounding the Project have been identified as representative of sensitive receptors within the area as shown in **Figure 26** and outlined in **Table 15**.

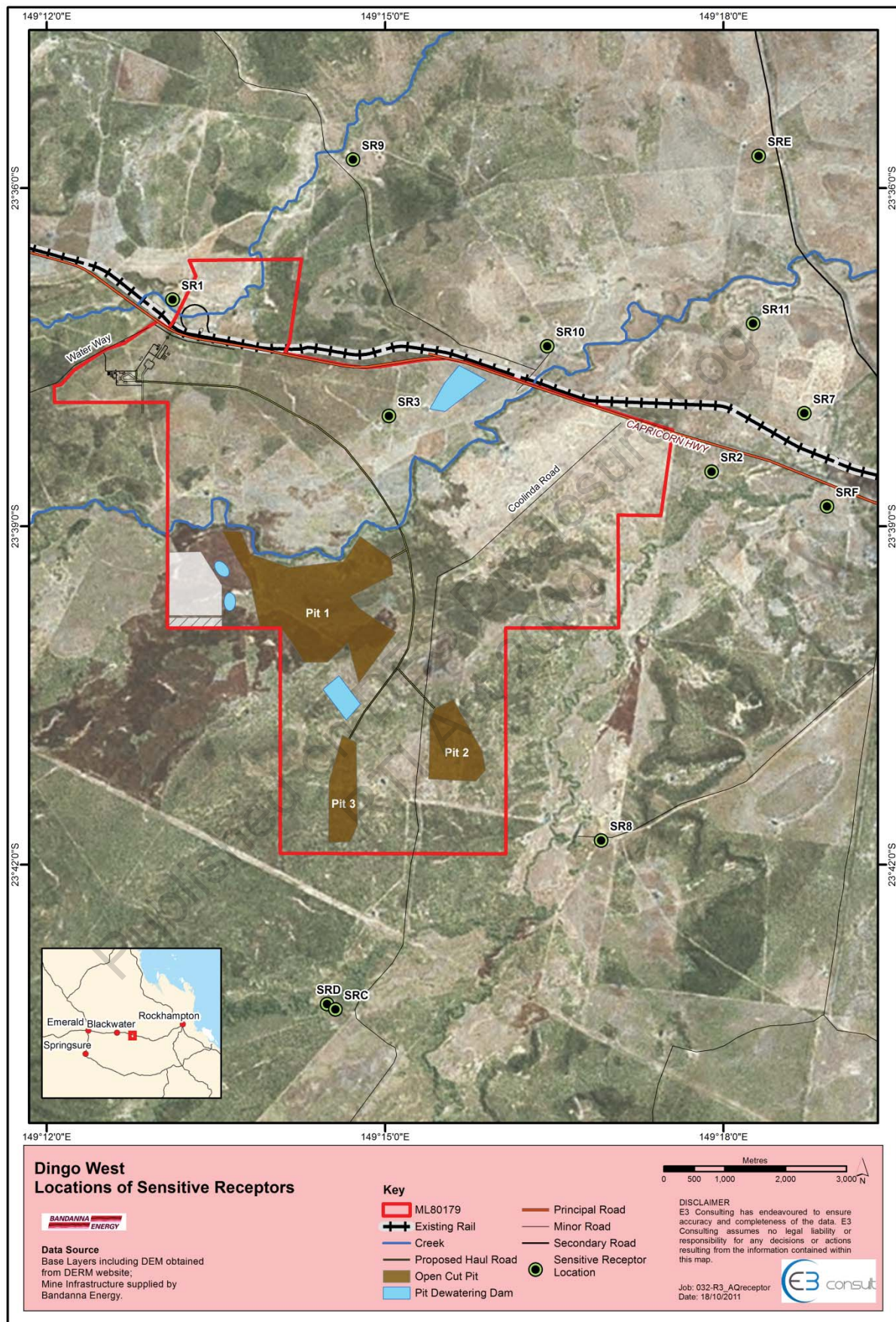
Table 15. Sensitive receptor locations within wider project area

Receptor	Location	
	Easting	Northing
SR 1	726355 m E	7386472 m S
SR 2	734439 m E	7383529 m S
SR 3	729588 m E	7384516 m S
SR 4	726371 m E	7385357 m S
SR 6	722416 m E	7384929 m S
SR 7	735853 m E	7384462 m S
SR 8	732679 m E	7377517 m S
SR 9	729114 m E	7388722 m S
SR 10	731994 m E	7385622 m S
SR 11	735106 m E	7385943 m S
SR A	721950 m E	7382119 m S
SR B	721379 m E	7386912 m S
SR C	728629 m E	7374813 m S
SR D	728504 m E	7374904 m S
SR E	735234 m E	7388685 m S
SR F	736170 m E	7382929 m S

Note: SR4-6 and SRA-B are not shown on Figure 26 due to their distance from the MLA area.

It is not expected that noise from the construction or operational phases will adversely affect the property owners in the vicinity of the mine or the Dingo township. Notwithstanding, a baseline noise assessment will be conducted as part of the EIS process. The results of the baseline assessment will be used to develop noise mitigation strategies and to form conditions in EA(ml).

Figure 26. Sensitive receptors



3.7 Air Quality

Similar to noise, impacts to air quality generated by the project are expected to be minimal. Regional air quality is typically influenced by grazing activities and climatic conditions. The construction and operation of the mine will result in dust emissions. Mine site emissions typically occur from mobile equipment movements, topsoil stripping, blasting activities, coal stockpiles and waste disposal stockpiles.

