

# Section 3

## Issue Identification and Prioritisation

### PREAMBLE

*This section describes how the environmental issues assessed in the Environmental Assessment were identified and prioritised. In summary:*

- i. a comprehensive list of all relevant environmental issues was assembled through consultation with the local community and local and State government agencies, and a review of environmental planning documentation and guidelines, previous environmental studies and ongoing environmental monitoring;*
- ii. a review of the project design and local environment was undertaken to identify risk sources and potential environmental impacts for each environmental issue;*
- iii. an analysis of **unmitigated** risk for each potential environmental impact was then completed with a risk rating assigned to each impact based on likelihood and consequence of occurrence; and*
- iv. through a review of the allocated risk ratings and the frequency with which each issue was identified, the relative priority of each issue was determined, with this priority used to provide an order of assessment and breadth of coverage within Section 4B.*

*It is noted that the **mitigated** risk ratings for each issue are reviewed in Section 6.2.1 of this document, i.e. after the adoption of the proposed design and operational safeguards.*



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## 3.1 INTRODUCTION

In order to undertake a comprehensive *Environmental Assessment* of the proposed LOM Project, appropriate emphasis needs to be placed on those issues likely to be of greatest significance to the local environment, neighbouring landowners and the wider community. To ensure this has occurred, a program of community and government consultation, and a review of previous environmental studies, environmental monitoring and environmental planning documentation was undertaken to identify relevant environmental issues and potential impacts. This was followed by an analysis of the risk posed by each potential impact in order to prioritise the assessment of the identified environmental issues within the *Environmental Assessment*.

## 3.2 ISSUE IDENTIFICATION

### 3.2.1 Introduction

Identification of environmental issues relevant to the LOM Project involved a combination of consultation and background investigations and research. This included:

- consultation with surrounding landowners and the local community (Section 3.2.2.2);
- consultation with State and local government agencies (Section 3.2.2.3);
- reference to relevant NSW government policies and guidelines (Section 3.2.3); and
- a review of previous environmental studies undertaken for Werris Creek Coal Mine and ongoing environmental monitoring (Section 3.2.4).

### 3.2.2 Consultation

#### 3.2.2.1 LOM Project Communications Strategy

The Proponent has developed and implemented a communications strategy specifically for the LOM Project. The communications strategy identifies all key stakeholders, the specific communications activities related to each stakeholder group and the timing of each activity. The key objectives of the communications strategy were as follows.

- Ensure all external communication associated with the LOM Project is handled in an open, honest and transparent manner.
- Minimise any misinformation regarding the LOM Project in the broader community and ensure that stakeholders have an accurate understanding of the LOM Project.
- Meet all regulatory communications requirements.
- Ensure key issues are communicated in a timely manner.
- Ensure stakeholders understand the avenues through which they can raise any questions or issues.



### 3.2.2.2 Consultation with Surrounding Landowners and the Local Community

#### Community Consultative Committee

The Proponent holds a Community Consultative Committee (CCC) Meeting each quarter where representatives of the Proponent, local community and Council discuss issues related to the operation of the Werris Creek Coal Mine.

Whilst strictly a forum for discussion related to the approved operations, the Proponent has used the CCC meeting to keep the local community informed of the LOM Project development. The proposal to extend the life of the Werris Creek Coal Mine was formally presented to the CCC at the meeting of 11 March 2010. Questions specifically related to the operation of rail traffic (and interaction with local road traffic) and possible future property acquisitions were raised. While not being able to be answered categorically in the CCC meeting, these issues were duly noted for further consideration. The preparation of a community newsletter was also flagged in this CCC meeting in which further information of the LOM Project would be provided.

Progress of the *Environmental Assessment* for the LOM Project was also raised and discussed at the CCC meetings of 27 May 2010 and 16 September 2010.

#### Community Newsletters

Following the lodgement of the *Preliminary Environmental Assessment* (PEA) for the LOM Project, a community newsletter was distributed to all households and businesses within the Werris Creek Community. This newsletter contained general information on both the ongoing operations at the Werris Creek Coal Mine, as well as the LOM Project proposal. Contact details for the Environmental Officer at the Werris Creek Coal Mine was included to provide the local community with a contact point for enquiries related to the current and proposed operations of the mine.

