

## Draft Terms of Reference for an Environmental Impact Statement

### Draft Terms of Reference for the Ellensfield Coal Mine Project Environmental Impact Statement (EIS)

|                                                                |    |
|----------------------------------------------------------------|----|
| GLOSSARY .....                                                 | 4  |
| PART A                      PREAMBLE .....                     | 6  |
| PART B                      CONTENT OF THE EIS.....            | 10 |
| EXECUTIVE SUMMARY .....                                        | 11 |
| GLOSSARY OF TERMS .....                                        | 11 |
| 1     INTRODUCTION .....                                       | 11 |
| 1.1     Project Title .....                                    | 11 |
| 1.2     Project Proponent .....                                | 11 |
| 1.3     Project Description .....                              | 11 |
| 1.4     Project Objectives and Scope .....                     | 12 |
| 1.5     The Environmental Impact Statement Process.....        | 12 |
| 1.5.1     Objectives of the EIS.....                           | 12 |
| 1.5.2     Submissions .....                                    | 13 |
| 1.5.3     Matters of national environmental significance ..... | 13 |
| 1.6     Public Consultation Process .....                      | 13 |
| 1.7     Project Approvals .....                                | 13 |
| 1.7.1     Legislation and Policy Requirements.....             | 13 |
| 1.7.2     Planning Processes and Standards.....                | 14 |
| 2     PROJECT NEED AND ALTERNATIVES.....                       | 14 |
| 2.1     Project Justification.....                             | 14 |
| 2.2     Alternatives to the Project .....                      | 14 |
| 3     DESCRIPTION OF THE PROJECT .....                         | 15 |
| 3.1     Location .....                                         | 15 |
| 3.1.1     Regional Context.....                                | 15 |
| 3.1.2     Local Context .....                                  | 15 |
| 3.2     Resource .....                                         | 15 |
| 3.3     Construction .....                                     | 15 |
| 3.4     Operation .....                                        | 15 |
| 3.4.1     Location and Tenure.....                             | 16 |
| 3.4.2     Mine Life and Coal Resource Base .....               | 16 |
| 3.4.3     Mining Methods and Equipment .....                   | 16 |
| 3.4.4     Mine Sequencing .....                                | 17 |
| 3.4.5     Ongoing Evaluation and Exploration Activities.....   | 17 |
| 3.4.6     Processing .....                                     | 17 |
| 3.4.7     Product Handling .....                               | 17 |
| 3.4.8     Waste Management.....                                | 17 |
| 3.4.8.1     Air emissions .....                                | 18 |
| 3.4.8.2     Excavated waste.....                               | 18 |
| 3.4.8.3     Tailings.....                                      | 18 |
| 3.4.8.4     Solid Waste.....                                   | 19 |
| 3.4.8.5     Waste water.....                                   | 19 |

|         |                                                                                                           |           |
|---------|-----------------------------------------------------------------------------------------------------------|-----------|
| 3.5     | Infrastructure Requirements.....                                                                          | 19        |
| 3.5.1   | Transport - Road / Rail / Ship .....                                                                      | 20        |
| 3.5.2   | Energy .....                                                                                              | 20        |
| 3.5.3   | Water Supply / Storage .....                                                                              | 20        |
| 3.5.4   | Stormwater Drainage.....                                                                                  | 21        |
| 3.5.5   | Sewage.....                                                                                               | 21        |
| 3.5.6   | Accommodation and Other Infrastructure .....                                                              | 21        |
| 3.6     | Rehabilitation and Decommissioning.....                                                                   | 21        |
| 4       | <b>DESCRIPTION OF THE EXISTING ENVIRONMENTAL VALUES / POTENTIAL IMPACTS AND MITIGATION MEASURES .....</b> | <b>22</b> |
| 4.1     | Climate.....                                                                                              | 23        |
| 4.2     | Land .....                                                                                                | 24        |
| 4.2.1   | Environmental Values .....                                                                                | 24        |
| 4.2.1.1 | Topography/Geomorphology.....                                                                             | 24        |
| 4.2.1.2 | Geology .....                                                                                             | 24        |
| 4.2.1.3 | Mineral Resource.....                                                                                     | 24        |
| 4.2.1.4 | Soils.....                                                                                                | 25        |
| 4.2.1.5 | Land Use.....                                                                                             | 25        |
| 4.2.1.6 | Infrastructure.....                                                                                       | 25        |
| 4.2.1.7 | Sensitive Environmental Areas.....                                                                        | 25        |
| 4.2.1.8 | Landscape Character.....                                                                                  | 25        |
| 4.2.1.9 | Visual amenity.....                                                                                       | 26        |
| 4.2.2   | Potential Impacts and Mitigation Measures.....                                                            | 26        |
| 4.2.2.1 | Land Use Suitability.....                                                                                 | 26        |
| 4.2.2.2 | Land Disturbance.....                                                                                     | 27        |
| 4.2.2.3 | Land Contamination .....                                                                                  | 27        |
| 4.2.2.4 | Erosion and stability.....                                                                                | 28        |
| 4.2.2.5 | Landscape character .....                                                                                 | 28        |
| 4.2.2.6 | Visual amenity.....                                                                                       | 28        |
| 4.2.2.7 | Lighting.....                                                                                             | 29        |
| 4.2.2.8 | Transport.....                                                                                            | 29        |
| 4.2.2.9 | Subsidence .....                                                                                          | 29        |
| 4.3     | Water Resources .....                                                                                     | 29        |
| 4.3.1   | Environmental Values .....                                                                                | 29        |
| 4.3.2   | Surface Waterways.....                                                                                    | 29        |
| 4.3.3   | Groundwater.....                                                                                          | 30        |
| 4.3.4   | Potential Impacts and Mitigation Measures.....                                                            | 31        |
| 4.3.4.1 | Surface Water and Watercourses.....                                                                       | 31        |
| 4.3.4.2 | Groundwater.....                                                                                          | 32        |
| 4.4     | Air.....                                                                                                  | 32        |
| 4.4.1   | Environmental Values .....                                                                                | 32        |
| 4.4.2   | Greenhouse Gas Emissions .....                                                                            | 33        |
| 4.4.3   | Potential Impacts and Mitigation Measures.....                                                            | 33        |
| 4.4.4   | Greenhouse Gas Abatement .....                                                                            | 34        |
| 4.4.5   | Climate Change Adaptation .....                                                                           | 34        |
| 4.5     | Noise and Vibration .....                                                                                 | 35        |
| 4.5.1   | Environmental Values .....                                                                                | 35        |
| 4.5.2   | Potential Impacts and Mitigation Measures.....                                                            | 35        |
| 4.6     | Waste .....                                                                                               | 35        |
| 4.6.1   | Environmental Values .....                                                                                | 35        |
| 4.6.2   | Potential Impacts and Mitigation Measures.....                                                            | 35        |

|         |                                                  |    |
|---------|--------------------------------------------------|----|
| 4.7     | Nature Conservation.....                         | 36 |
| 4.7.1   | Environmental Values .....                       | 36 |
| 4.7.1.1 | Terrestrial Flora.....                           | 38 |
| 4.7.1.2 | Terrestrial Fauna.....                           | 39 |
| 4.7.1.3 | Aquatic Biology.....                             | 39 |
| 4.7.2   | Potential Impacts and Mitigation Measures.....   | 39 |
| 4.8     | Cultural Heritage.....                           | 41 |
| 4.8.1   | Environmental Values .....                       | 41 |
| 4.8.2   | Potential Impacts and Mitigation Measures.....   | 41 |
| 4.9     | Social .....                                     | 42 |
| 4.9.1   | Environmental Values .....                       | 42 |
| 4.9.2   | Potential Impacts and Mitigation Measures.....   | 42 |
| 4.10    | Health and Safety.....                           | 44 |
| 4.10.1  | Environmental Values .....                       | 44 |
| 4.10.2  | Potential Impacts and Mitigation Measures.....   | 44 |
| 4.11    | Economy .....                                    | 44 |
| 4.11.1  | Environmental Values .....                       | 44 |
| 4.11.2  | Potential Impacts and Mitigation Measures.....   | 45 |
| 4.12    | Hazard and Risk.....                             | 45 |
| 4.12.1  | Environmental Values Affected.....               | 45 |
| 4.12.2  | Potential Impacts and Mitigation Measures.....   | 45 |
| 5       | CROSS REFERENCE WITH THE TERMS OF REFERENCE..... | 46 |
| 6       | ENVIRONMENTAL MANAGEMENT PLAN .....              | 46 |
| 7       | REFERENCES.....                                  | 47 |
| 8       | RECOMMENDED APPENDICES.....                      | 47 |
| A1      | Final Terms of Reference for this EIS.....       | 47 |
| A2      | Development Approvals.....                       | 47 |
| A3      | The Standard Criteria .....                      | 47 |
| A4      | Research.....                                    | 47 |
| A5      | Consultation Report .....                        | 47 |
| A6      | Study Team .....                                 | 47 |
| A7      | Glossary of Terms .....                          | 48 |
| A8      | Specialist Studies .....                         | 48 |
| A9      | Corporate Environmental Policy .....             | 48 |

#### LIST OF TABLES

|         |                                     |   |
|---------|-------------------------------------|---|
| Table 1 | Exploration Tenement Ownership..... | 8 |
|---------|-------------------------------------|---|

## GLOSSARY

The following abbreviations have been used in this document:

|                   |                                                                                                |
|-------------------|------------------------------------------------------------------------------------------------|
| <b>ACH Act</b>    | <i>Aboriginal Cultural Heritage Act 2003</i>                                                   |
| <b>AHCA</b>       | <i>Australian Heritage Commission Act 1995</i>                                                 |
| <b>ANZECC</b>     | Australian and New Zealand Environment and Conservation Council                                |
| <b>CAMBA</b>      | China and Australia Migratory Bird Agreement                                                   |
| <b>CHMP</b>       | Cultural Heritage Management Plan                                                              |
| <b>CHPP</b>       | Coal Handling and Preparation Plant                                                            |
| <b>DNRMW</b>      | Queensland Department of Natural Resources, Mines and Water                                    |
| <b>ECM</b>        | Ellensfield Coal Management Pty Ltd                                                            |
| <b>ECMP</b>       | Ellensfield Coal Mine Project                                                                  |
| <b>EIS</b>        | environmental impact statement                                                                 |
| <b>EM plan</b>    | environmental management plan                                                                  |
| <b>EP Act</b>     | <i>Environmental Protection Act 1994</i>                                                       |
| <b>EPA</b>        | Environmental Protection Agency                                                                |
| <b>EPBC Act</b>   | <i>Environment Protection &amp; Biodiversity Conservation Act (Cwlth) 1999</i>                 |
| <b>EPP(Air)</b>   | <i>Environmental Protection (Air) Policy 1997</i>                                              |
| <b>EPP(Noise)</b> | <i>Environmental Protection (Noise) Policy 1997</i>                                            |
| <b>EPP(Waste)</b> | <i>Environmental Protection (Waste Management) Policy 2000</i>                                 |
| <b>EPP(Water)</b> | <i>Environmental Protection (Water) Policy 1997</i>                                            |
| <b>EPWMR</b>      | <i>Environmental Protection (Waste Management) Regulation 2000</i>                             |
| <b>ESD</b>        | ecologically sustainable development                                                           |
| <b>IAS</b>        | initial advice statement                                                                       |
| <b>IDAS</b>       | Integrated Development Assessment System as defined by the <i>Integrated Planning Act 1997</i> |
| <b>IPA</b>        | <i>Integrated Planning Act 1997</i>                                                            |
| <b>JAMBA</b>      | Japan and Australia Migratory Bird Agreement                                                   |
| <b>MDL</b>        | Mineral Development Licence issued pursuant to the <i>Mineral Resources Act 1989</i>           |

**Mining project**—defined in section 147 of the EP Act as:

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

**Mining activities** are defined in section 147 of the EP Act as:

- (1) A mining activity means an activity mentioned in Subsection (2 below), that, under the *Mineral Resources Act 1989*, is authorised to take place on –
  - (a) land to which a mining tenement relates; or
  - (b) land authorised under that Act for access to land mentioned in paragraph (a).
- (2) For subsection (1) the activities are as follows:
  - (a) prospecting, exploring or mining under the *Mineral Resources Act 1989* or another Act related to mining;
  - (b) processing a mineral won or extracted by an activity under paragraph (a);
  - (c) an activity that –