It is not expected that air quality in the region will be adversely affected by the construction and operation of the mine. A baseline air quality assessment will be conducted as part of the EM Plan process. The results of the baseline assessment will be used to develop air quality mitigation strategies and to form conditions in EA(ml). Mitigation measures that will be considered include the use of water trucks for road watering, progressive rehabilitation, water sprays on crushers and conveyor transfer points.

3.8 Waste Management

Construction and operation activities associated within the project will increase the volume of waste materials from the project area. Waste materials have the potential to impact the receiving environment through contaminating soil, habitat and water resources, in addition to having the potential to harm or injure neighbouring communities and fauna and flora species.

While waste produced during the construction phase will be of a relatively short duration (in comparison to the operational phase of the project), waste will continue to be produced during the operation and decommissioning phases of the Project. The management of wastes generated by the project will be addressed in the EIS. The EIS will identify controls, which target the reduction of generated wastes and ensure that onsite wastes do not enter the environment and minimise subsequent impacts.

To manage project related waste in accordance with Government Policies, the following measures will be put in place:

- A waste management strategy will be developed along with processes and procedures that form a suitable environmental management framework allowing the incorporation of waste management into daily operations and will develop efficient practices throughout the lifecycle of the project. These principles will ensure early identification of anticipated waste streams and quantities, and allow effective implementation of appropriate management and mitigation measures to reduce the potential for impacts to occur;
- Generated waste will be managed and disposed of by licenced contractors in accordance with the waste's classification i.e. regulated wastes (e.g. hydrocarbons, solvents, asbestos, contaminated soil) will be tracked and recorded prior to being removed from site; and
- A proactive rather than reactive approach to waste generation and minimisation will assist in reducing the volume of waste generated due to the project.

3.8.1 Potential Impacts

Wastes generated by the Project have the potential to impact on surface water and groundwater, quality, air quality, visual amenity and soil quality and visual amenity of Project area and the surrounding environment if they are not managed appropriately. Sensitive receptors including rural residences and ecological sensitive areas within and adjacent to the Project area could be negatively impacted if waste streams were to enter waterways and groundwater systems and migrate off-site. Likewise, air emissions have the potential to impact both on and off-site sensitive receptors.

Potential impacts from uncontrolled discharges of poor waste management practices during the construction and operation phases included:

- Decreased air quality in the form of odours and airborne contaminants;
- Contamination of soil land and impacts to current and existing land use practices;
- Contamination of surface or groundwater;
- Direct impacts to flora and/or fauna;
- Impacts to natural habitats and thus, indirectly impacting flora and/or fauna;
- Increased fire hazards and reduced visual amenity due to untidy or poorly managed waste storage;
- Increased pressure on existing waste infrastructure;
- Introduction and/or dispersal of pests and weed species;
- Anthropogenic and ecological health and hygiene issues, such as increased prevalence of pests, abundance in mosquito breeding areas and animal entanglement; and
- Reduction in visual amenity for surrounding community.

Waste will be managed to avoid negative impacts on the health and wellbeing of people and the ecological and ecosystems processes and both on and off-site.

3.9 Safety and Health

A Safety and Health Management System will be established for the project to ensure all activities that potentially have an impact on safety and health are carried out in a manner that complies with:

- Relevant legislation, standards and codes of practice; and
- Bandanna Energy standards.

Typical hazards expected at a mine site such as this one include:

- Fuel spills – spills and leaks during storage or handling;
- Transport – traffic accidents that may resulting in injury to workers, damage to vehicles or spillage of hazardous substances;
- Heavy machinery - the use of heavy machinery that may result in injury to workers and damage to equipment;
- Hazardous materials / substances / chemicals - the storage, handling and may result in spills and leaks;
- Adverse weather - undertake activities in adverse weather conditions such as cyclones, storms, winds or heat that may result in equipment damage or injury;
- Working at heights - injury associated with falls from heights and material falling from height;
- Confined space entry, excavation and trenching - injuries associated with working in confined spaces; slips, trips and falls - through every day construction activities;
- Dust exposure - exposure to long term dust (that may contain hazardous materials) resulting in injury or making the work place hazardous;
- Excessive noise exposure - impacts to hearing from prolonged noise exposure;

- Spontaneous combustion of coal stockpile -resulting in a fire risk at the site that may lead to injury or loss of life;
- Undertaking underground mining operations - resulting in injury through working in a highly energized and potentially gaseous work environment;
- Blasting and vibration - that may lead to injury to personnel or serious damage to equipment; and
- Electrical work - electrocution, injury and fires which may damage or cause injuries to personnel and equipment.

The lead construction contractor will implement a Safety and Health Management System (SHMS) that is consistent with the principals required by Dingo West Coal and fully complies with legislative obligations. A site specific construction safety and health management plan, work instructions, and permits to work will be completed prior to construction works commencing.

3.10 Visual Impacts

The project will include infrastructure that will be clearly visible from the road. In particular, the product coal stockpile, reclaim conveyor, trainload out facility and balloon loop will be clearly visible to users of the Capricorn Highway. The proposed rail infrastructure will be of similar nature to that used at the Yarrabee Siding. Where practicable, screening will be utilised to mitigate the adverse impacts to the aesthetic value of the area. Conversely, the proponent will consult with the CHRC in regard to designing observation platforms and interpretive signage that may be utilized as tourist vantage locations.