Direct response to the newsletter was limited to two phone calls from local residents, the first of which commending Werris Creek Coal Pty Limited for their ongoing support to the local community and the second recommending a particular fast growing species of tree for the vegetation of the Acoustic and Visual Amenity Bund. Follow-up consultation undertaken by the Environmental Officer at the Werris Creek Coal Mine with owners of properties surrounding the Project Site confirmed that the newsletter was generally well received and appreciated by the local community as a way of keeping them informed of ongoing and future operations.

A second newsletter was distributed in early October 2010. This newsletter provided updated information on the LOM Project including an indicative time line for completion, assessment and determination of the LOM Project application. The newsletter also included:

- an introduction by the Werris Creek Coal Mine Project Manager;
- an invitation to the Community Open Day held on 20 October 2010;
- the Werris Creek Coal Mine Community Enquires and Complaint Hotline;
- comments from the Chairman of the CCC; and
- an update on rehabilitation completed at the mine.



## Media Contact

The LOM Project has received significant local media coverage, with the Proponent agreeing to requests for interview for print, radio and television media. The following provides a summary of the Proponent's involvement in the media prior to the lodgement of the *Environmental Assessment*.

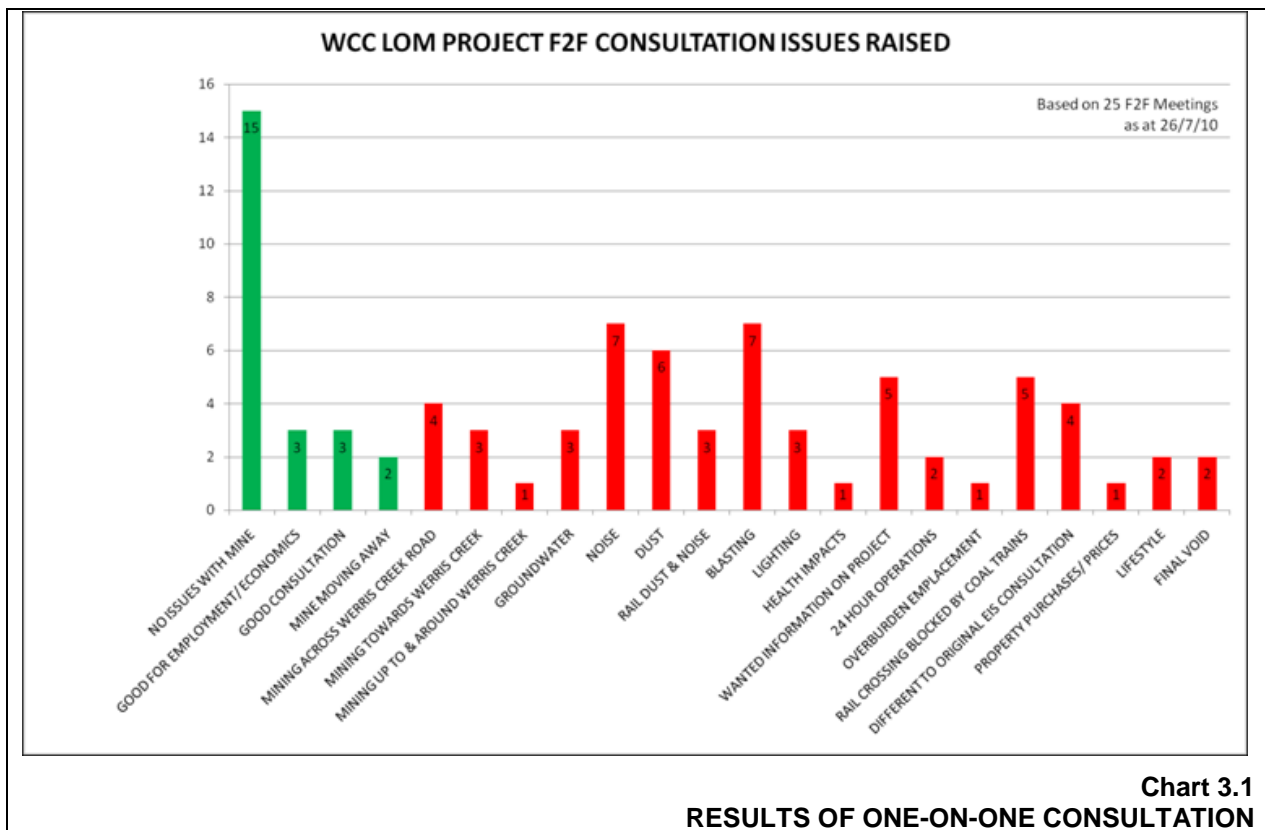
- Print Media
  - A media release was provided to the Quirindi Advocate on 29 June 2010 announcing the Proponent's decision to lodge an application for the LOM Project and commence the approval process under Part 3A of the EP&A Act. The Quirindi Advocate ran the media release, almost verbatim, in an edition of the paper.
  - The proposed LOM Project has been the subject of several local and regional newspaper articles.
  - An advertisement was placed in the Quirindi Advocate on 6 and 13 October, the Werris Creek Flyer on 6, 13 and 20 October and the Northern Daily Leader on 15 October, inviting all interested parties to a Community Information and Open Day at the Werris Creek Bowling and Tennis Club on 20 October 2010.
- Radio Media
  - The Proponent accepted an invitation for an interview on ABC radio (New England Mornings) on 29 June 2010. Mr Danny Young, the Whitehaven Group Environmental Manager discussed the current and proposed operations at the Werris Creek Coal Mine. A large portion of the interview revolved around the Proponent's commitment to addressing the issues raised by Liverpool Plains Shire Council in its submission to the Department of Planning (as part of the development of the DGRs) and discussed on the New England Mornings program on 28 June 2010. The primary issues discussed included:
    - contributions by the Proponent for road maintenance;
    - impacts of rail transport on local road traffic;
    - potential dust emissions and mitigation strategies;
    - potential noise impacts and mitigation strategies.
- Television Media
  - The Proponent accepted an invitation for an interview regarding the proposed LOM Project on Prime TV (28 June 2010). NBN also ran a story on the LOM Project (1 July 2010) without any direct contact with the Proponent. The focus of questioning for the Prime TV interview revolved around the impact of the LOM Project on the local road network, the potential impacts of dust emissions and the possible impacts on the town of Werris Creek to the north.