- (i) is directly associated with, or facilitates or supports, an activity mentioned in paragraph (a) or (b); and
- (ii) may cause environmental harm;
- (d) rehabilitating or remediating environmental harm because of a mining activity under paragraphs (a) to (c);
- (e) action taken to prevent environmental harm because of an activity mentioned in paragraphs (a) to (d);
- (f) any other activity prescribed for this subsection under a regulation.

|              |                                                                                                                                      |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>ML</b>    | Mining Lease issued pursuant to the <i>Mineral Resources Act 1989</i>                                                                |
| <b>ML</b>    | Mega Litre                                                                                                                           |
| <b>MRA</b>   | <i>Mineral Resources Act 1989</i>                                                                                                    |
| <b>Mtpa</b>  | million tonnes per annum                                                                                                             |
| <b>NCA</b>   | <i>Nature Conservation Act 19992</i>                                                                                                 |
| <b>NHMRC</b> | National Health Medical Research Council                                                                                             |
| <b>NEPM</b>  | National Environmental Protection Measure                                                                                            |
| <b>NES</b>   | National Environmental Significance as defined by the <i>Environment Protection &amp; Biodiversity Conservation Act (Cwlth) 1999</i> |
| <b>ROM</b>   | run of mine                                                                                                                          |
| <b>TIA</b>   | <i>Transport Infrastructure Act 1994</i>                                                                                             |
| <b>TOR</b>   | terms of reference                                                                                                                   |
| <b>URS</b>   | URS Australia Pty Ltd                                                                                                                |
| <b>WAct</b>  | <i>Water Act 2000</i>                                                                                                                |
| <b>VMA</b>   | <i>Vegetation Management Act 1999</i>                                                                                                |

## **PART A PREAMBLE**

### **PROJECT PROPONENT**

The Ellensfield Coal Mine Project (ECMP) is owned by a joint venture of Nebo Central Coal Pty Ltd and CVRD (CQ) Australia Pty Ltd, both wholly owned companies of CVRD Australia Pty Ltd,.

The proponent may be contacted through Ellensfield Coal Management Pty Ltd as follows:

**Site Office**  
PO Box 558  
MORANBAH QLD 4744  
ABN 40 123 542 754  
Ph: 1300 557 995

**Registered Office**  
GPO Box 731  
Brisbane QLD 4001  
Ph: 07 3220 0330

### **SUMMARY**

#### **Project Description**

The intent of ECMP is to develop an underground coal mine using a longwall system to extract the Leichhardt coal seam. The project will consist of three mining leases (ML East, ML West, and ML Wedge), which overlay EPC's 667, 722, 951 and 1036. The preferred option for the project comprises of the following components.

- a) A small open cut mine on ML West which will potentially serve as the access to the underground mine.
- b) An extension of the open cut mine on ML West.
- c) The storage of out-of-pit spoil on ML West.
- d) An underground coal mine on ML East.
- e) A ROM stockpile located on ML West for the temporary storage of small amounts of ROM coal (emergency stockpile).
- f) A large ROM stockpile located on ML East with live reclaim capability for the transient storage of ROM coal up to approximately 150,000 t live capacity and with the ability to expand the stockpile capacity up to approximately 300,000 t by dozer push (stockpile capacities subject to detailed simulation studies).
- g) A coal washing plant located on ML East with the capacity to handle up to 5.5 Mtpa of feed coal and deliver a two product specification (thermal and coking coal). The location of the coal washing plant is subject to further studies.
- h) A product coal handling facility (product stockpiles) with the capability of handling two product types (thermal and coking) each with live capacity up to 200,000 t and connected to a truck loading bin (stockpile capacities subject to detailed simulation studies).
- i) A rail loading facility consisting of loading bin and truck discharge system.
- j) Development of a haul road to link the truck loading bin to the rail load-out bin.
- k) Development of a new rail loop to the new rail load-out bin.
- l) Development of a rejects storage facility.
- m) Development of an access haul road, administration and operations buildings, and associated services.
- n) Development of a site based power generation system (gas turbines).

The final layout will depend on the outcome of discussions with Peabody Resources regarding the connection between ML East and ML West. The Burton Mine haul road (Peabody Energy Australia Coal Pty Ltd) traverses between ML West and ML East and the intent is for the ECMP open cut excavation to be located on the western side of this haul road and the underground workings on the eastern side. The underground (UG) mine access headings will extend under the haul road from the open cut on the western side to the UG workings on the eastern side at an approximate depth of 50 m. Additionally a surface crossing of the Burton Mine haul road will be constructed (nominally a tunnel under the haul road) which will provide a transport corridor for personnel, equipment, services, coal conveyor, etc between the two sites.

Ongoing studies may determine the proposed open cut access method to the UG mine as being uneconomical, impractical or inefficient and in this circumstance the project will consider accessing the UG from twin surface drifts located on ML East.

### **Project Site**

The ECMP is located within the northern region of the Bowen Basin, approximately 175km west of the major regional coastal city of Mackay. The site lies on the northern side of the Peak Downs Highway approximately midway between the local towns of Coppabella and Moranbah. Site access is gained via the Carborough Downs and Broadlea turnoff from the Peak Downs Highway and then by travelling north along the Broadlea and Ellensfield mine access road. Surrounding mines in the near vicinity include the Burton Downs open cut to the north west, the Broadlea open cut to the south west, the South Walker Creek open cut to the east and the Carborough Downs underground to the south.

The proposed project will occur over a total area of approximately 3,430ha of which the majority will be underground operations. The area of surface disturbance associated the underground activities is anticipated to be approximately 700ha.

The ECMP area is approximately 7km east to west (at the widest point) and 7km north to south. The area is situated at approximately 250m to 350m AHD and local relief is generally up to 40m. The topography of the project area consists of low-lying gently sloping plains of generally less than 2% gradient. Steep-sided, rocky ridgelines, approximately 20m to 40m in height are located in the far northern and south-eastern margins of the area, with smaller rocky knolls being located throughout the central parts of the project area.

The majority of the ECMP area is located within the catchment of Spade Creek. Spade Creek forms a wide, multi-channelled, high-flow corridor that drains the central and southern parts of the project area. Several smaller tributaries also branch off Spade Creek to the north and south. Bullock Creek, and a minor tributary, drain the northern and north-western sections of the project area. Both Spade Creek and Bullock Creek discharge into Teviot Brook, which then flows into the Isaac River to the south of the project area. All stream flows within the project area are ephemeral.

### **Tenements and Tenure**

The proposed Mining Lease Application area lies within four exploration tenements, namely EPC 722, EPC667, EPC951 and EPC1036. These are held by a number of companies which are all owned 100% by CVRD Australia (refer Table 1). Work is underway to consolidate these holdings.

**Table 1 Exploration Tenement Ownership**

| Tenement | Holding Company                                                      | Owner                  | Tenement Status                                                                                                                                                                                                                     |
|----------|----------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EPC667   | CVRD Australia (CQ) Pty Ltd (60%)<br>Nebo Central Coal Pty Ltd (40%) | CVRD Australia Pty Ltd | Granted from 31 May 2000 to 31 May 2008                                                                                                                                                                                             |
| EPC722   | CVRD Australia (CQ) Pty Ltd (60%)<br>Nebo Central Coal Pty Ltd (40%) | CVRD Australia Pty Ltd | Granted from 28 September 2004 to 27 September 2006. This exploration permit is currently being renewed. DME proposing grant from 28 Sep 2006 to 27 Sep 2011 subject to required outcome of Native Title process as decided by NNTT |
| EPC951   | Swanbank Resources Pty Ltd (100%)                                    | CVRD Australia Pty Ltd | Granted from 2 August 2006 to 2 August 2009                                                                                                                                                                                         |
| EPC1036  | Swanbank Resources Pty Ltd (100%)                                    | CVRD Australia Pty Ltd | Granted from 14 February 2007 to 13 February 2010                                                                                                                                                                                   |

The ECMP is located within the Nebo and Belyando Shires, which are a well-established grazing, farming and coal mining region within the Bowen Basin. The proposed mine area is located on the following leases:

**Table 2 Details of property affected by EPC722 (excluding ML and MDL areas)**

| Description     | Land Tenure Type | Current Usage | Owners/Lessee Name       |
|-----------------|------------------|---------------|--------------------------|
| L12 on SP147333 | Leased           | Grazing       | Wotonga Pastoral Pty Ltd |

**Table 3 Details of property affected by EPC951 (excluding ML and MDL areas)**

| Description     | Land Tenure Type | Current Usage | Owners/Lessee Name       |
|-----------------|------------------|---------------|--------------------------|
| L12 on SP147333 | Leased           | Grazing       | Wotonga Pastoral Pty Ltd |

**Table 4 Details of property affected by EPC1036 (excluding ML and MDL areas)**

| Description     | Land Tenure Type | Current Usage      | Owners/Lessee Name       |
|-----------------|------------------|--------------------|--------------------------|
| L3 on GV54      | Freehold         | Grazing            | Allan G.H. Williams      |
| L12 on SP147333 | Leased           | Grazing            | Wotonga Pastoral Pty Ltd |
| L4 on CP903281  | State Lease      | Grazing and Mining | AL Atkinson              |

**Table 5 Details of property affected by EPC667 (excluding ML and MDL areas)**

| Description    | Land Tenure Type | Current Usage      | Owners/Lessee Name |
|----------------|------------------|--------------------|--------------------|
| L4 on CP903281 | State Lease      | Grazing and Mining | AL Atkinson        |

### Native Title

Native title rights are extinguished over all the tenements as it is a 'pre-existing rights based act' under the Native Title Act 1993.

A cultural heritage claim exist over these tenements by the traditional owners Barada Barna Kabalbara and Yetimarla People #3 (BBKY#3) (QC01/013).

A Cultural Heritage Management Plan (CHMP) covering these tenements will be negotiated with the BBKY#3 traditional owners during the feasibility study.

**ADMINISTRATIVE DETAILS FOR THESE TERMS OF REFERENCE**

**The Legislative Framework**

The ECMP requires three MLs under the *Mineral Resources Act 1989* (MRA) to secure tenure for the ECMP. To obtain the mining leases, an environmental authority (non-standard mining activity) under the *Environmental Protection Act 1994* (EP Act) is required.

The proponent submitted an application, which was approved by the EPA, to conduct a voluntary EIS for this mining project.

## **PART B            CONTENT OF THE EIS**

### **GENERAL INFORMATION**

- 1 The objective of the EIS process is to ensure that all matters relevant to the ECMP, particularly environmental, social and economic impacts, are fully identified and addressed. There may be issues other than those specified within this draft TOR that will be considered in the EIS.
- 2 Consistent with this objective, the EIS will provide:
  - for interested bodies and persons, a basis for understanding the ECMP; alternatives and preferred solutions; the existing environment that it would affect, both on and off the site; the impacts that may occur and the measures to be taken to mitigate all adverse impacts;
  - for the advisory agencies, a framework for assessing the impacts of the ECMP, in view of legislative and policy provisions; and
  - a definitive statement of measures or actions to be undertaken to mitigate any adverse impacts during and following the implementation of the ECMP. The EP Act requires that these objectives be achieved by the inclusion of a draft Environmental Management Plan in the EIS that describes acceptable impacts and environmental management strategies designed to meet agreed performance criteria.
- 3 It is the responsibility of the consultant (URS) preparing the EIS (in conjunction with ECM) to determine those parties that should be consulted during the EIS preparation stage in addition to those specified by this draft TOR.
- 4 The EIS will be a stand-alone document, i.e. it will contain sufficient information from previous studies to avoid the need to search out previous or supplementary reports.
- 5 Where possible, information provided in the EIS will be clear, logical, objective and concise, so that non-technical persons may easily understand it. Where appropriate, text will be supported by maps and diagrams. Factual information contained in the document will be referenced wherever possible. Where applicable, aerial photography and/or digital information will be presented. The purpose of the document is to enable members of the public, the assessing agencies and the determining authority to properly understand the environmental consequences of the proposed development.
- 6 The body of the EIS is to be written in a clear and concise style that is easily understood by the general reader and avoids the use of technical jargon wherever possible. It will be acknowledged that readers are likely to include representatives of Commonwealth, State and Local Governments, special interest groups and the general public.
- 7 The EIS will refer (by suitable appendices) to all relevant studies/investigations that may have been carried out.
- 8 If the proponent requires any information in the EIS to remain confidential, this shall be clearly indicated, and separate information shall be prepared on these matters.
- 9 A concise reference list and bibliography will be included. Any Internet 'web' pages used as data sources will also be referenced.
- 10 A checklist shall be provided to indicate compliance of the EIS with the final TOR.
- 11 The EIS will state the criteria adopted in assessing the ECMP and its impacts, such as compliance with relevant legislation, policies and standards; community acceptance; maximisation of environmental benefits (if any); and minimisation of risks and harm.
- 12 The level of analysis in the EIS shall reflect the level of significance of the impacts. Unknown variables or assumptions made in the assessment will be clearly stated and discussed. The extent to which the limitations, if any, of available information may influence the conclusions of the environmental assessment will also be discussed.
- 13 The emphasis shall be on quality and not quantity. Repetition will be avoided wherever possible.
- 14 The environmental management plan (EM plan) will relate to the ECMP including the areas of construction, operation, maintenance, and decommissioning. The EM plan will enable reasonable economic and

technically achievable conditions to be developed to ensure that the impact of the ECMP is reduced to acceptable levels.