Due to the setback distance from the Capricorn Highway and the presence of screening vegetation in the road reserve, it is unlikely the mine and infrastructure area will create an adverse impact. Notwithstanding, the proponent will assess the need for additional roadside screening. Should additional screening be required, endemic tree species will be used and this will have an additional benefit of increasing endemic habitat and offsetting greenhouse gas emissions associated with the project.

3.11 Cultural and European Heritage

3.11.1 Cultural Heritage

Database searches identified no registered Aboriginal cultural heritage sites within the Project area. With the exception of field surveys associated with exploration activities, specific Indigenous cultural heritage field surveys for the Project have not been conducted. Although the survey reports are confidential in nature (and cannot be published with this current document), the field surveys have identified potential cultural heritage material in the vicinity of the Project area. Sites identified have included isolated artifacts and a stone artifact scatter.

Several cultural heritage studies have been previously conducted in the broader Project area to assess the presence of cultural heritage artifacts. Many recent surveys have been undertaken as per EIS requirements associated with coal mining projects in the region including:

- A comprehensive survey of both Indigenous European cultural heritage within the Bowen Basin (Scott L'Oste-Brown, Luke Godwin and Carl Porter, 1998);
- Cultural heritage study undertaken for the Coppabella mine (2001);
- Archaeological assessment undertaken for the Moorvale West mine (2006);and
- Surveys undertaken for the Washpool Coal mine (2011).

These studies indicate that stone artifacts - both as scatters and isolated finds - are the most common items found of cultural heritage significance; however scarred trees have also been located. Generally these sites have been identified around creeks and watercourses.

A detailed Indigenous cultural heritage field survey of the Project area will be undertaken in accordance with the requirements of the forthcoming Cultural Heritage Management Plan (CHMP) and prior to the commencement of works.

3.11.2 European Heritage

No areas containing European cultural heritage significance were identified from the desktop review of both the Commonwealth and National Heritage Register and Queensland Heritage Registers. Three sites of European cultural heritage significance were identified within in the wider surrounding region and all sites are a significant distance from the Project area:

- Dawson Valley Colliery (former) approximately 80km's south-east from the Project;
- Lilyvale Stand Monument approximately 90km's away north-west from the Project; and
- Tieri War Memorial approximately 100km's north-west from the Project.

Several small graveyards believed to be of local families exist within the Project area at Lot 2 RP904099 and Lot 3 SP226576. Historic artifacts such as gravesites are protected under the provisions of QH Act and the graves are also protected under the provisions of *The Coroner's Act 2003*. In addition, Part 9 of the QH Act outlines provisions for the discovery of archaeological artifacts including strict penalties for not reporting the discovery of artifacts of potential state significance.

Further investigation of the gravesites will be undertaken during the EIS

3.12 Socio – Economics

The resource sector is the main employer in the immediate area of the proposed mine, with a number of mines already operating in the area. The majority of employees are expected to come from the nearby towns of Dingo, Blackwater and Emerald. A workers camp will be located within the mine to cater for employees, particularly those workers that utilize FIFO.

The Dingo West Project will positively contribute to the local and regional areas with increased direct employment opportunities and indirect opportunities through the ongoing requirement for services and support.

The Dingo West project will require the hiring of between 220 and 120 full time employees during the construction and operational phases respectively. Given the small scale of the project, and considering the majority of employees will be local it is not expected that adverse social impacts will arise from the Project. A Social Impact Management Strategy will be developed as part of the EIS process.

3.13 Traffic and Transportation

Transport and traffic issues associated with the project will include the transport of heavy and oversize loads, plant and equipment, construction materials and camp accommodation, together with workforce movements. The Capricorn Highway will be the major road utilised to transport materials to the project area; however, Local Authority roads will also be utilised to gain site access through the life of the mine.

At this stage of the project design, no estimates are available for the likely number and type of transport trips required for the project. Procedures for the movement and transport of vehicles and personnel during the construction and operation of the mine will be prepared to ensure that these traffic movements do not cause

unnecessary damage to local or regional roads. Traffic movement on regional and local roads will be minimised where practicable and restricted in areas of high sensitivity where practical.

The ability of the existing infrastructure in the region to meet project transport needs will be examined as part of future project design activities.

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4. Cumulative Impacts

At present, there are 15 coal mining projects that are either proposed or are currently operating within an approximate 40km radius of the Project (see **Figure 27**).

4.1 Impacts to environmental values

4.1.1 Land resources

The Project will result in the loss of approximately 34.8ha of Class C2 GQAL defined as "Pasture Land - Suitable for grazing native pastures with or without the addition of pasture species introduced without ground disturbance". The Project area is used exclusively for cattle grazing rather than cropping due to existing soil quality and much of the Project area will revert to cattle grazing post-mining.

The cumulative effects of these operations will impact primarily on the percentage of GQAL and grazing land in the region. However, the soils within the Project area and the surrounding landscape are generally not regarded as high quality GQAL. Nevertheless, impacts associated with the loss of grazing land can be effectively addressed through consultation with tenure holders to ensure, where practicable, minimal disturbance to land outside of the mining footprint whilst maintaining safe and efficient operation and progressive rehabilitation of the Project. Impacts can further be reduced through effective consultation with regard to the timing and removal or relocation of existing property infrastructure such as fences, gates, dams and irrigation systems within the mine footprint.