### One-on-One Meetings with Local Land Owners and Lease Holders

Between the lodgement of the PEA and the exhibition of the *Environmental Assessment*, the Werris Creek Coal Mine Environmental Officer has undertaken regular consultation with the land owners and lease holders of properties surrounding the Project Site. The purpose of the consultation, which varied in length between 5 minutes and 3 hours, was to inform the residents of the proposed mine extension, identify any concerns with the current operations and identify any issues that the land owner or lease holder would like to see addressed in the *Environmental Assessment*.

In total 25 separate discussions were held. **Chart 3.1** presents a general overview of the issues raised during the one-on-one meetings.



As illustrated by **Chart 3.1**, the majority of those consulted (15 of 25) indicated they have no issue with the current or proposed mining operations. Three of those consulted actually commented on the positive benefits of the mine. The main issues of concern identified included:

- noise and blasting (7 of 25);
- dust (6 of 25);
- impacts of rail on road traffic (5 of 25);
- other rail-related impacts (3 of 25);
- impacts on groundwater (3 of 25); and
- impact of night time lighting (3 of 25).

The one-on-one consultation also identified the degree of misinformation within the local community with four of those consulted of the (incorrect) understanding that the open cut would cross the Werris Creek Road and one person (incorrectly) thinking the mine would extend around the town of Werris Creek.

### Consultation with the Aboriginal Community

All consultation with the Aboriginal community has been completed in accordance with the “*Aboriginal Cultural Heritage Requirements for Proponents 2010*” (DECCW, 2010). In accordance with DECCW (2010), the aims of the consultation undertaken with the Aboriginal community was to facilitate positive Aboriginal heritage outcomes by:

- providing an opportunity for those in the Aboriginal community who hold cultural knowledge relevant to the local area to be included in consultation and provide advice as to the significance of any sites or artefacts identified; and
- providing Aboriginal people who hold cultural knowledge relevant to the local area with an opportunity to be involved in the decision making process relevant to the management of any Aboriginal sites or artefacts identified.