- 15 The terms 'describe', 'detail' and 'discuss' will be taken to include both quantitative and qualitative matters as practicable and meaningful. Similarly, adverse and beneficial effects will be presented in quantitative and/or qualitative terms as appropriate.
- 16 Within this draft TOR, the term ECMP includes all mining activities undertaken on lands covered by the proposed ECMP area and supporting ECMP infrastructure (e.g. haul road) as defined in the glossary.
- 17 A listing of all members of the advisory agencies for the EIS process will be provided, along with contact details. A 'preliminary' EIS (number of copies to be advised) will be lodged with the relevant Government authorities for review prior to its release for public comment.
- 18 Copies (number to be advised) of the prepared EIS will be lodged with the relevant Government authorities for distribution to advisory agencies for comment and review during the public review period. Documents will be made available in CD ROM format with a quantity of hard copy documents also produced. Further advice on arrangements for public review will be sought closer to the EIS completion date.
- 19 Nomenclature in the EIS will be as defined in the relevant State legislation, including the Environmental Protection Act 1994 (EP Act) and the Water Act 2000 (WAct) unless otherwise specified or defined.

While every attempt has been made to ensure that the draft TOR address all of the major issues associated with this ECMP, the issues are not necessarily exhaustive and will not be interpreted as excluding from consideration matters deemed to be significant but not incorporated in them, or matters (currently unforeseen) that emerge as important or significant from environmental studies or otherwise during the course of preparation of the EIS.

## **EXECUTIVE SUMMARY**

The function of the executive summary is to convey the most important aspects and options relating to the ECMP to the reader in a concise and readable form. The structure of the executive summary will follow that of the EIS, focussing on the key issues.

## **GLOSSARY OF TERMS**

A glossary of technical terms, acronyms and abbreviations for the EIS shall be provided.

## **1 INTRODUCTION**

The introduction will clearly explain the function of the EIS, why it has been prepared and what it sets out to achieve, in particular, the level of detail of information required to meet the level of approval being sought.

It will also define the audience to whom it is directed and contain an overview of the structure of the document.

### **1.1 Project Title**

The project title is the 'Ellensfield Coal Mine Project'.

### **1.2 Project Proponent**

This section will provide details regarding the proponent for the ECMP including details of any joint venture partners.

### **1.3 Project Description**

A brief description of the key elements of the ECMP will be provided. Any major associated infrastructure requirements associated with the ECMP will also be summarised with detailed descriptions of the ECMP presented in Section 3. The location of the ECMP and its infrastructure requirements will be described and mapped showing the location of the project in relation to adjacent rail and road infrastructure, the existing and proposed crossing points, and access arrangements.

A brief description of studies or surveys which have been undertaken for the purposes of developing the ECMP and preparing the EIS, including references to relevant baseline studies or investigations previously undertaken, will be provided.

#### 1.4 Project Objectives and Scope

This section will provide:

- a statement of the objectives which have led to the development of the ECMP and a brief outline of the events leading up to the ECMP's formulation, including alternatives, the time scale envisaged for implementation and ECMP life; anticipated establishment costs and actions already undertaken within the ECMP area;
- the current status of the ECMP and an outline of the relationship of the ECMP to other developments or actions which may relate, whether or not they have been approved; and
- the consequences of not proceeding.

#### 1.5 The Environmental Impact Statement Process

The important aspect of this section is to make clear the objectives of the environmental impact assessment process under the EP Act. This section will note that the EIS is voluntary and include a description of the impact assessment process steps, timing and decisions to be made for relevant stages of the ECMP. Importantly, this section will outline mechanisms in the process for public input and the public release of the EIS. All responses to stakeholder submissions will be identified.

This section will highlight the necessity for the proponent to undertake community consultation as part of the impact assessment process.

The information required in this section will ensure:

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

##### 1.5.1 Objectives of the EIS

Having described the objectives of the EIS process, a succinct statement will be made of the objectives of the ECMP EIS. The structure of the EIS will then be outlined as an explanation of how the EIS will meet its objectives. In brief, the purpose of the EIS is to provide public information on the need for, and likely effects of, the ECMP; to set out acceptable standards and levels of impacts (both beneficial and adverse) on environmental values, and demonstrate how environmental impacts can be managed through the protection and or enhancement of the environmental values. Discussion of options and alternatives will be a key aspect of the EIS.

While the terms of reference provide guidance on the scope of the EIS studies, they should not be seen as exhaustive or limiting. **If it transpires during the preparation of the EIS that previously unforeseen matters not addressed in the terms of reference are found to be relevant to the assessment of impacts of the proposal, those matters must be included in the EIS.**

The EIS will address all relevant matters concerning environmental values, impacts on those values and proposed mitigation measures. No relevant matter will be raised for the first time in an appendix or the draft EM plan. When considering whether an impact is or is not significant, the EIS will take into account both the intensity of the impact and the context in which it would occur.

The role and purpose of the EIS will be outlined, and the audience will be able to distinguish the EIS as the key environmental document providing advice to decision-makers considering approvals for the ECMP. The main text will be written in plain English, avoiding jargon as much as possible. Additional technical detail, where required, will be provided in appendices. The main text will not assume that a reader has a prior knowledge of the ECMP site. The role of the EM plan in the regulation of the ECMP will also be discussed. The EM plan's role will provide management measures that can be carried over into conditions that would attach to any

approval(s), environmental authorities and permits for the ECMP.

### 1.5.2 Submissions

Readers will be informed as to:

- how and when to make submissions;
- what form the submissions will take and required contact details; and
- how submissions on the draft EIS will be addressed and taken into account in the decision-making process.

### 1.5.3 Matters of national environmental significance

The proponent has referred the project to the Commonwealth Department of Environment and Water Resources (DEWR) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and it has been determined to be a controlled action. The controlling provision under Division 1 of Part 3 of the EPBC Act is: sections 18 and 18A (listed threatened species and communities). The State's environmental impact statement (EIS) process is accredited for the assessment under Part 8 of the EPBC Act in accordance with the bilateral Agreement between the Commonwealth of Australia and the State of Queensland (2004). Consequently, the State's process will be used to assess both State and Commonwealth matters.

The EIS will provide separate discussions under sub-headings in the relevant sections that describe the values and address the potential impacts on relevant matters of national environmental significance (sections 18 and 18A - threatened species and communities). The locations of those sub-headings will be readily identifiable from the Table of Contents.

## 1.6 Public Consultation Process

An appropriate public consultation program is essential to the full conduct of the impact assessment. This section will outline the methodology to be adopted to identify and mitigate socio-economic impacts that may arise from the ECMP. Information about consultation that has taken place up to the date of the EIS release, and the results of such consultation, will be provided.

Section 41 of the EP Act requires the submission of a list of affected persons and interested persons as well as information on consultation.

The public consultation program will attempt to provide ongoing opportunities for community involvement and education, and may include public meetings, interest group meetings, production of summary information and updates, and other consultation mechanisms designed to encourage and facilitate active public participation.

The public consultation process will attempt to identify broad issues of concern to the local community and interest groups and will extend from the ECMP planning phase through operations and final rehabilitation.

## 1.7 PROJECT APPROVALS

### 1.7.1 Legislation and Policy Requirements

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

- *Environmental Protection Act 1994*;
- *Water Act 2000*;
- *Mineral Resources Act 1989*;
- *Integrated Planning Act 1997*;
- *Transport Infrastructure Act 1994*;
- *Transport Planning and Coordination Act 1994*;

- *Transport Operation (Road Use Management) Act 1995*, and
- Department of Main Roads (DMR) Guidelines for Assessment of Road Impacts of Development (2006).

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

### **1.7.2 Planning Processes and Standards**

This section will discuss the consistency of the ECMP with existing land uses or the long term policy framework for the area (e.g. as reflected in local and regional plans) and the legislation, the standards, codes or guidelines available to monitor and control operations on site and refer to all relevant State and Regional Planning Policies. In particular, this section will highlight requirements of the EP Act, such as ESD, 'best practical environmental management', 'general environmental duty', relevant Environmental Protection Policies (EPPs) i.e. Air, Noise, Water and Waste Management, the *Environmental Protection Regulation 1998* (EPR) and *Environmental Protection (Waste Management) Regulation 2000* (EPWMR).

Local Government planning controls, local laws and policies applying to the development will also be described together with a list of the approvals required for the ECMP and the expected timetable for approval of the various applications.

This information is required to make clear how the ECMP conforms to State, regional and local plans for the area.

## **2 PROJECT NEED AND ALTERNATIVES**

### **2.1 Project Justification**

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

### **2.2 Alternatives to the Project**

This section will describe feasible alternatives, including conceptual, technological and locality alternatives to the proposed ECMP and a discussion of the consequences of not proceeding. Alternatives will be discussed in sufficient detail to enable an understanding of the reasons for preferring certain options and courses of action and rejecting others. Reasons for selecting the preferred options will be delineated in terms of technical, commercial, social and natural environment aspects. The comparative environmental impacts of each alternative will be summarised.

The interdependence of the various project components will be described, explaining how the infrastructure requirements relate to the viability of the ECMP. A rationale for power, transport, water supply and/or storage infrastructure will be described. The relationship of options chosen for waste management and any emissions produced will also be detailed.

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

### 3 DESCRIPTION OF THE PROJECT

This section will describe the ECMP through its lifetime. Where appropriate, each section will also address the various stages of the project i.e. planning, construction, operation and decommissioning. It also allows further assessment of which approvals may be required.

#### 3.1 LOCATION

##### 3.1.1 Regional Context

The regional context of the ECMP will be described and illustrated on maps at suitable scales. The following maps will be provided.

- Existing local and state road network systems complete with road names.
- Location of construction activities.
- Access locations to the State Controlled Roads (SCR).
- Existing and proposed locations of construction compounds and accommodation camps.

##### 3.1.2 Local Context

The local context of the ECMP will be described and illustrated on maps at suitable scales. Real property descriptions of the ECMP site will be provided.

#### 3.2 RESOURCE

This section will summarise the results of studies and surveys undertaken to identify and delineate the coal resource and describe the location, tonnage and quality of the resource and resource utilisation.

The geological reserves and/or resource will be defined using formal terminology as recommended by the Australian Stock Exchange, the Australasian Institute of Mining and Metallurgy and the Australian Mining Industry Council.

Where relevant, maps will be provided showing the general location of the ECMP, and in particular:

- the location of the reserve, i.e. that component of the resource which is viable to extract under current economic circumstances;
- the location and boundaries of mining tenures, granted or proposed, to which the ECMP area is or will be subject;
- the location of any proposed buffers surrounding the working areas; and
- the location and boundaries of the site.

Consideration will be given to providing a rectified aerial photo overlaid by the ECMP to illustrate a comparison to the natural features of the area.

#### 3.3 CONSTRUCTION

The extent and nature of the ECMP's construction phase will be described, including the type and methods of construction to be employed, the construction equipment to be used and the items of plant to be transported onto the construction site. Any staging of the proposal should be described and illustrated showing site boundaries, development sequencing and timeframes. The estimated numbers of people to be employed in the project construction phase should also be provided together with their projected source locations and a brief description of where those people may be accommodated and/or how they will be transported to the site. Sources of construction materials and their associated haulage routes will also be identified for assessment purposes.

#### 3.4 OPERATION

The location of the proposed ECMP will be illustrated on maps and described, including the probable mining boundaries and development sequences or timeframes, any final void to be left at the cessation of mining and

the processing of coal. The rationale for the preferred operational program will be explained.