4.1.2 Visual amenity

The Project site, while generally flat, is partially bisected by low ridge lines running south west to north east. In addition, areas of remnant vegetation remain within and surrounding the Project area and are mainly confined to riparian zones, roadsides and isolated patches. The natural variations in topography and the presence of native vegetation will assist in screening the various aspects of the proposed mining operation from the public view.

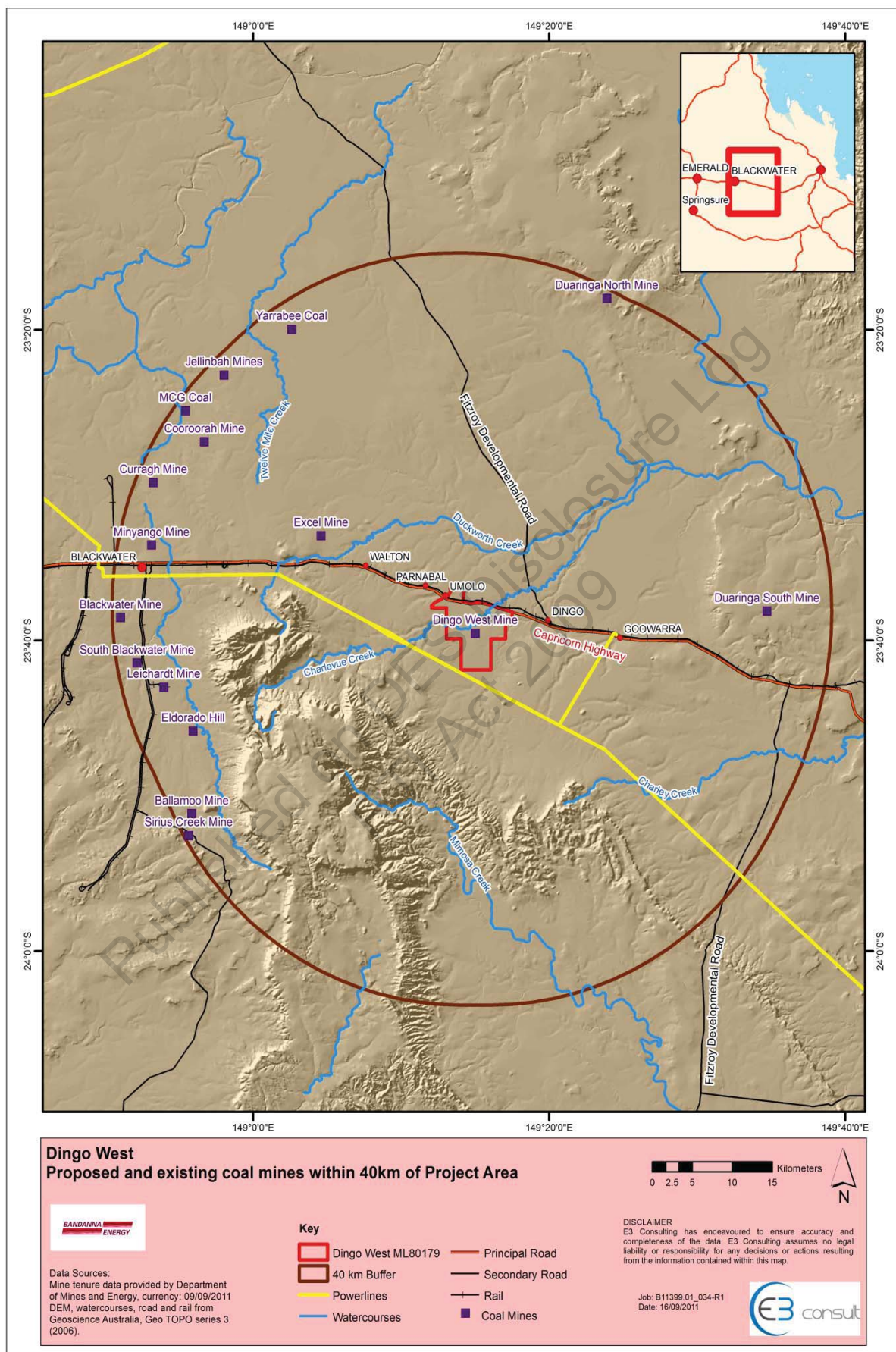
Where two or more project sites reside within the same locality, direct cumulative impacts may be experienced where both projects are visible from the same view point and indirect cumulative impacts may occur from incidental sightings of multiple mines such as through the use of the major transportation routes (e.g. the Capricorn Highway). No existing mines occur within the immediate vicinity of the Projects view shed. As such, direct cumulative impacts resulting from views of multiple mines within the local landscape or projects will not occur.

Although the over-road conveyor, rail loop and loaders will provide the main source of visual impacts along the Capricorn Highway, these structures are not uncommon in the region. While local impacts may result from these structures, regional impacts are expected to be low given their existing presence along the Capricorn Highway to the west.

4.1.3 Nature conservation

Broad-scale vegetation clearing has occurred in the Brigalow Belt Bioregion for many decades. Compared to clearing for agricultural purposes, mining projects have resulted in relatively smaller clearing footprints. In addition, from an Australia wide perspective, mining projects have contributed relatively minor roles to overall plant extinctions with the loss of only a single species attributed to mining (Lindenmayer, 2007).