The consultation process was initiated by the Proponent and subsequently managed by Dr Matt Cupper of Landskape Natural and Cultural Heritage Management. The consultation process included notification about the LOM Project proposal, identification and registration of Aboriginal parties, presentation of information relevant to the LOM Project and a proposed assessment methodology to the registered Aboriginal parties, formal survey and discussion of results and proposed management of Aboriginal cultural heritage. In total, nine Aboriginal parties registered an interest in the LOM Project and as a result of consultation, four representatives from the registered parties participated in the field survey that was conducted on 9 and 10 June 2010.

Prior to the survey, all parties noted their concern with any development that may impact upon Aboriginal heritage values and other values of the land that are traditionally theirs. There was general consensus amongst the consulted Aboriginal stakeholders that they would like to see the Narrawolga Axe-Grinding Grooves reinstated to a position as close as is possible to their original location following rehabilitation of the final landform for the LOM Project.

Following the completion of field survey over the Project Site, during which no Aboriginal sites were identified, a draft Cultural Heritage Assessment Report was sent to each of the registered Aboriginal parties. No objections were received as to the proposed management of Aboriginal cultural heritage at the Werris Creek Coal Mine.

Section 4B.7.4 and Part 6 of the *Specialist Consultant Studies Compendium* provide a more detailed summary of the consultation process with the Aboriginal community.

### Community Open Day

A Community Open Day was held at the Werris Creek Bowling and Tennis Club on 20 October 2010. Attended by representatives of the Proponent, R.W. Corkery & Co. Pty Limited and the consultant team responsible for the preparation of the specialist environmental assessments, the purpose of the Community Open Day was to:

- provide the local community with an overview as to the proposed operations;
- provide the local community with an opportunity to ask specific questions of the Proponent and specialist consultant team;



- provide a forum for the local community to raise particular issues of concern; and
- provide those interested with a tour of the existing Werris Creek Coal Mine to aide in their understanding of the nature and extent of mining-related impacts.

Held between 12 noon and 7:00pm, the attendance of 169 people was registered<sup>1</sup>. In general, the feeling was generally positive towards the LOM Project with a number of attendees commenting positively on the efforts of the Proponent to contribute to the Werris Creek economy (although it is noted that some attendees thought that the majority of the benefits were going to the larger town of Quirindi). A major achievement of the open day was to correct some of the misinformation pertaining to the LOM Project, e.g. the open cut was to encircle the town. The following provides an overview of some of the common issues raised.

- **Air Quality.** The potential impact of the mining operations on dust levels was raised by a number of attendees. Concerns ranged from potential impacts on health, e.g. asthma, impacts on rainwater collection, and cumulative impacts of coal dust from rail wagons through local towns.
- **Rehabilitation.** There was interest in the nature and method of rehabilitation to be implemented. Some residents did not like the idea that the final landform would not 'replace' the landform disturbed, however, most understood that exact replication of the pre-mining environment is not feasible. Many residents commented on the generally good performance of rehabilitation efforts to date.
- **Noise.** Concerns were raised over the potential impact on noise levels, in particular at night as the mining operations move towards Werris Creek. A number of people commented that operations were audible now (although generally those commenting on the noise indicated that this was not adversely affecting them currently) with noise levels likely to increase significantly in the future.
- **Lighting.** Several residents of Werris Creek commented on the very bright lighting used at the mine which was affecting driving conditions between Quirindi and Werris Creek.

A number of attendees commented on the size of the proposed Biodiversity Offset Strategy and considered this to be a very positive proposal.

Notably, very few attendees identified impact on groundwater as an issue of concern (which perhaps illustrates an acceptance of previous predictions of minimal impact on the aquifers surrounding the Werris Creek Coal Measures basin). No mention was made of concerns with the extension of the out-of-pit overburden emplacement adjacent to Werris Creek Road. There were also no concerns raised over the proposed increase in road transport of coal, operation of local intersections or possible impacts on the road surface.

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<sup>1</sup> It is estimated between 10 and 20 people attended but did not register.



### 3.2.2.3 Consultation with Government Agencies

Key government agencies were consulted throughout the planning and assessment process for the LOM Project. While the DoP decided that no Planning Focus Meeting would be required for the LOM Project, a copy of the PEA was distributed to all relevant government agencies to review. Issues raised by each government agency arising from the review of the PEA were formalised in correspondence back to DoP and were distilled into the Director-General's Requirements (DGRs). The DGRs, which identify key assessment requirements to be addressed in the *Environmental Assessment* together with a description of what measures should be implemented to avoid, minimise, mitigate, offset, manage and/or monitor these impacts, were issued by DoP on 29 June 2010. The key issues raised in the DGRs were as follows.