The extent and nature of the ECMP mining operations will be described, including:

- a description of plant and equipment to be employed;
- the capacity of plant and equipment;
- the approximate quantity of coal to be mined;
- the location and extent of existing and proposed excavations, overburden stockpiles and waste to be handled during the operation; and
- the operational workforce.

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

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

#### **3.4.1 Location and Tenure**

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

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

Consideration will be given to providing a rectified air photo enlargement to illustrate components of the project in relation to the land and mining tenures and natural and built features of the area.

#### **3.4.2 Mine Life and Coal Resource Base**

Specific details will be provided of the following.

- The proposed mine life and an outline of the coal resource base (further detail will be provided in section 4.2.1.2, Geology).
- The quantity of coal to be mined annually including any proposed ramping of production or staging of development.

#### **3.4.3 Mining Methods and Equipment**

Specific details will be provided of the following.

- The mining type, methods and equipment to be used.
- The use of different techniques in areas of different topographic or geotechnical character.
- Any chemicals to be used, including hydraulic fluids used in underground operations.

The description will refer to, and be complemented by, the figures previously presented in Section 3.4.1 showing the locations of key aspects of the project. Additional figures will be provided as required.

#### 3.4.4 Mine Sequencing

Specific details will be provided of the following.

- The proposed sequence and timing of mining within the mining lease.
- The physical extent of excavations, location of stockpiles and/or coal reject to be handled during the Project's operation or left after mining ceases. The description will include the rate of throughput of product and reject.

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

#### 3.4.5 Ongoing Evaluation and Exploration Activities

This section will describe the extent and nature of any proposed ongoing exploration or geological/geotechnical evaluation activities within the project area that may be required over the life of the project.

#### 3.4.6 Processing

The location and nature of the proposed coal processing activities will be described including:

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

Concept and layout plans will be provided identifying proposed buildings, structures, plant and equipment associated with the processing operation. The nature, sources, location and quantities of all materials to be handled, including the storage and stockpiling of raw materials, will be described. Flow-sheets will be provided showing material balances for the mine and processing plant, and the anticipated rates of inputs, along with similar data on products, wastes and recycling streams. A description of the quantities and characteristics of the products produced will be provided.

The source, location and numbers of the operational workforce will also be identified.

#### 3.4.7 Product Handling

This section will describe and show on plans (at an appropriate scale), the proposed methods and the facilities to be used for ROM coal storage and for transferring product coal from the processing plant to the storage facilities and from the storage facilities to train or truck loading facilities. Environmental design features for proposed facilities will also be described.

#### 3.4.8 Waste Management

This section will provide an inventory of all wastes generated by the proposed activities through construction, mining and production. In addition to the expected total volumes of each waste produced, this section will include an inventory of the tonnage of coal processed; the amount of resulting process wastes; the tonnage and volume of waste rock removed to extract the coal; and the volume and tonnage of any by-products left from the processing of the coal per unit volume of product coal.

The physical and chemical characteristics of the waste material from the mine and processing plant will be provided. All other wastes, including regulated wastes, generated by the ECMP, e.g. tyres, packaging materials etc, will be described.

The EIS will describe waste management strategies having regard to the *Environmental Protection (Waste Management) Policy 2000* (EPP Waste) including the concepts for waste avoidance, reuse, recycling, treatment and disposal.

Schematic diagrams will be provided for each distinct stage of the project (e.g. construction/site preparation, commissioning, operation and decommissioning) indicating the processes to be used and highlighting their associated waste streams (i.e. all waste outputs: solid, liquid and gaseous), including recycling efforts, such as stockpiling and reusing topsoil. The physical and chemical characteristics of the waste material from the process plant will be provided.

Where relevant, cleaner production waste management planning will be detailed, especially as to how these concepts have been applied in order to prevent or minimise environmental impacts at each stage of the ECMP.

If applicable, details on natural resource use efficiency (e.g. energy and water) will be presented. This information will be provided to enable the resource management agencies and other stakeholders to assess the efficiency of resource use.

An initial geochemical study into the geochemical characteristics of the coal rejects will be undertaken, including an assessment of the potential for acid mine drainage to be generated. The study will describe the geochemical nature of the waste materials to be generated from the ECMP and their potential to leach contaminated water, impact on the quality of mine rehabilitation and impact on existing environmental values.

#### **3.4.8.1**      *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 disturbed by wind action on stockpiles and conveyors, or by transportation equipment (e.g. trucks, either by entrainment from the load or by passage on unsealed roads).

The methods to be employed in the mitigation of impacts from air emissions should be described in section 4.6.

#### **3.4.8.2**      *Excavated waste*

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

- An estimated tonnage and/or volume of waste rock and subsoil to be produced annually;
- Results of waste rock and subsoil characterisation that includes the net acid producing potential of the mined waste rock (metals analysis, sulfides, pH, conductivity, Net Acid Generation (NAG) and Acid Neutralising Capacity (ANC)).
- Characterisation should also address the properties of waste rock and subsoil that affect their erosion potential. Sampling should be representative with profiles of all geological units included and based on accepted statistical procedures and be in accordance with recognised guidelines.
- Details of any likely leachate quality expected under field conditions, including contaminants such as sulfate, pH, chloride, iron, major cations and anions, and any chemical species in sufficient quantity that is likely to be reactive and/or toxic.
- Measures to ensure stability of the waste dumps, particularly the management of drainage.
- Slope profiles that are consistent with intended land use and acceptable post-mining land management and maintenance.
- Alternatives for excavated waste disposal, including in-filling of voids, off-site options and treatment of any contaminated soil.

#### **3.4.8.3**      *Tailings*

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

Describe the approximate quantity of tailings to be produced by the project and its processing plant annually for the life of the mine. Tailings characterisation information should also be presented in this section, including:

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

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

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

#### **3.4.8.4 Solid Waste**

Describe the quantity and quality of solid wastes (other than waste rock, subsoil and tailings addressed in other sections) and the proposed methods of their disposal. The proposed location, site suitability, dimensions and volume of any landfill, including its method of construction, should be shown.

#### **3.4.8.5 Waste water**

A description will be presented of the origin, quality and quantity of wastewater originating from the ECMP. Particular attention will be paid to the capacity of any wastes produced to generate acid, saline or sodic waste water. A water balance for the ECMP will be provided.

Where relevant the EIS will consider the management of:

- groundwater from the underground workings;
- rainfall on disturbed areas;
- run-off from infrastructure areas;
- drainage (i.e. run-off plus any seepage or leakage) from dumps and stockpiles;
- seepage from other waste storages;
- water usage for domestic purposes, process use, and dust suppression;
- evaporation;
- liquid effluent and sludge from any domestic sewage treatment plant; and
- management of wastes from any water supply treatment plant.

### **3.5 Infrastructure Requirements**

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

### 3.5.1 Transport - Road/Rail/Ship

Arrangements for the transport of plant, equipment, coal, products, wastes and personnel during the construction and operational phases of the ECMP will be described, including the proposed use of rail or trucks for transport of materials, products or wastes to or from the ECMP.

Information will also be provided on the implications of the mine on transportation requirements on public roads including:

- the volume, composition (types and quantities), origin and destination of additional goods to be moved including construction materials, plant, raw materials, wastes, hazardous materials, finished products;
- the volume of additional traffic generated by workforce personnel, visitors and service vehicles;
- method of movement (including vehicle types and number of vehicles likely to be used);
- anticipated times at which movements may occur;
- details of additional vehicle traffic and transport of heavy and oversize indivisible loads (including types and composition);
- the proposed transport routes; and
- need for increased road maintenance and upgrading.

Information will also be provided on the implications of the mine on rail transport and infrastructure including:

- details of rail coal tonnages and any phasing in production growth;
- the number and type of train services required;
- any capital upgrade required for rail systems or infrastructure (e.g. track, rail balloon-loop, or loading facilities); and
- any proposals to create an appropriate buffer zone (if required) between mining areas and the rail corridor to ensure rail infrastructure and rail operations are kept safe from the any effects of land subsidence.

Details will be included on any new roads, road realignments or proposed road closures required as a result of the ECMP.

Reference will be made to DMR Guide to the Assessment of Road Impacts of Development (2006) to identify and assess potential road impacts, as well potential mitigation measures for inclusion in an Environmental Management Plan (EM plan) as detailed in section 4.2.2.7.

The assessment of road impacts will be presented in a Road Impact Assessment Report (RIA) for inclusion within the EIS if the road traffic from the ECMP generates more than 5% on existing traffic levels on State Controlled Roads. The RIA report will provide appropriate mitigation measures as detailed (see section 4.2.2.7 comments) and will identify impacts on the roads' values, that is, road safety and transport efficiency.

### 3.5.2 Energy

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

### 3.5.3 Water Supply/Storage

The EIS will provide information on water usage by the ECMP, including the quality and quantity of all water supplied to the Ellensfield processing plant and other operational requirements, including demand for potable and process water. Both proposed and optional sources of water supply will be described (e.g. bores, mine water and any surface storages such as dams, weirs and/or municipal water supply pipelines, etc).

Estimated rates of supply from each source (average and maximum rates) will be given and any proposed water conservation and management measures will also be described. Similarly, if water storage and treatment is proposed on site for use by the site workforce, then this will be described.

#### **3.5.4 Stormwater Drainage**

An illustrated description will be provided of the ECMP stormwater drainage system as well as the proposed disposal arrangements, including any off-site services.

#### **3.5.5 Sewage**

This section will describe, in general terms, the sewerage infrastructure required by the project. The EIS will provide volume estimates of industrial and domestic effluent that will be produced and the proposed method of disposal.

#### **3.5.6 Accommodation and Other Infrastructure**

A description will be provided of any other developments directly related to the ECMP not previously described, such as:

- camps, townships or residential developments;
- fuel storage areas;
- equipment maintenance areas;
- laboratories;
- site offices; and
- roads (both haul roads and access roads).

### **3.6 Rehabilitation and Decommissioning**

This section will present the strategies and methods for both progressive and final rehabilitation of the environment disturbed directly or indirectly by the ECMP, including areas subsided by underground mining, in the context of the expected final landform for nominated final land uses. Excavations, waste dumps and co-disposal areas will be shown and the post-mining land use suitability of the various land disturbance types described.

The means of decommissioning the ECMP, in terms of removal of plant, equipment, structures and buildings, will be described (including any potential for reuse of these facilities), together with the methods proposed for the stabilisation of the affected areas. Final rehabilitation of the plant site and implications for long term use will be discussed in terms of ongoing land use suitability, stability, sustainability, management of any residual contaminated land and other land management issues and the site's inclusion on the Environmental Management Register or Contaminated Land Register.

Where dams are to be constructed, proposals for the management of these structures after the completion of the ECMP will be given. A contour map of the lease area after the proposed mining operation is completed will be provided, and the final drainage and seepage control systems and long term monitoring plans will be described.

Rehabilitation of co-disposal areas will be described in detail, including consolidation, capping, and revegetation.

Any potential impacts of the proposed rehabilitation and decommissioning methods and the mitigation measures will be discussed for each relevant section (e.g. flora and fauna, soil, air and water) and appropriately cross-referenced, and include long term monitoring plans.

The strategic approach to progressive and final rehabilitation will be described. The strategies and methods presented for progressive and final rehabilitation of disturbed areas will demonstrate compliance with the objectives of Guideline 18 – Rehabilitation Requirements for Mining Projects, or with updated versions of that policy as they become available. The land suitability assessment will follow the *Technical guidelines for the*

*environmental management of exploration and mining in Queensland, 1995.* In particular, the strategies and methods will have the following objectives.

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

The final topography of any excavations, waste areas and dam sites will be shown on maps at a suitable scale.

Options and methods for the disposal of wastes from the demolition of plant and buildings will be discussed in sufficient detail for their feasibility and suitability to be established.