Figure 27. Coal Mining Projects within the direct vicinity of the Project



Recognising the extent of historical clearing, Dingo West Coal has carefully considered locating infrastructure to either avoid or minimise clearing of remnant vegetation, particularly vegetation listed under Commonwealth and State legislation. Where clearing cannot be avoided, the overall impact footprint has been reduced.

The Project will result in the clearing of approximately 204.7h of remnant vegetation which represents less than 1% (approximately 0.53%) of the entire vegetation extent within a 10km buffer zone around the Project. Importantly, the Project will not adversely impact on the Brigalow TEC which has historically been heavily cleared throughout the wider Brigalow Belt. The remainder of the Projects' footprint comprises grasslands dominated by the introduced Buffel grass.

Significant remnant vegetation will be retained within the proposed mining lease area which has been maximised from re-arranging key infrastructure such as the haul road, dams and the CHPP and MIA to avoid, where possible remnant vegetation, particularly currently mapped Endangered REs. Minimising clearing also has the co-benefit of minimising adverse impacts to fauna species from removal of breeding habitat. As such, the Project is not expected to contribute to either localised or regional cumulative impacts and will not, directly or indirectly, impact negatively on any threatened fauna or flora species.

4.1.4 Surface water resources

Construction and ongoing operation of the mine has the potential to impact on existing watercourses in the region and similar activities associated with other existing and proposed projects are also likely to contribute to impacts on creek systems. These activities have the potential to result in cumulative impacts on the Mackenzie and Fitzroy River systems downstream of the mine areas.

Although local creek systems in the vicinity of each project ultimately flow into the Mackenzie River, the Project is located in an isolated local catchment. It is the intention of Dingo West Coal to retain water on-site and not discharge to receiving environments, hence further reducing the potential contribution to negative impacts downstream. Dingo West Coal has committed to multiple mitigation and control strategies pertaining to the control of dirty water from the mine, the diversion of clean water around disturbed areas and appropriately engineered designs for creek crossings that would effectively result in little to no impact outside of the immediate mine footprint on receiving environments. It is expected that other mining projects in the area will implement similar management regimes. Where the construction and ongoing operation of all projects are undertaken in accordance with similar management and control measures, the cumulative impacts to the Mackenzie and Fitzroy River systems would be low.

4.1.5 Groundwater Water Resources

Preliminary groundwater impacts were assessed through preliminary numerical modelling of groundwater drawdown and pit inflows resulting from mining activities. Modelling predicted drawdown would equate to 9.3m to 2.0m below current water levels and could be up to 5m at distances of up to 4km from the Project area. However the drawdown is likely to be low as water levels will still be accessible from adjacent bores. In addition, the existing groundwater has limited uses due to high salinity levels.

Although groundwater will be impacted to some degree throughout the development and operation of the respective coal mines the impacts are likely to be restricted to localised impacts which with suitable implementation of proposed management measures will be reduced to negligible levels.

The distance (approximately 30 – 40km) between the Project and existing and/or future proposed mines is unlikely to result in cumulative impacts of drawdown on local water tables. However, this impact will be determined in part by pit designs and production levels of new mining projects.

4.1.6 Air quality

The primary potential source of air emissions at Dingo West are ground-level particulate matter and dust deposition. Air emissions during the construction phase of the mine site will be primarily dust related from clearing of vegetation and topsoil stripping, excavation works, blasting, transportation movements, and construction activities. Cumulative air quality impacts may result from increased dust generation from the mining operations in the localised area, and also dust generated from the increased rail movements in the region.

Existing air quality levels and potential impacts have undergone preliminary assessment through predictive modelling based on existing background conditions at Red Rock Camp, the sensitive receptor closest to the TLO, MIA and CHPP. Numerical modelling predicted that dust concentrations and PM₁₀ are unlikely to exceed the ambient air quality goals in the EPP (Air).

Although the project will lead to some increase in dust, particulate matter and emissions over and above those already generated by existing sources, the air quality assessment predicts cumulative ground level concentrations (those generated by the proposed mining activities plus existing background levels). Hence, the assessment is in effect, a cumulative assessment. Further, the nearest operating mine is approximately 25km to the west near Blackwater. Therefore, the lack of mining activities in the vicinity of the Project, coupled with the cumulative ground level concentrations for PM₁₀ and dust deposition not exceeding DERM trigger criteria levels indicates the Project is unlikely to result in adverse cumulative impacts.

4.1.7 GHG Emissions

Total GHG Emissions for mining activities undertaken at Dingo West for the life of operations are estimated to be approximately 1,193,606 t CO₂-e. Transport fuel during operations is the largest contributor at 664,072 t CO₂-e, with open cut mining (306,000 t CO₂-e) and power generation (190,836 t CO₂-e) the next largest contributors.

The Project can most effectively reduce its emissions through improvements in energy efficiency and Dingo West Coal will explore options for cost-effective low-emission energy sources and technological, operational, and behavioural options for energy efficiency such as the potential use of biodiesel in generators and vehicles, and real-time monitoring of vehicle fuel-use efficiency. In addition to mandatory reporting under NGERs and the EEO Program, Dingo West Coal is committed to undertaking ongoing internal measurements and monitoring of emissions to identify sources with the greatest potential for emissions reductions. This may include offsetting emissions via carbon sequestrations and specific rehabilitation practices.

As GHG emissions are measured on a local, regional, national and international scale, cumulative impacts are likely to occur. However, compared to other larger mining operations in the region, Dingo West Coals overall contribution to world emissions is minimal.