- Soil and Water – including:
  - a detailed site water balance, including a description of site water demands, water supply and disposal methods;
  - detailed modelling and assessment of potential impacts on;
    - the quality and quantity of existing surface water and groundwater resources;
    - affected licenced water users and basic landholder rights;
    - the riparian, ecological, geomorphological hydrological values of watercourses: and
    - impacts to agricultural lands,
  - a detailed description of the proposed water management system (including all infrastructure and storages) and water monitoring program;
  - a detailed description of measures to minimise all water discharges; and
  - a detailed description of measures to mitigate surface water and groundwater impacts.
- Biodiversity – including:
  - an accurate quantification of any vegetation clearing;
  - a detailed assessment of potential impacts on terrestrial or aquatic threatened species or populations or their habitats, endangered ecological communities and groundwater dependent ecosystems;
  - a detailed description of the measures that would be implemented to avoid or mitigate impacts on biodiversity; and
  - an offset strategy to ensure the project maintains or improves the biodiversity values of the region in the medium to long term.
- Noise and Vibration – including a quantitative assessment of potential construction, operational, blasting and transport noise impacts.
- Air Quality – including a quantitative assessment of potential air quality impacts, including dust emissions from rail wagons.



- Transport – including a detailed assessment of potential impacts on the safety and performance of the rail and road networks.
- Greenhouse Gases – including:
  - a quantitative assessment of the potential scope 1, 2 and 3 greenhouse gas emissions of the project;
  - a qualitative assessment of the potential impacts of these emissions on the environment; and
  - an assessment of all reasonable and feasible measures that could be implemented on site to minimise greenhouse gas emissions and ensure the project is energy efficient.
- Rehabilitation and Mine Closure.
  - A detailed description of the proposed rehabilitation and mine closure strategies for the project, having regard to the key principles in Strategic Framework for Mine Closure, including:
    - rehabilitation objectives, methodology, monitoring programs, performance standards and proposed completion criteria;
    - decommissioning and management of surface infrastructure;
    - nominated final land uses, having regard to any relevant strategic land use planning or resource management plans or policies; and
    - the potential for integrating the rehabilitation strategy with any other offset strategies in the region.
- Heritage – both Aboriginal and non-Aboriginal.
- Visual Amenity – including a detailed description of the measures that would be implemented to minimise the visual impact of the project.
- Waste – including:
  - accurate estimates of the quantity and nature of the potential waste streams of the project; and
  - a description of the measures that would be implemented to minimise, handle and dispose of waste on site.
- Socio-economic – including an assessment of the costs and benefits of the project as a whole, the demand on local infrastructure and services and whether it would result in a net benefit for the NSW community.
- Hazards – including bushfires.

On 30 June 2010, the Proponent referred the LOM Project to the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) (now the Department of Sustainability, Environment, Water, Populations and Communities [DSEWPaC]) for determination as to whether the LOM Project represents a 'controlled action' under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). On 12 August 2010, DSEWPaC confirmed the LOM Project represents a controlled action and therefore requires approval from the Commonwealth Minister for Environmental Protection, Heritage and the Arts under the EPBC Act. On 1 September 2010, the Department of Planning released supplementary DGRs that required the Environmental Assessment should "include enough information about the controlled action and its relevant impacts to allow the Commonwealth Minister for Environmental Protection, Heritage and the Arts to make an informed decision whether or not to approve the controlled action under the EPBC Act."

**Appendix 2** presents an itemised and tabulated summary of both the individual issues that were provided in the correspondence of the government agencies to DoP and the formal DGRs.

Following the issuing of the DGRs, further consultation was undertaken with government agencies and authorities. A summary of the further consultation is provided below.

#### **Department of Planning (DoP)**

The Department of Planning (DoP) has been regularly updated regarding the status of project planning and the preparation of the *Environmental Assessment*. Specific issues discussed included the following.