#### **4 DESCRIPTION OF THE EXISTING ENVIRONMENTAL VALUES/ POTENTIAL IMPACTS AND MITIGATION MEASURES**

The functions of this section will be to describe:

- the existing environmental values of the area which may be affected by the ECMP. Environmental values, which are defined by the EP Act, EPPs, regulations and other documents such as the ANZECC 2000 guidelines, will be described with reference to background information and studies; and
- the potential adverse and beneficial impacts of the ECMP on the identified environmental values. Any likely environmental harm on the environmental values will also be described;
- any cumulative impacts on environmental values caused by the ECMP, either in isolation or by combination with other known existing or planned sources of contamination;
- present environmental protection objectives and the standards and measurable indicators to be achieved;
- viable alternative strategies for managing impacts. These alternatives will be presented and compared in view of the stated objectives and standards to be achieved. Available techniques, including best practice, to control and manage impacts to the nominated objectives will be discussed. This section will detail the environmental protection measures incorporated in the planning, construction, operations, decommissioning, rehabilitation and associated works for the proposal. Measures will prevent, or where prevention is not possible, minimise environmental harm and maximise the socio-economic and environmental benefits of the proposal. Preferred measures will be identified and described in more detail than other alternatives;
- environmental protection objectives that may be derived from legislative and planning requirements which apply to the ECMP, 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; and
- 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 ECMP.
  - Environmental values affected - A description of the existing environmental values of the area to be affected, including values and areas that may be affected by any cumulative impacts, will be provided. The description will include reference to any background studies, some of which may need to be undertaken over several seasons. It will be explained how the environmental values were derived (e.g. by citing published documents or by following a recognised procedure to derive the values).

- Impact on relevant environmental values - A quantitative description of the likely impacts of the proposal on the identified environmental values of the area will be provided. The cumulative impacts of the proposal will be considered over time or in combination with other (all) impacts in the dimensions of scale, intensity, duration or frequency of the impacts. In particular, any requirements and recommendations of relevant State planning policies, environmental protection policies, national environmental protection measures and integrated catchment management plans will be addressed.
- Cumulative impacts on the relevant environmental values of land, air and water and cumulative impacts on public health and the health of terrestrial, aquatic and marine ecosystems will be discussed in the relevant sections.
- Environmental protection objectives – A qualitative and quantitative description of the proposed objectives for enhancing or protecting each relevant environmental value will be presented. A description of the proposed indicators to be monitored to demonstrate the extent of achievement of the objective as well as the numerical standard i.e. auditable standard that defines the achievement of the objective will be provided. Objectives for progressive and final rehabilitation and management of contaminated land will be included.
- Control strategies to achieve the objectives - A description of the control principles, proposed actions and technologies to be implemented that are likely to achieve the environmental protection objectives would be provided. The details to show that the expected performance is achievable and realistic would also be provided.
- Monitoring programs – Details of the monitoring parameters, monitoring points, frequency, data interpretation and reporting proposals will be provided.
- Auditing programs - A description on how progress towards achievement of the objectives would be measured, reported and whether external auditors will be employed will be presented.
- Management strategies - A description will be provided of the strategies to be used to ensure the environmental protection objectives are achieved and control strategies implemented e.g. continuous improvement framework including details of corrective action options, reporting (including any public reporting), monitoring, staff training, management responsibility pathway, and any environmental management systems and how they are relevant to each element of the environment.
- Information quality – The information given under each element will 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.

#### **4.1 CLIMATE**

The EIS will provide descriptions of the air temperature, humidity, wind (direction and speed) and any other special features (e.g. temperature inversions) likely to affect air quality within the environs of the ECMP. Rainfall patterns, including magnitude and seasonal variability, will be described. Extremes of climate (i.e. droughts, floods, cyclones, etc) will also be discussed, with particular reference to water management at the ECMP site. The vulnerability of the area to natural or induced hazards, such as floods, bushfires, landslides and earthquakes, and the relatively frequency, magnitude and risk of these events, will be addressed.

The potential impacts due to climatic factors should be addressed in the relevant sections of the EIS. The impacts of rainfall on soil erosion should be addressed in Section 4.2. The impacts of storm events on the capacity of waste containment systems (e.g. site bunding/stormwater management and tailings dams) should be addressed in the water resources section with regard to contamination of waterways and in the waste section with regard to the design of the waste containment systems. The impacts of winds, rain, humidity and temperature inversions on air quality and noise should be addressed in the relevant sections.

## 4.2 Land

### 4.2.1 Environmental Values

This section will describe the existing environment of the land area which may be affected by the ECMP in the context of environmental values as defined by the EP Act, EPPs and regulations. It will also define and describe the objectives and practical measures for protecting or enhancing land-based environmental values, describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

The following topics will be addressed.

#### 4.2.1.1 Topography/Geomorphology

Contour information for the ECMP will be provided at 1m increments with levels shown with respect to Australian Height Datum (AHD), and the environmental values of the cultural landscapes of the affected area described in terms of the physical and cultural integrity of the landforms.

Aerial photographs will be provided showing the topographic features of the project and the surrounding area, and with proposed underground mining and other associated surface disturbance areas marked and defined.

#### 4.2.1.2 Geology

The EIS will provide a description, map and geological cross sections of the ECMP, with particular reference to the physical and chemical properties of surface and sub-surface materials and geological structures within the areas to be mined. Properties which may influence stability, occupational health and safety, rehabilitation programs, or the quality of wastewater leaving any area disturbed by the ECMP will also be described.

In locations where the age and type of geology is such that significant fossil specimens (such as of dinosaurs or their tracks) may be uncovered during construction/operations, the EIS will address the potential for significant finds.

#### 4.2.1.3 Mineral Resource

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

The location, tonnage and quality of the coal resources within the project area will be described in detail as indicated below and, where possible it will be presented on a 'seam by seam' basis and include the modifying factors and assumptions made in arriving at the estimates. The coal resources will be estimated and reported in accordance with the Australasian code for reporting of mineral resources and ore reserves (the JORC Code) and the principles outlined in the Australian guidelines for the estimating and reporting of inventory coal, coal resources and coal reserves as appropriate.

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

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

#### 4.2.1.4 Soils

A soil survey of the areas to be affected by the project will be conducted at a suitable scale, with particular reference to the physical and chemical properties of the materials which will influence erosion potential, stormwater run-off quality and rehabilitation.

Soil profiles will be mapped at a suitable scale and described according to the Australian Soil and Land Survey Field Handbook (McDonald *et al*, 1990) and Australian Soil Classification (Isbell, 1996). In the areas of proposed surface disturbance, an appraisal of the stability, depth and quality of soil will be undertaken, with the information to be presented according to the standards required in the Planning Guidelines: the Identification of Good Quality Agricultural Land (DPI & DHLGP, 1993), and the State Planning Policy 1/92: Development and the Conservation of Agricultural Land.

#### 4.2.1.5 Land Use

The EIS will provide a description of current land tenures and land uses, including native title, in the entire ECMP area, with particular mention of land with special purposes. The location and owners/custodians of native title in the area and details of native title claims will be identified.

A map showing existing land uses and tenures, and the locations of the various project elements (approved and proposed) will be provided for the entire project area and surrounding land that could be affected by the ECMP. Maps will be included identifying areas of conservation value, the location of existing dwellings, and the zoning of all affected lands according to any relevant existing town or strategic plan.

The land use suitability of the affected area will be described in terms of physical and economic attributes. The potential environmental harm caused by the project on the adjacent areas currently used for agriculture will be described, together with the implications of the ECMP for future developments in the impacted area, including constraints on surrounding land uses.

A land suitability map of the proposed and adjacent areas, illustrating land suitability and current land uses, will be provided, with land classified as Good Quality Agricultural Land (GQAL) (as defined by Planning Guideline: the Identification of Good Quality Agricultural Land (DPI & DHLGP, 1993)), identified.

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

#### 4.2.1.6 Infrastructure

The location and owners/custodians of all tenures, reserves, stock routes and the like, covering the affected land will be identified, as will the locations of gas and water pipelines, powerlines and any other easements. The environmental values affected by this infrastructure will be addressed.

#### 4.2.1.7 Sensitive Environmental Areas

The EIS will identify whether areas that are environmentally sensitive could be affected directly and/ or indirectly by the ECMP, and the proximity of any elements of the ECMP to sensitive environmental areas identified. In particular, the EIS will indicate if the land affected by the ECMP is or is likely to contain heritage/historic areas or items, national estates or areas of cultural significance.

#### 4.2.1.8 Landscape Character

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

#### 4.2.1.9 Visual amenity

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

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

#### 4.2.2 Potential Impacts and Mitigation Measures

The function of this section will be to define and describe the objectives for protecting the environmental values for land. Topics that may be relevant are listed below.

##### 4.2.2.1 Resource Utilisation

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

##### 4.2.2.2 Land Use Suitability

The potential for the ECMP to change the existing and potential land uses of the ECMP site and adjacent areas will be detailed. Post operations land use options will be detailed including suitability of the area to be used for agriculture, industry, or nature conservation. The factors favouring or limiting the establishment of those options should be given in the context of land use suitability prior to the proposal and minimising potential liabilities for long-term management.

The potential environmental harm caused by the proposal on the adjacent areas currently used for agriculture, urban development, recreation, tourism, other business and the implications of the proposal for future developments in the impact area including constraints on surrounding land uses will be described. Should it be determined that the development adjoins or potentially impacts on Good Quality Agricultural Land or residential land, then an assessment of the potential for land use conflict will be undertaken, with the investigations to follow the procedures set out in the Planning Guidelines: Separating Agricultural and Residential Land Uses (DNR & DLGP, 1997).

The following will be identified and measures to avoid unacceptable impacts discussed.

- Incompatible land uses, whether existing or potential, adjacent to all aspects of the ECMP, including essential and proposed ancillary developments.
- Activities and areas directly or indirectly affected by the construction and operation of these activities.

#### *4.2.2.3 Land Disturbance*

The EIS will assess and illustrate with maps showing 1m contours the impacts of subsidence on the surface. The EIS will also assess the effects of subsidence on the permeability of land in preparation for an assessment in the water resources section of the consequent impacts on surface water and groundwater.

A strategy will be developed that will minimise the amount of land disturbed at any one time. The strategic approach to progressive rehabilitation of landforms and final decommissioning should be described with particular regard to the impacts in the short, medium and long timeframes. The proposed methods to rehabilitate areas of direct and indirect surface disturbance will be presented including backfilling, covering, re-contouring, topsoil handling and revegetation.

Where dams and roads and other infrastructure are to be constructed, proposals for the management of these structures after the completion of the proposal will be given. A contour map of the area will be provided. Also, the final drainage and seepage control systems, erosion and sediment controls and any long term monitoring plans will be described.

The description of topsoil management in areas of proposed surface disturbance will consider pre-stripping, transport, storage and replacement, including feasible methods for the minimisation of topsoil storage times (i.e. to reduce fertility degradation).

Proposed decommissioning will be described in detail, including consolidation, revegetation, fencing, and monitoring. Information will also be provided regarding decommissioning of any plant site, removal of the processing plant, rehabilitation of concrete footings and foundations, hardstand areas and storage tanks (including any potential for reuse of these facilities).

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

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

#### *4.2.2.4 Land Contamination*

The possibility of contamination of land from aspects of the mining activities, e.g. waste, coal rejects, and spills at chemical and fuel storage areas, will be described and the means of preventing land contamination (within the meaning of the EP Act) will be addressed.

Methods proposed for recording, containing and remediating any contaminated land will be outlined. Intentions shall be stated concerning the classification (in terms of the Queensland Contaminated Land Register) of land contamination on the land, processing plant site and product storage areas after completion of the ECMP.

Where appropriate, a preliminary site investigation (PSI) of the ECMP site consistent with the EPA's Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland will be undertaken to determine background contamination levels. The results of the PSI will be summarised in the EIS and provided in detail in an appendix.

If the results of the preliminary site investigation indicate potential or actual contamination, a detailed site investigation progressively managed in accordance with the stages outlined in Appendix 5 of the Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland, will be undertaken where appropriate.

In short, the following information will be presented in the EIS:

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

In addition to the prevention and management of contamination resulting from mining activities, the EIS will address management of any existing or potentially contaminated land.

#### *4.2.2.5 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 should be outlined. An erosion-monitoring program, including rehabilitation measures for erosion problems identified during monitoring, should also be outlined. Mitigation strategies should be developed to achieve acceptable soil loss rates, levels of sediment in rainfall runoff and wind-generated dust concentrations.

The report should include an assessment of likely erosion 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; and
- access roads or other transport corridors.

Methods proposed to prevent or control erosion should be specified and should 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 should address the selective handling of waste rock and capping material to maximise long-term stability of final landforms in regard to slumping and erosion both on and below the surface. Erosion control measures should be developed into an erosion and sediment control plan for inclusion in the EM plan.

#### *4.2.2.6 Landscape character*

A description of the potential impacts of the ECMP on the landscape character of the site and the surrounding area will be provided. Particular mention will be made of any changes to the broad-scale topography and vegetation character of the area e.g. due to spoil dumps, excavated voids and broad-scale clearing.