4.1.8 Noise and vibration

Preliminary noise monitoring was undertaken to quantify the existing ambient noise environment within and surrounding the Project area and was used to determine noise limits for the Project. Modelling predicted that noise levels would likely be exceeded at five nearby receptors with the highest exceedence at Red Rock Camp. In contrast, sleep disturbance criteria was not exceeded at any of the receptors and localised impacts from blasting activities were also predicted to be minimal. The distal location of existing and proposed mining projects to Dingo West suggests cumulative noise and vibration impacts from these mines will not occur. Noise and vibration resulting from transport and export of coal from the Project will be the responsibility of QR National and WICET Pty Ltd. and are likely to be localised.

Dingo West Coal will examine mining operations with the aim of reducing noise and vibration emissions and resulting impacts to nearby dwellings. Where noise attenuation and vibration and air blast modification are

impractical, Dingo West Coal will consult with the affected property to negotiate favourable management outcomes.

4.1.9 Waste management

General wastes such as excess spoils and vegetative media during construction, operation wastes, and hazardous wastes will ultimately increase the volume and diversity of wastes disposed of at both a local and regional scale. Although waste produced during the construction works will be of relatively short duration, waste will continue to be produced during the operation and decommissioning phases of the Project. To minimise potential waste-related impact, the management, disposal and transportation of all waste material will be undertaken in accordance with the EP Regulation (Waste) and the EPP (Waste).

Despite an overall increase in waste, cumulative impacts of waste generation and disposal are considered to be relatively minor due to the implementation of best practice protocols and a responsible waste management approach. This will ensure the potential for harm to the environment and human health is minimised, and where possible, avoided completely.

4.1.10 Traffic and transport

The Project will result in increased traffic during both the construction and operation phases and are therefore, likely to result in some cumulative impacts. Although a formal traffic assessment has yet to be undertaken, larger projects in the wider area that used similar transport options to that expected at Dingo West were unlikely to generate significant adverse traffic impacts.

Any potential impacts are anticipated to peak during construction. These impacts are expected to be temporary and can be effectively managed through the implementation of appropriate mitigation works and management plans. It is likely that the additional construction traffic can be adequately accommodated in the existing state-controlled road network. However, some disruption to traffic during minor intersection works will occur.

By generally limiting construction traffic to well-defined transport corridors and the purpose-built internal service road, transport and traffic impacts can be more easily managed and mitigated. To further minimise traffic impacts on the Capricorn Highway from the construction of new intersections, the main access to MIA and CHPP has been located at a point on Charlevue Road / Water Way, approximately 600m from the Capricorn Highway intersection.

4.1.11 Cultural heritage

No registered Indigenous or European cultural heritage will be impacted by the planned mine development. However, there may be impacts on some cultural heritage material within the Project area. Any impacts to Indigenous cultural heritage values can be effectively mitigated by conducting dedicated field surveys by the relevant Aboriginal party as agreed in the CHMP implementing mitigation measures in accordance with approved CHMP.

Impact mitigation measures that may be required include avoiding certain highly sensitive areas, carrying out more field investigations including sub-surface testing, recovering datable occupation material, and collecting and relocating cultural heritage items.

Similarly, dedicated field surveys will be undertaken prior to construction to identify any unrecorded European cultural heritage values. Any identified values will be managed in accordance with the QH Act and a European Cultural Heritage Management Plan (that will be developed prior to construction).

4.1.12 Social impact assessment

The preliminary social impact assessment determined that while the Project in isolation is unlikely to have a significant adverse impact on the local community, the continued expansion of mining in the region may result larger cumulative impacts.

While the issues outlined may be intensified by the Project, none of the issues are likely to be unmanageable. However, proponents of proposed resource development projects, key stakeholder and local and State governments will need to avoid and minimise potential significant social impacts to surrounding communities.

4.1.13 Economic impact assessment

Queensland is Australia's largest coal exporter accounting for approximately 56% of coal produced and in the 2009/10 financial year, Queensland exported 183 Mt of coal to worldwide markets. In the financial year ending 30 June 2010, coal contributed significantly to the State economy by providing 88% of mining royalties which equated to \$1.8 billion in revenue. The cumulative economic impacts of the Project are positive and include increased export income, royalties and employment that will provide significant benefits the wider community.

4.1.14 Conclusion

Cumulative impacts on environmental, social and built values have been collectively assessed for the Project. The most significant potential impacts to existing environmental values are associated with surface water, groundwater, noise, traffic and transport and the loss of Indigenous and European cultural heritage artefacts. Dingo West Coal will manage and off-set these impacts by implementing the mitigation measures outlined for each environmental value. **Table 16** below provides a summary of the likely impact of each environmental value discussed above.

Table 16. Cumulative impact summary

Environmental Value	Likely Impact
Land	Low
Visual Assessment	Low
Terrestrial Ecology	Low - Medium
Groundwater Resource	Medium
Surface Water Resource	Medium
Air Quality and Green House Gases	Low
Noise and Vibration	Low - Medium
Waste	Low
Traffic and Transport	Low - Medium
Indigenous Heritage	Low - Medium
Non-Indigenous Heritage	Low - Medium
Social Impact Assessment	Low - Medium
Economic Impact Assessment	Low

5. Stakeholder Engagement

Dingo West Coal is committed to a consultation program as part of the project approvals process, which provides opportunities for active community involvement and education through an inclusive program.