- Discussions relating the need for a Planning Focus Meeting (PFM) for the proposed Project. The DoP concluding that no formal PFM was required given the familiarity of the DoP and other government agencies and authorities with the Werris Creek Coal Mine.
- The DoP was consulted in relation to a determination by DSEWPaC of the LOM Project as a controlled action under the EPBC Act. As a result of the DSEWPaC determination, the DGRs were re-issued by the DoP on 1 September 2010 to confirm that the assessment of impact on biodiversity would be assessed bilaterally.

#### **NSW Department of Environment, Climate Change and Water (DECCW)**

An initial Biodiversity Offset Strategy for the LOM Project (LOM Project BOS), prepared by Eco Logical Australia Pty Ltd (ELA), was forwarded to DECCW on 4 August 2010 for consideration.

On 16 August 2010, a meeting between representatives of DECCW, the Proponent, ELA and R.W. Corkery & Co. Pty. Limited was held to discuss the adequacy of the proposed LOM Project BOS. At this meeting, the DECCW representatives indicated general satisfaction with the approach being taken by the Proponent to the development of an adequate biodiversity offset strategy. However, the following was also noted, and the Proponent encouraged to address in a revision to the proposed LOM Project BOS.

- Rehabilitation should not be included in any calculation of areas allocated to the offset strategy. While encouraged by DECCW, rehabilitation is considered too uncertain in its outcomes to be considered as a direct offset.



- The LOM Project BOS needs to illustrate that the conserved vegetation will represent 'like for like or better' vegetation. It was noted that the offsetting of one EEC with another, especially if considered to be of higher conservation value, was considered likely to represent a suitable offset.
- The LOM Project BOS needs to address the 13 guiding principles for biodiversity offsets contained within Principles for the use of Biodiversity Offsets in NSW (DECC 2008e).

The BOS presented in Section 2.14 generally addresses the requirements of DECCW, as noted during the 16 August 2010 meeting (as well as those of DSEWPaC).

#### **Commonwealth Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC)**

- On 30 June 2010, the LOM Project was formally referred to the to the Minister of Environment under the EPBC Act for the disturbance to areas of Grassy White Box and Derived Native Grassland, and Brigalow Endangered Ecological Communities (EECs).
- On 19 July 2010, representatives of ELA (on behalf of the Proponent) met with representatives of DSEWPaC to discuss the proposed action and clarify any questions related to the development and operation of the LOM Project. Ongoing rehabilitation activities and an existing biodiversity offset strategy were discussed, along with additional impact mitigation and offset measures that could be implemented for the LOM Project. The DSEWPaC representatives, whilst noting the assessment of the referral was ongoing, indicated that the impact associated with the LOM Project was likely to be assessed as significant and therefore requiring approval under the EPBC Act. DSEWPaC confirmed this position on 12 August 2010.

#### **Industry and Investment NSW (I&I NSW)**

- A Conceptual Project Development Plan (CPDP) meeting for the LOM Project was held with I&I NSW at the Maitland head office on 29 March 2010 with key planning, geologists, safety and environmental officers present. The aspects of the LOM Project that were focussed upon were resource utilisation, mining leases and rehabilitation. The Department was generally supportive of how the LOM Project, as proposed, addressed these issues.
- As a result of consultation with DECCW and DSEWPaC, it has become evident that rehabilitation and post-mining land management should focus on the re-establishment of corridors for the Endangered Ecological Communities that would be disturbed by the LOM Project across the final landform. As a consequence, the location of land that would be rehabilitated for future agricultural activities has been proposed to be relocated from the currently approved isolated location on top of the overburden emplacement, to the site of the Rail Load-out Facility and turn-around rail loop which would be adjacent and continuous with existing agricultural practices on the "Escott" and "Cintra" properties.

While noting that the full detail of the proposed rehabilitation requires review, this approach received a high level of support from DECCW and I&I NSW officers during discussions through the preparation of the *Environmental Assessment*.



### Australian Rail Track Corporation (ARTC)

The Proponent maintains an ongoing dialogue with ARTC which has not indicated any issues with the proposed increase in rail movements to and from the Project Site. On 22 November, the Proponent wrote to ARTC (and Pacific National) to engage in discussions on the possibility of initiating air quality monitoring in Quirindi. No response has been received from ARTC (or Pacific National).

### Liverpool Plains Shire Council (“Council”)

The Proponent has maintained open lines of communication with the Council since the commencement of mining in 2005. The following provides a summary of the consultation completed since the lodgement of the application for project approval for the LOM Project.