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

#### *4.2.2.7 Visual amenity*

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

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

#### 4.2.2.8 Lighting

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

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

#### 4.2.2.9 Transport

This section will discuss the impact on the environmental values for transport i.e. the protection of the safety and efficiency of the State-controlled road (SCR) and rail network system. The EIS will provide sufficient information for the Department of Main Roads (DMR) and/or Local Governments to make an independent assessment of how their roads may be affected. Sufficient information will also be provided to enable Queensland Rail (QR) to make an independent assessment of how the rail network (including infrastructure) will be affected.

The EIS will include a detailed analysis of probable impacts of the identified construction and incremental operational traffic generated by the ECMP, with particular emphasis on impacts on road infrastructure, road users and road safety. This will be achieved by comparing the traffic situation and road conditions with and without the ECMP and be undertaken in close consultation with the local district office of the DMR. Measures necessary to address any adverse road impacts, and the costs involved, will be provided.

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

Details will be provided on product spill contingency plans and the adequacy of equipment and facilities to deal with possible spills at the transport nodes.

#### 4.2.2.10 Subsidence

This section will 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 reliability of the predictions. The results of the predictions will be shown on maps at a scale appropriate for assessment of surface subsidence impacts. Mitigation measures will be proposed to deal with any significant impacts that would result from subsidence.

### 4.3 Water Resources

#### 4.3.1 Environmental Values

The function of this section is to describe the existing environment for water resources which may be affected by the ECMP in the context of environmental values as defined by the EP Act, EPPs, ANZECC 2000 guidelines and regulations.

#### 4.3.2 Surface Waterways

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

Stormwater contributions will be assessed based on relevant contributing catchments, at risk levels consistent with relevant Queensland and Australian technical codes and guidelines. In particular the Queensland technical guideline on Site Water Management, and the *Code of Environmental Compliance for Environmental Authorities for High Hazard Dams Containing Hazardous Waste* (and successors to these guidelines and codes) will be complied with to the extent they are applicable in this project.

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

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

The water quality description will include, seasonal variations or variations with flow, where applicable. If appropriate, a relevant range of physical, chemical and biological parameters will be measured to gauge the potential for environmental harm on any affected creek or wetland system present.

As appropriate, the environmental values of the surface waterways in the affected area will be described in terms of:

- values identified in the *Environmental Protection (Water) Policy 1997* (EPP Water);
- sustainability, incorporating both quality and quantity;
- physical integrity, fluvial processes and morphology of watercourses, including riparian zone vegetation and form; and
- any Water Resource Plans, Land and Water Management Plans relevant to the affected catchment.

#### **4.3.3 Groundwater**

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

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

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

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

This section will include reference to:

##### *Nature of the aquifer/s*

- Geology/stratigraphy - such as alluvium, volcanic, metamorphic
- Aquifer type - such as confined, unconfined
- Depth to and thickness of the aquifers; and

*Hydrology of the aquifer(s)*

- Depth to water level and seasonal changes in levels
- Groundwater flow directions (defined from water level contours)
- Interaction with surface water
- Interaction with sea/salt water
- Possible sources of recharge
- Vulnerability to pollution

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

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

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

#### **4.3.4 Potential Impacts and Mitigation Measures**

This section will assess the potential impacts caused by the ECMP, and define and describe the objectives and practical measures for protecting or enhancing the water resources environmental values; describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed.

Water management controls will be described, addressing surface and groundwater quality, quantity, drainage patterns and sediment movements. The beneficial (environmental, production and recreational) use of the surface and groundwater resources will be described.

Where appropriate, monitoring programs will be described which will assess the effectiveness of the management strategies for protecting water quality during the construction, operation and decommissioning of the proposal, with the key water management strategy objectives including:

- the protection of any important local aquifers and their waters;
- minimisation of impacts on flooding levels and frequencies both upstream and downstream of the project; and
- the maintenance of a sufficient quantity and quality of surface waters to protect existing beneficial downstream uses of those waters.

The EIS will also consider the risks of uncontrolled emissions to water due to system or catastrophic failure, the implications of such emissions for human health and natural ecosystems, and describe the strategies to prevent, minimise and contain impacts.

##### **4.3.4.1 Surface Water and Watercourses**

The potential environmental harm to the flow and the quality of surface waters from the ECMP will be discussed, with particular reference to their suitability for the current and potential downstream uses (including the requirements of any affected riparian area, wetland and any in-stream biological uses). The impacts of surface water flows on existing infrastructure will be considered.

The effects of subsidence will be assessed and illustrated with regard to the impacts on overland flow and flow in watercourses, including the ponding of surface water and the retention of low flows, and the loss of surface flows by increased percolation into the ground.

The water quality characteristics discussed will be those appropriate to the downstream uses that may be affected. The chemical and physical properties of any wastewater (including concentrations of constituents) at

the point of entrance to natural surface waters will be discussed, along with toxicity of effluent constituents to flora and fauna.

Reference will be made to the properties of the land disturbed, the technology for settling suspended sediments from contaminated water (if necessary), and the techniques to be employed to ensure that contaminated water is contained and successfully treated on the site.

In relation to water supply and usage and wastewater disposal, the EIS will discuss anticipated flows of water to and from the ECMP area. Where dams, weirs or ponds are proposed, the EIS will investigate the effects of predictable climatic extremes (i.e. storm events, floods and droughts, etc) on the capacity of the dams to retain contaminants; the structural integrity of the containing walls; the quality of water contained; and the quantity and quality of water discharged.

The need or otherwise for licensing of any dams (including referable dams) under the *Water Act 2000* (WAct) will be discussed and a dam failure impact assessment undertaken for any proposed dam where required under the WAct. If required, water allocation and water sources will be established in consultation with the Department of Natural Resources and Water (DNRW). All approvals required for the ECMP under the WAct will be identified and discussed. i.e. referable dams, riverine protection permits, water licences for groundwater and surface water, operational works, etc.

Reference will be made to the Fitzroy Resource Operations Plan and identified demand for surface water from watercourses will need to be considered and if required, addressed (licences are only available through unallocated water tender purchase).

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

The Australian and New Zealand Environment and Conservation Council's (ANZECC, 2000) 'National Water Quality Management Strategy, Australian Water Quality Guidelines for Fresh and Marine Waters' and the EPP Water will be used as a reference for evaluating the effects of various levels of contamination.

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

#### 4.3.4.2 Groundwater

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

The impact assessment will define the extent of the area within which groundwater resources are likely to be affected by the proposed operations and the significance of the proposal to groundwater depletion or recharge, and propose management options available to monitor and mitigate these effects. The response of the groundwater resource to the progression and finally cessation of the proposal will be described.

An assessment will be undertaken of the impact of the proposal on the local ground water regime caused by the altered porosity and permeability of any land disturbance. An assessment of the potential to contaminate groundwater resources and measures to prevent, mitigate and remediate such contamination will be discussed.

## 4.4 Air

This section will describe the existing air environment which may be affected by the ECMP in the context of environmental values as defined by the EP Act, EPPs and regulations.

### 4.4.1 Environmental Values

A description of the existing airshed environment will be provided having regard to particulates, gaseous and odorous compounds. The background levels and sources of suspended particulates, SO<sub>x</sub>, NO<sub>x</sub>, and any other major constituent of the air environment, including greenhouse gases, which may be affected by the ECMP will be discussed.

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

The description of the environmental values of the airshed for the affected area will be provided in terms of the *Environmental Protection (Air) Policy 1997* (EPP Air).

The environmental impact of coal dust transported by rail and dust nuisance will also be addressed as part of the EIS process.

#### **4.4.2 Greenhouse Gas Emissions**

This section of the EIS will:

- provide an inventory of projected annual emissions for each relevant greenhouse gas, with total emissions expressed in 'CO<sub>2</sub> equivalent' terms;
- estimate emissions from upstream activities associated with the ECMP, including fossil fuel based electricity consumed;
- provide an estimate of coal seam methane to be released as well as emissions resulting from such activities as transportation of products and consumables, and energy use; and
- briefly describe the method(s) by which the estimates were made.

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

#### **4.4.3 Potential Impacts and Mitigation Measures**

This section will define and describe the objectives and practical measures for protecting or enhancing environmental values for air, describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed. Mapped contours from a suitable atmospheric dispersion model, and other relevant information, will also be presented to describe the primary air emissions generated by the mining activities.

The proposed levels of emissions will be compared with the national environmental protection measures (NEPMs) for ambient air quality (1998), the National Health and Medical Research Council (NHMRC) National Guidelines (1985) for control of emissions from stationary sources, and the EPP Air.

The EIS will identify residential areas or other developments that could be sensitive to the effects of the predicted emissions and discuss the likely impact of air emissions on nearby vegetation and biodiversity. Ground level predictions will be made at any rural residence in close proximity to the project. These predictions will be made for both normal and expected maximum emission conditions and the worst case meteorological conditions will be identified and modelled where necessary. The techniques used to obtain the predictions will be referenced, and key assumptions and data sets explained. The air quality assessment will discuss:

- the limitations and accuracy of the applied atmospheric dispersion model(s);
- air quality predictions compared to the relevant goals in the National Environmental Protection Council (Ambient Air Quality) Measure and the EPP Air goals; and
- airshed management and the contribution of the ECMP to airshed capacity, i.e. in view of existing and future users of the airshed, for assimilation and dispersion of emissions.

The EIS will define and describe measures to suppress or minimise emissions, including dust from all significant potential sources and odours.

#### 4.4.4 Greenhouse Gas Abatement

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

- a description of the proposed measures (alternatives and preferred) to avoid and/or minimise greenhouse gas emissions directly resulting from activities of the ECMP, including such activities as transportation of products and consumables, and energy use by the project;
- an assessment of how the preferred measures minimise emissions and achieve energy efficiency;
- an indication of how the preferred measures for emission controls and energy consumption compare with the relevant sector of industry with a view to achieving best practical environmental management;
- a description of any opportunities for further offsetting greenhouse gas emissions through indirect means; and
- an assessment of the potential viability of extracting coal seam methane (CSM) and its use, e.g. for on-site electricity generation (with the sale of excess electricity) to the regional electricity grid or supply to a local CSM pipeline (including staged connection), within the context of the overlapping petroleum lease tenure which gives the holder priority to the CSM.

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

- commitments to the abatement of greenhouse gas emissions from the ECMP, with details of the intended objectives, measures and performance standards to avoid, minimise and control emissions;
- commitments to energy management, including undertaking periodic energy audits with a view to progressively improving energy efficiency;
- a process for regular review of new technologies to identify opportunities to reduce emissions and use energy efficiently, consistent with best practical 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 ECMP's processes or products;
- opportunities for offsetting greenhouse emissions, including, if appropriate, carbon sequestration and renewable energy uses; and
- commitments to monitor, audit and report on greenhouse emissions from all relevant activities and the success of offset measures.

#### 4.4.5 Climate Change Adaptation

Climate change, through alterations to weather patterns and rising sea level, has the potential to impact in the future on developments designed now. Most developments involve the transfer to, or use by, a proponent of a community resource in one form or another, such as the granting of a non-renewable resource or the approval to discharge pollutants to air, water or land. It is recognised that the ECMP design should be adaptive to climate change so that community resources are not depreciated or abandoned or require costly modification before their potential to provide a full return to the community is realised. Consequently, the EIS will provide an assessment of the ECMP's vulnerabilities to climate change and describe possible adaptive 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 ECMP;
- the preferred and alternative adaptive strategies to be implemented; and
- commitments to undertaking, where practicable, a co-operative approach with government, other industry and other sectors to address adaptation to climate change.

## 4.5 Noise and Vibration

This section will describe the existing environment values that may be affected by noise and vibration from ECMP.

### 4.5.1 Environmental Values

The results of baseline monitoring of noise and vibration, including the daily variation of background noise levels at nearby residences in the vicinity of the ECMP, will be described and comments provided on any current activities near the project area that may cause a background level of ground vibration.

Monitoring methods will adhere to accepted best practice methodologies, relevant EPA Guidelines or Australian Standards, and any relevant requirements of the *Environmental Protection (Noise) Policy 1997* (EPP Noise).

### 4.5.2 Potential Impacts and Mitigation Measures

This section will define and describe the objectives and practical measures for protecting or enhancing environmental values from impacts by noise and vibration, describe how nominated quantitative standards and indicators may be achieved for noise and vibration management, and how the achievement of the objectives will be monitored, audited and managed. The assessment of noise impacts 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.