The public consultation process would identify broad issues of concern to local community and interest groups at all stages including project planning, construction, commissioning, operations and final decommissioning.

The public consultation program would include public meetings, interest group meetings, production of regular summary information and updates and other consultation mechanisms for encouraging and facilitating active public consultation. A list of affected persons and interested stakeholders would be developed.

The key objectives of the developed consultation program will be to:

- Inform the different interest groups about the project proposal;
- Seek an understanding of interest group concerns about the proposal;
- Explain the environmental impact assessment process and indicate how public input might influence the final recommendations for the project;
- Provide an understanding of the regulatory approval process;
- Seek local information and input into the project; and
- Provide the community with a sense of ownership in the project.

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Date : 25/11/2011 9:16:59 AM

From : [redacted] Personal info

To : "Juergensen Christine"

Cc : "TMI Environmental Services"

Subject : FW: Dingo West EIS Application

Attachment : Dingo West EIS Application potentially affected_interested persons.pdf;image001.png;

Hi Christine,

As discussed, I've attached the document I sent yesterday with Lot 2SP226576 (Queensland Rail) added to Table 1.

Cheers,

[redacted]

[redacted] Personal

Senior Environmental Scientist | E3 Consulting Australia Pty Ltd

m [redacted] Per

From: [redacted] Perso

Sent: Thursday, 24 November 2011 3:12 PM

To: 'christine.juergensen@derm.qld.gov.au'

Cc: 'TMI Environmental Services'

Subject: Dingo West EIS Application

Dear Christine,

[redacted] F whom you spoke to yesterday asked me to send the attachment which includes two tables and a map that show the likely interested persons for the Dingo West EIS. I also wanted to introduce myself as I'm the person who will be managing the Dingo West EIS for E3 consulting.

Would you be available one day next week around 12pm for a brief introductory meeting so [redacted] and myself can come and introduce ourselves. I can also drop of the existing Dingo West EM Plan that was submitted as part of the ALD process.

I look forward to hearing from you and meeting you in the near future.

Cheers,

[redacted] Personal in

Senior Environmental Scientist | E3 Consulting Australia Pty Ltd

21 McLachlan St, FORTITUDE VALLEY, QLD, 4006

d: +61 7 3828 6939 | t: +61 7 3303 8775 | f: +61 7 3828 6999 | m [redacted] Per



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Table 1. Potentially affected persons

LOT AND PLAN	CURRENT OWNER	POSTAL ADDRESS	STREET DESCRIPTION
1HT424 100RP882349 3SP226576	sch4p4(6) Personal information	sch4p4(6) Personal information	sch4p4(6) Personal inform
13HT63	RESERVE FOR CEMETERY	STATE OF QUEENSLAND (REPRESENTED BY DERM) - UNKNOWN TRUSTEE	0 CAPRICORN HWY
2HT138	sch4p4(6) Personal information	sch4p4(6) Personal information	sch4p4(6) Personal
22HT119	RESERVE FOR RAILWAY	C/-FACILITIES ASSET MANAGER, RAILWAY STATION, CLERMONT ST, EMERALD QLD 4720	0 CAPRICORN HWY
2RP801280	sch4p4(6) Personal informa	PO BOX 161 BLACKWATER QLD 4717	CHARLEVUE RD, DINGO
3RP801280 4RP801280	sch4p4(6) Personal information	sch4p4(6) Personal information	sch4p4(6) Personal info
624SP129819	QUEENSLAND RAIL	C/-FACILITIES ASSET MANAGER, PO BOX 198, ROCKHAMPTON QLD 4700	0 RAILWAY CORRIDOR
643SP129820	QUEENSLAND RAIL	C/-FACILITIES ASSET MANAGER, PO BOX 198, ROCKHAMPTON QLD 4700	0 RAILWAY CORRIDOR