Mapped noise contours from a suitable acoustic model, and other relevant information, will also be presented to describe the noise generated by the mining activities. The potential environmental harm of noise and vibration at all potentially sensitive places will be quantified in terms of the objectives, standards and indicators to be achieved. The assessment will also include potential environmental harm on terrestrial animals and avifauna, particularly migratory species. Ameliorative measures, such as screening, lining, enclosing or bunding will be considered, if necessary, in order to minimise or eliminate these effects. If appropriate, timing schedules for the proposed construction activities will be discussed with respect to minimising environmental impacts from noise.

Particular consideration will be given to emissions of low-frequency noise; that is, noise with components below 200Hz and, if necessary, measures will be described for reducing the intensity of these components.

Information will be supplied on blasting which might cause ground vibration on or adjacent to the site, with particular attention given to sensitive places, including details of the magnitude, duration and frequency of any vibration. Measures to prevent or minimise environmental harm, including nuisance, will be discussed.

## 4.6 Waste

This section will complement other sections of Part 4 of the EIS by providing technical details of waste treatment and minimisation together with proposed emission, discharge and disposal criteria. Other sections of the EIS will 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. The description of waste disposal will provide details and design parameters and address the stability of proposed containment systems for rejects from the CHPP whether on or off the Project site.

### 4.6.1 Environmental Values

This section will introduce and briefly describe the existing environment values that may be affected by the project's wastes. Each of the waste streams described in section 3.4.8 will be referred to with references provided to more detailed descriptions of the relevant environmental values in other sections of Part 4 of the EIS.

### 4.6.2 Potential Impacts and Mitigation Measures

The purpose of this section is to bring together a description of the preferred methods (and discuss any alternatives) to be used to deal with waste streams and outline their impacts. The full description of the magnitude and nature of impacts on particular environmental values due to the management of waste will be provided in the relevant sections of Part 4 of the EIS.

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

- operational handling and fate, including storage;
- proposed on-site treatment methods;
- proposed methods of disposal (including the need to transport wastes off-site for disposal) for any liquid and solid wastes;
- the potential level of impact on environmental values; and
- proposed discharge/disposal criteria for liquid and solid wastes;

Measures to ensure stability of the co-disposal areas will be described and methods to prevent, seepage and contamination of groundwater from stockpiles will be given. The EIS will also address waste minimisation techniques and processes proposed; the market demand for recyclable waste (where appropriate) and decommissioning of the site.

The EIS will indicate the results of investigations into the feasibility of using waste minimisation and cleaner technology options during all phases of the project having regard to the EPP Waste and EPWMR, and the draft guidelines covering aspects for waste management under the EPP Waste and EPWMR.

## **4.7 Nature Conservation**

This section will describe the existing environment values for nature conservation that may be affected by the proposed activities.

### **4.7.1 Environmental Values**

The environmental values of nature conservation for the affected area will be described in terms of:

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

A discussion will be presented on the nature conservation values of the areas likely to be affected directly or indirectly by ECMP and, where relevant, rare and threatened flora and fauna communities, NES matters (Matters of National Environmental Significance) and environmentally sensitive localities will be described in relation to potential impacts from ECMP.

The EIS will include a plant species list, a vegetation map at an appropriate scale, and an assessment of the significance of native vegetation from a local, regional, State and Commonwealth perspective, including the Biodiversity Planning Assessment (BPA) produced by the EPA. Reference will be made the *Queensland Vegetation Management (VM) Act, 1999*, including the findings of any Regional Vegetation Management Plan, the *Queensland Nature Conservation (NC) Act, 1992* and the Commonwealth *Environment Protection and Biodiversity Conservation (EPBC) Act, 1999*.

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

The EIS will identify NES matters including species or important habitats of species listed under the EPBC Act as presumed extinct, endangered, vulnerable or rare and ecosystems listed as critically endangered, endangered or vulnerable under the EPBC Act.

Sites listed under international treaties such as Ramsar wetlands and World Heritage areas will be identified along with sites in, or adjacent to, areas containing resting, feeding or breeding sites for migratory species of

conservation concern listed under the Convention of Migratory Species of Wild Animals, and/or bilateral agreements between Australia and Japan (JAMBA) and between Australia and China (CAMBA).

Any areas of wetlands (as listed in the Directory of Important Wetlands in Australia, Environment Australia 2001), lakes or springs (as listed in Fensham and Fairfax, 2002, Queensland Springs – distribution and assessment) will be identified and vegetation associated with these described under this section.

The EIS will identify issues relevant to sensitive areas, or areas which may have low resilience to environmental change, and assess the capacity of the environment to assimilate discharges/emissions/subsidence etc. Areas regarded as sensitive with respect to flora and fauna have one or more of the following features (and which should be identified, mapped, avoided or effects minimised):

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

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

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

Should any key flora and fauna indicators be identified, further monitoring may be proposed. Surveys of flora and fauna will be conducted to provide details of species structure, assembly, diversity and relative abundance and to identify migratory species.

Within each defined (standard system) vegetation community, three sites (a minimum of at least one site) will be surveyed for plant species, as follows.

- Site data will be recorded in a form compatible with the Queensland Herbarium CORVEG database.
- The minimum site size will be 10 by 50 metres.
- A complete list of species present at each site will be recorded.
- The relative abundance of plant species present will be recorded.
- Any plant species of conservation, cultural, commercial or recreational significance will be identified.
- Specimens of species listed as Protected Plants under the NCR, other than common species, are to be submitted to the Queensland Herbarium for identification and entry into the HERBRECS database.

Where existing information on plant species is derived from surveys consistent with the above methodology, this information may be used instead of new survey work. The methodology used for flora surveys will be provided.

#### **4.7.1.1 Terrestrial Flora**

A terrestrial vegetation map (at a suitable scale) will be provided, with descriptions of the units mapped. Sensitive or important vegetation types will be highlighted and their value as habitat for fauna and conservation of specific rare floral and faunal assemblages or community types discussed. The existence of rare or threatened species protected under State and Commonwealth legislation will be specifically addressed.

The surveys will include species structure, assemblage, diversity and abundance. The description should contain a review of published information regarding the assessment of the significance of the vegetation to conservation, recreation, scientific, educational and historical interests.

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

Vegetation mapping will identify:

- the ECMP including infrastructure and irrigation land, if relevant; and
- the terrestrial vegetation communities within the affected areas will be mapped at an appropriate scale (i.e. 1:10,000) from aerial photographs and ground truthing, showing:
  - the location and extent of vegetation types using the EPA's regional ecosystem type descriptions in accordance with the Regional Ecosystem Description Database [REDD];
  - the location of vegetation types of conservation significance based on EPA's regional ecosystem types and the occurrence of species listed as Protected Plants under the *Nature Conservation (Wildlife) Regulation 2006* and subsequent amendments, as well as areas subject to the VMA;
  - the location and type of endangered ecological communities and endangered, rare and vulnerable flora.
  - the current extent (bioregional and sub-regional) of protected vegetation types of conservation significance within the protected area estate (National Parks, Conservation Parks, Resource Reserves, Nature Refuges); and
  - any plant communities of cultural, commercial or recreational significance.

#### **4.7.1.2 Terrestrial Fauna**

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

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

A comprehensive vertebrate fauna survey will be undertaken of the project area at a sampling intensity that supports the scale of vegetation mapping (i.e. 1:10 000 or better). The EPA's local District Office will be consulted when developing the fauna survey methodology. Apart from the species recorded in the survey, an indicative list of all known and potential species and threatened species in the project area will be provided, by reference to the regional ecosystems within the project area and a 100km buffer, and knowledge of species present in the local bioregion. The occurrence of fauna of conservation significance will be geocoded to mapped vegetation units or habitats, which can then be used to propose areas to be protected."

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

#### **4.7.1.3 Aquatic Biology**

A description of the streams likely to be affected by the ECMP (including Spade Creek and Bullock Creek as a minimum), will be provided, noting any patterns and distribution in the waterways. The description will be illustrated by photographs and address the fauna and flora present or likely to be present in the ephemeral streams during and after flow events, and during prolonged periods of low rainfall. The description will include:

- fish species, mammals, reptiles, amphibians, crustaceans and aquatic invertebrates occurring in the waterways within the affected area;
- aquatic plants;
- aquatic and benthic substrate; and
- habitat downstream of the ECMP area.

#### **4.7.2 Potential Impacts and Mitigation Measures**

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

The EIS will address any proposed actions or likely impacts that will require a permit under the NC Act, and/or would be assessable development for the purposes of the VMA, and will cover all likely direct and indirect potential environmental harm on flora and fauna, particularly on sensitive areas. Human impacts and the control of any domestic animals introduced to the area will also be described.

Strategies for protecting any rare or threatened species will be described, and any obligations imposed by State or Commonwealth legislation or policy or International treaty obligations (Japan and Australia Migratory Bird Agreement (JAMBA) and China and Australia Migratory Bird Agreement (CAMBA)) will be discussed.

The potential environmental harm to the ecological values of the area arising from the ECMP such as clearing, salvaging or removal of vegetation, subsidence and its consequential effects will be described, and the indirect effects on remaining vegetation will be discussed. Short-term and long-term effects will be considered with comment on whether the impacts are reversible or irreversible. Mitigation measures and/or offsets will be proposed to compensate for adverse impacts. Any departure from no-net-loss of ecological values will be described.

The potential environmental harm on flora and fauna arising from subsidence, including any alterations to the local surface water and groundwater environment will be discussed with specific reference to environmental harms on vegetation in general, particularly trees, riparian or other sensitive vegetation communities. Any proposed disturbance(s) to areas of 'Endangered' and 'Of Concern' vegetation will be discussed and an appropriate approach for the development of offset strategies under the VMA and/or EPBC Act will be described. A monitoring program and measures to mitigate the environmental harm to habitat and remaining endangered ecosystems; the inhibition of normal movement, propagation or feeding patterns, and change to food chains will be described if appropriate.

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

Weed management strategies aimed at containing existing weed species (that is, *Parthenium* and other declared plants) and ensuring no new declared plants are introduced to the area will be discussed, and feral animal management strategies will be addressed. Weed control strategies will include specific components relating to wash-down procedures, education of on-site staff and reporting mechanisms during all phases of the ECMP. The EIS will present strategies to ensure that the ECMP does not contribute to increase in population and/or encroachment of feral animal species, with reference made to the local government authority pest management plans when determining control strategies. The strategies for flora, fauna and pest management will be discussed in the main body of the EIS and provided in a working form in a pest management plan as part of the overall EM plan for the ECMP.

The following information will be provided if areas are proposed to be cleared.

- The area of remnant vegetation listed by regional ecosystem (on both freehold and leasehold land).
- The area of non-remnant vegetation on leasehold land.

The EIS will outline mitigation measures, taking into consideration the Regional Vegetation Management Code for Ongoing Clearing Purposes for Nebo-Broadsound (Brigalow Belt Bioregion).

Areas regarded as sensitive with respect to flora and fauna have one or more of the following features and will be identified, mapped and, if relevant, avoided or the effects minimised.

- Important habitats of species listed under the NCA as presumed extinct, endangered, vulnerable or rare.
- Regional ecosystems recognised by the EPA as 'endangered' or 'of concern'.
- Good representative examples of remnant regional ecosystems or regional ecosystems which are poorly represented in protected areas.
- Sites containing near threatened or bio-regionally significant species or essential, viable habitat for near threatened or bio-regionally significant species.
- Sites in, or adjacent to, areas containing important resting, feeding or breeding sites for migratory species of conservation concern listed under the Convention of Migratory Species of Wild Animals, and/or bilateral agreements, and CAMBA.
- Sites containing common species which represent a distributional limit and are of scientific value or which contains feeding, breeding, resting areas for populations of echidna, koala, platypus and other species of special cultural significance.

- Sites containing high biodiversity that are of a suitable size or with connectivity to corridors/protected areas to ensure survival in the longer term; such land may contain:
  - natural vegetation in good condition or other habitat in good condition, for example, wetlands; and/or
  - degraded vegetation or other habitats that still supports high levels of biodiversity or acts as an important corridor for maintaining high levels of biodiversity in the area.
- A site containing other special ecological values, for example, high habitat diversity and areas of high endemism.
- Ecosystems which provide important ecological functions e.g. riparian vegetation, and important buffers to a protected area or, an important habitat corridor.
- Sites of palaeontologic significance such as fossil sites.
- Protected areas which have been proclaimed under the NCA or are under consideration for proclamation.
- Areas of major interest, or critical habitat declared under the NCA or high nature conservation value areas or areas vulnerable to land degradation under the VMA.

## **4.8 Cultural Heritage**

This section will describe the existing cultural heritage values that may be affected by the proposed activities in the context of the *Aboriginal Cultural Heritage Act 2003* (ACH Act).

### **4.8.1 Environmental Values**

The EIS will report, to the extent allowed by confidentiality requirements, on the cultural heritage values of the cultural landscapes of the affected area in terms of the physical and cultural integrity of the landforms. A number of cultural heritage surveys have been undertaken to date over the high priority areas of the proposed mining leases. There is a plan in place with the registered Aboriginal Party to survey the entire ML areas (West, East and the Wedge). Discussions with the Traditional Owners have commenced and a CHMP for the ML areas is in draft. Additional studies may be required in order to describe indigenous and non-indigenous cultural heritage sites and places, and their values. Any studies undertaken will be in accordance with the ACH Act.

### **4.8.2 Potential Impacts and Mitigation Measures**

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

The potential for environmental harm to cultural heritage values in the vicinity of the ECMP will be managed under a registered CHMP. The CHMP will provide a process for the management of both identified at subsurface cultural heritage places at the ECMP site.

The CHMP will address and include the following.

- a process for including Aboriginal people associated with the ECMP areas in protection and management of indigenous cultural heritage;
- processes for mitigation, management and protection of identified cultural heritage places and material in the ECMP site, including associated infrastructure developments, both during the construction and operational phases of the project;
- provisions for the management of any cultural material accidentally discovered, e.g. including burial sites;
- the monitoring of foundation excavations and other associated earthwork activities for possible subsurface cultural material;
- cultural awareness training or programs for ECMP staff; and

- a conflict resolution process.

The development of the CHMP will be discussed with the lead agency (DNRW) and all stakeholder representatives.

Any collection of artefact material as part of a mitigation strategy will be undertaken in accordance with the CHMP.

## **4.9 Social**

The function of this section will be to describe the existing social values which may be affected by the mining activities.

### **4.9.1 Environmental Values**

The amenity and use of the ECMP area and adjacent areas will be described, with consideration, where relevant, to the following.

- Community infrastructure and services, access and mobility.
- Population and demographics.
- Local community values, vitality and lifestyles.
- Recreational, cultural, leisure and sporting facilities and activities.
- Health and educational facilities.
- On farm activities near the ECMP.
- Number of properties and or families directly affected by the ECMP.

The environmental values of social attributes for the affected area will be described in terms of:

- the integrity of social conditions, including amenity and liveability, harmony and well being, sense of community, access to recreation, and access to social and community services and infrastructure; and
- public health and safety (refer Section 4.10).

Cumulative impacts from regional mining activities on the local shires and affected coastal communities will be discussed.

### **4.9.2 Potential Impacts and Mitigation Measures**

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

The social impact assessment of the project will be carried out in consultation with affected local authorities and relevant State authorities, such as the Departments of Communities, Housing and Planning, DLGP, Queensland Health and Education Queensland. The assessment of impacts will describe the likely response of affected communities and identify possible beneficial and adverse impacts (both immediate and cumulative). These impacts will be considered both at the regional and local level.

The ECMP social impact assessment will consider the information gathered in the community consultation program and the analysis of the existing socio-economic environment, and describe the ECMP's impact (both beneficial and adverse) on the local community. The impacts of ECMP on local and regional residents, community services and recreational activities will be analysed. The nature and extent of the community consultation program will be described and a summary of the results incorporated in the EIS.

The social impact assessment will include sufficient data to enable affected local authorities and State authorities, such as Queensland Health and Education Queensland, to plan for the continuing provision of public services in the region of the project. Proponents of projects that are likely to result in a significant increase in population of an area should consult, where relevant, with the management units of the State authorities, and summarise the

results of the consultations in the EIS. The summary should discuss how the impacts of population increase on public services, particularly health and education, would be mitigated, and consider:

- impacts on demographic, social, cultural and economic profiles;
- impacts on local residents, current land uses and existing lifestyles and enterprises;
- Identify any new skills and training to be introduced in relation to the project. Adequate provision should be made for apprenticeship and worker training schemes. If possible, the occupational skill groups required and potential skill shortages anticipated should be indicated.
- impacts on local residents' values and aspirations; and
- impacts on the ability of social infrastructure, such as health and education facilities, to meet the community's needs.

The EIS will include an assessment of impacts on local and state labour markets, with regard to the source of the workforce. This information is to be presented according to occupational groupings of the workforce. In relation to the source of the workforce, information is required as to whether the proponent and/or contractors are likely to employ locally or through other means and whether there are initiatives for local employment opportunities.

The EIS will address impacts of both construction and operational workforces and associated contractors on housing demand, community services and community cohesion. The capability of the existing housing stock, including rental accommodation, to meet any additional demands created by the project is to be discussed.

The EIS will describe the ECMP workforce as a consequence of the construction of the proposed infrastructure and its commissioning, as well as any consequential changes in the operational workforce, including any additional accommodation, community infrastructure or community services that will be required as a result of the ECMP.

Estimates will be provided of the:

- a) **Construction workforce**, that is, the number of workers to be employed on-site during the construction activities, including the number of sub-contractors and an outline of the recruitment schedule and policies for the recruitment of workers.
- b) **Commissioning and operational phase workforce**, that is, the number of workers to be employed on-site during any commissioning activities and of mine personnel.

With respect to accommodation of workers, the EIS will, if relevant, provide:

- an estimate of the number of employees and their housing facilities;
- an estimate of the number of workers who will be accompanied by dependents;
- a description of the planned accommodation facilities, and the expected circumstances of workers who will occupy the accommodation (i.e. single or accompanied);
- details of the tenure of the planned facilities (that is, whether it will be exclusively owned or managed by ECM or by other parties);
- the size of the private rental market in the catchment area, including caravan parks, backpacker hostels, hotel and motel accommodation;
- the current vacancy rate of rental accommodation, including an assessment of seasonal fluctuations;
- the availability and median cost of housing for purchase in the catchment area; and
- any identified constraints and opportunities for new housing construction in the catchment area, including the capacity of the local land development and housing construction industries to provide new housing.

The potential environmental harm on the amenity of adjacent areas will be discussed, together with the implications of the ECMP for future developments in the local area.

## **4.10 Heath and Safety**

### **4.10.1 Environmental Values**

This section will describe the existing community values for health and safety which may be affected by the mining activities. Nearby and other potentially affected populations will be identified and described when assessing air and odour emissions from the ECMP. Particular attention will be paid to those sections of the population, such as children and the elderly, that are especially sensitive to environmental health factors.

### **4.10.2 Potential Impacts and Mitigation Measures**

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

The EIS will assess the effects on the ECMP workforce of occupational health and safety risks and the impacts on the community in terms of health, safety, and quality of life from project operations and emissions. Any impacts on the health and safety of the community, workforce, suppliers and other stakeholders from factors such as air emissions, odour, dust and noise will be detailed in terms of health, safety, quality of life.

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

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

## **4.11 Economy**

This section will describe the existing economic environment which may be affected by the ECMP.

### **4.11.1 Environmental Values**

The character and basis of the local and regional economies will be described, including:

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

The economic attributes of the area around the ECMP will be described in terms of the integrity of economic conditions and the economic benefits to the affected communities.

An analysis of the economy of the impacted areas will be undertaken addressing, where relevant:

- economic viability – the economic base, level of economic activity and future economic opportunities;
- the types and numbers of businesses; and
- availability and prices of goods and services.

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

#### **4.11.2 Potential Impacts and Mitigation Measures**

An economic analysis will be presented from National, State, regional and local perspectives as appropriate to the scale of the ECMP, and the general economic benefits from the project will be described.

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

- the significance of this proposal on the local and regional economic context;
- the long and short-term beneficial (e.g. job creation) and adverse (e.g. competition with local small business) impacts that are likely to result from the development;
- the potential, if any, for direct equity investment in the project by local businesses or communities;
- the cost to all levels of government of any additional infrastructure provision;
- implications for future development in the locality (including constraints on surrounding land uses and existing industry);
- the potential economic impact of any identified major hazard;
- the distributional effects of the proposal including proposals to mitigate any negative impact on disadvantaged groups;
- the value of lost opportunities or gained opportunities for other economic activities anticipated in the future; and
- impacts on local property values.

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

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

#### **4.12 Hazard and Risk**

This section will describe the potential hazards and risk to people and property that may be associated with the proposal as distinct from hazards and risk to the natural environment, which should be addressed in other sections of the TOR.

##### **4.12.1 Environmental Values Affected**

This section will detail the values related to people and property that could be affected by any hazardous materials and actions incorporated in the proposal. The degree and sensitivity of risk will be detailed.

##### **4.12.2 Potential Impacts and Mitigation Measures**

This section defines and describes the objectives and practical measures for protecting people and places from hazards and risk, describes how nominated quantitative standards and indicators may be achieved for hazard and risk management, and how the achievement of the objectives will be monitored, audited and managed. An analysis will be conducted into the potential impacts of both natural and induced emergency situations and assess counter-disaster and rescue procedures as a result of the ECMP on sensitive areas and resources, State and Local Government controlled roads, places of residence and work, and recreational areas, as relevant.

A preliminary hazard analysis (PHA) will be conducted for the ECMP. The assessment will outline the implications for, and the impacts on surrounding land uses, and will involve consultation with Department of Emergency Services, Queensland Fire and Rescue Authority, and Queensland Ambulance Service. The PHA will incorporate:

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

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

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

Details should be provided of:

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

## **5 CROSS REFERENCE WITH THE TERMS OF REFERENCE**

This section provides a cross reference of the relevant sections of the EIS to the appropriate sections of the TOR.

## **6 ENVIRONMENTAL MANAGEMENT PLAN**

The EM plan for the ECMP will be an integral part of the EIS, will be developed from the information in the EIS and set commitments to environmental management in order to protect the identified environmental values.

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.

The EM plan will be based on these commitments.

The general contents of the EM plan will comprise:

- the ECM's commitments to acceptable levels of environmental performance, including environmental objectives, i.e. levels of expected environmental harm, performance standards and associated measurable indicators, including progressive and final rehabilitation, performance monitoring and reporting;
- impact prevention and control strategies to satisfy the commitments; and
- corrective actions to rectify any deviation from performance standards.

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

## **7 REFERENCES**

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

## **8 RECOMMENDED APPENDICES**

### **A1 FINAL TERMS OF REFERENCE FOR THIS EIS**

A copy of the final TOR will be included in the EIS. If it is intended to bind appendices in a separate volume from the main body of the EIS, the TOR at least will be bound with the main body of the EIS for ease of cross-referencing. A summary, cross-referencing specific items of the TOR to the relevant section of the EIS, will also be provided at the end of Section 4 of the EIS. For this purpose, the TOR will be line numbered.

### **A2 DEVELOPMENT APPROVALS**

A list of approvals required by the ECMP will be presented.

### **A3 THE STANDARD CRITERIA**

A brief summary will be presented of the proposal'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 Commonwealth Government in December 1992 (available from the Australian Government Publishing Service), each principle will be discussed and conclusions drawn as to how the proposal conforms. A life-of-project perspective will also be shown.

### **A4 RESEARCH**

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

### **A5 CONSULTATION REPORT**

A list of referral agencies will be provided in a summary Consultation Report, which will also list the Commonwealth, State and Local Government agencies and the individuals and groups of stakeholders consulted. The discussion will include the methodology used in the community consultation program, including the criteria used for identifying stakeholders and the communication methods employed.

A summary of the issues raised by these parties, and the means by which the issues were considered in finalising the EIS, will be provided.

Information about identifying affected parties and interested and/or affected persons will be included.

### **A6 STUDY TEAM**

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

#### **A7 GLOSSARY OF TERMS**

A glossary of technical terms and acronyms will be provided.

#### **A8 SPECIALIST STUDIES**

All reports on specialist studies undertaken as part of the EIS will be included as appendices. Based on the experience of URS, and issues identified with similar ventures in the area, it is considered likely that specialist investigations will be undertaken in the following fields.

- Flora and fauna.
- Surface hydrology.
- Groundwater.
- Soils.
- Subsidence.
- Transport.
- Economic and social environment issues.
- Hazard and risk.
- Land use and land capability.

#### **A9 CORPORATE ENVIRONMENTAL POLICY**

ECM will include a copy of its corporate environmental policy and planning framework document.