REGISTERED & PRINCIPAL OFFICE

Level 12

410 Queen Street

BRISBANE, QLD 4000

T: 61 7 3041 4400

F: 61 7 3041 4444

SYDNEY OFFICE

Suite 2, Level 1

80 Mount Street

NORTH SYDNEY, NSW 2060

T: 61 2 9923 1520

F: 61 2 9923 1528

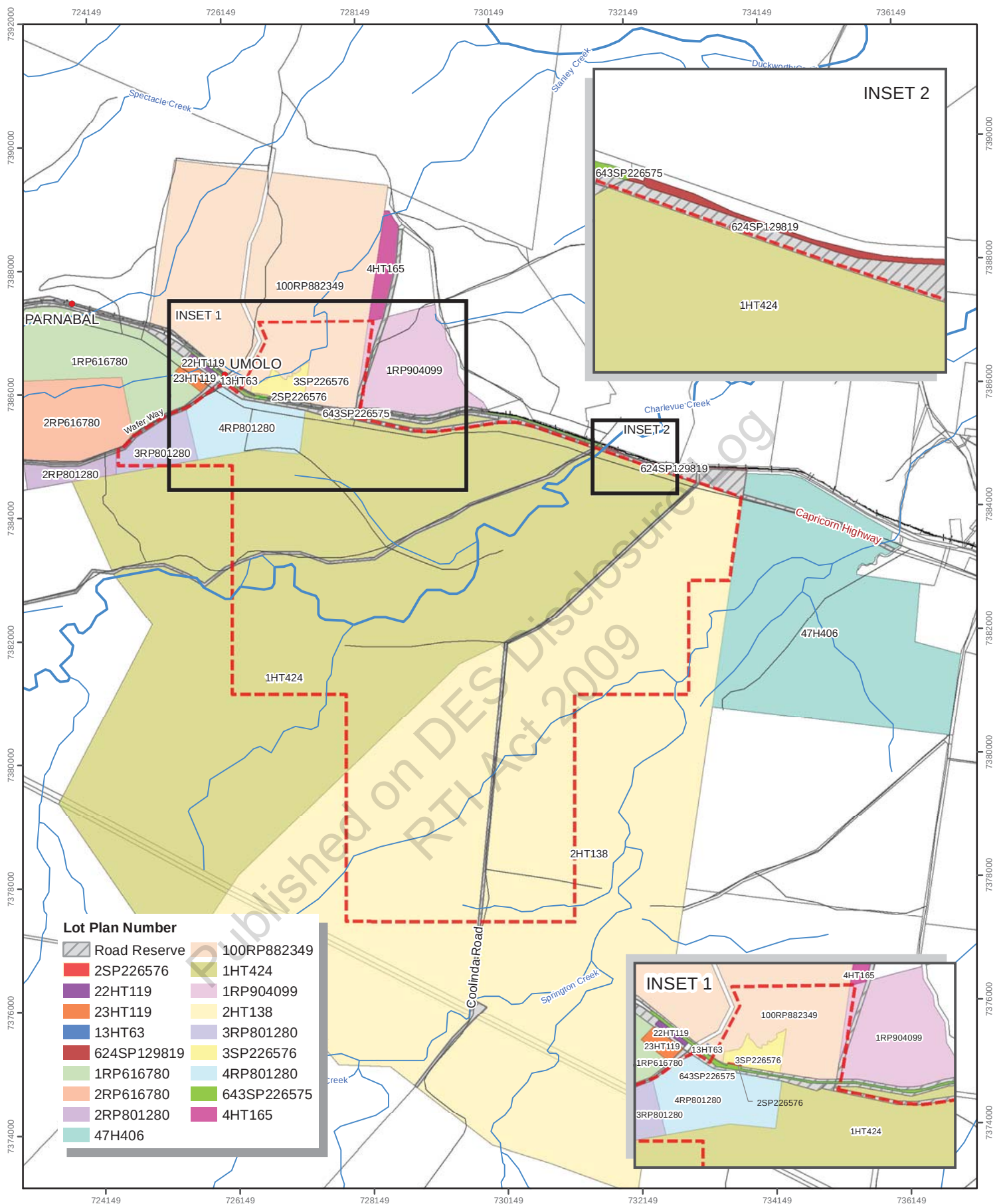
www.bandannaenergy.com.au

LOT AND PLAN	CURRENT OWNER	POSTAL ADDRESS	STREET DESCRIPTION
2SP226576	QUEENSLAND RAIL	C/-FACILITIES ASSET MANAGER, PO BOX 198, ROCKHAMPTON QLD 4700	0 RAILWAY CORRIDOR
47H406	sch4p4(6) Personal information	sch4p4(6) Personal information	sch4p4(6) Personal information
23HT119			
1RP616780			
2RP616780			
1RP904099			
4HT165			

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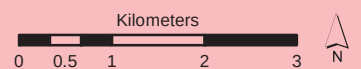
Bandanna Energy - Dingo West Mine **Property Tenure Boundaries**



Data Sources:
 Mine Infrastructure from Bandanna Energy;
 DEM, watercourses, road and rail from
 Geoscience Australia, GeoTOPO series 3

Key

- Dingo West ML 80180
- Road
- Existing Rail
- Property Boundary



DISCLAIMER
 E3 Consulting has endeavoured to ensure accuracy and completeness of the data. E3 Consulting assumes no legal liability or responsibility for any decisions or actions resulting from the information contained within this map.

Job: B11399_060-
 R1_propboundary
 Date: 23/11/2011



Table 2. Potentially interested parties

Regional Councils	
Central Highlands Regional Council	PO Box 21, Emerald, QLD 4720 Ph: 1300 242 686 Email: enquiries@chrc.qld.gov.au
Gladstone Regional Council	PO Box 29, Gladstone DC, QLD 4680 Ph: 07 49700700 Email: info@gladstonerc.qld.gov.au
Rockhampton Regional Council	PO Box 1860, Rockhampton, QLD 4700 Ph: 1300 225 577 Email: enquiries@rrc.qld.gov.au
Native Title Claimants	
Not applicable	
Aboriginal Parties	
Kangoulou People	sch4p4(6) Personal information
Utilities	
Sunwater	Level 9 120 Edward Street Brisbane QLD 4001
Powerlink	PO Box 1193 Virginia QLD 4014
Petroleum Tenure Holders	
Bow Energy	GPO Box 5244 Brisbane Qld, 4001
OME Resources	Level 2,103-113 Nerang Street, Southport QLD 4215
Mineral Tenure Holders	
MCG Resources	GPO Box 751 Morningside Qld, 4170
Aquila Resources (Argos Pty Ltd)	Level 2 Aquila Centre, 1 Preston Street, Como WA 6152
Federal Departments	
DSEWPac	GPO Box 787 Canberra ACT 2601
State Departments	
DERM	GPO Box 2454 Brisbane QLD 4001
DERM	PO Box 906 Emerald QLD 4720
Other Departments as advised by DERM	To be advised

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