- Consultation has been undertaken regarding the development and implementation of a Community Enhancement Fund (CEF), which would provide funding for the development of community projects within the LGA (but primarily within Werris Creek). An initial CEF proposal was submitted to the Council on 11 May, with the Proponent meeting with Council on 16 June to discuss the proposed CEF. The composition of the CEF was confirmed in a letter sent to Council on 16 June 2010 which Council accepted<sup>2</sup> (by letter dated 5 July).
- Following media interviews in June 2010 where the issue PM<sub>2.5</sub> particulate matter was raised, the Proponent has confirmed to Council its willingness to be involved in a regional air quality monitoring program on an equitable basis with the other mining operators of the region. It is anticipated discussions with respect to such a monitoring program will be ongoing.
- During August and September 2010, representatives of Constructive Solutions (road engineering and traffic consultants to the Proponent) held discussions with Mr Barry Maher in relation to requirements for road and intersection upgrades along the existing road haulage route. The proposed road and intersection upgrades included in the *Environmental Assessment* and Part 8 of the *Specialist Consultant Studies Compendium* reflect these discussions.
- On 16 September 2010, enquiries were made to the Werris Creek Coal Mine Environmental Officer by Mr Ron Van Katwyk (Council’s Director - Environmental Services) regarding the progress of the LOM Project application and consideration of the 17 points identified by Council in their contribution to the DGRs as requiring assessment. The status of the *Environmental Assessment* preparation was provided and it was confirmed that the key assessment requirements raised by Council would be addressed.
- On September 17 2010, Mr Alex Irwin of R.W. Corkery & Co. Pty. Limited contacted Mr Van Katwyk to discuss the status of *Environmental Assessment* preparation. During these discussions, Mr Van Katwyk noted that the cumulative increase in rail traffic through the Liverpool Plains local government area was an issue of concern and that this should be considered in the *Environmental Assessment*.

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<sup>2</sup> Council indicated that the valuation of the Council Quarries on the Project Site to be purchased by the Proponent remained unresolved.



### Liverpool Plains Shire Council Mining Sub-committee

On 10 June, 2010, the mining sub-committee of the Liverpool Plains Shire Council was invited on a site tour of the existing Werris Creek Coal Mine. The site tour provided an opportunity for those present to understand the details of the LOM Project and express any concerns they had about the project. The main concerns raised during the site tour were as follows.

- The proximity of the Project to the town of Werris Creek and the impact of the proposed amenity bund.
- The retention of a final void.
- Disturbance to remnant native vegetation, in particular the identified EECs, and options to offset this impact.
- Noise emissions from the transport of product coal by rail and road.
- Dust emissions from mining operations and the transport of product coal by rail.

### Namoi Catchment Management Authority (Namoi CMA)

A representative of the Namoi CMA was invited to inspect the existing Werris Creek Coal Mine operations and discuss the proposed LOM Project during a general site tour provided to the Liverpool Plains Shire Council Mining Sub-committee. During this meeting, the primary issues of concern to the Namoi CMA were identified as follows.

- Ensuring the quality and quantity of surface and groundwater flows within the local catchment is maintained.
- Ensuring that the clearing of native vegetation was suitably offset (to ensure equitability with restrictions placed on local agriculture).

## 3.2.3 Review of Planning Issues and Environmental Guidelines

### 3.2.3.1 Introduction

A number of NSW and regional planning instruments apply to the proposed LOM Project. These planning instruments were reviewed to identify any environmental aspects requiring consideration in the *Environmental Assessment*. In addition, the DGRs identified a number of guideline documents to be referenced / reviewed during the preparation of the *Environmental Assessment*.

A brief summary of each relevant planning instrument is provided in Sections 3.2.3.2 to 3.2.3.4. The application and relevance of planning instruments related to specific environmental issues have been assessed in the relevant specialist consultant assessments.

### 3.2.3.2 State Planning Issues

The following four State Environmental Planning Policies (SEPPs) have been identified which may apply to the Project.

- SEPP (Major Development) 2005.
- SEPP (Mining, Petroleum Production and Extractive Industries) 2007.
- SEPP 33 – Hazardous and Offensive Development.
- SEPP 44 – Koala Habitat Protection.



### **State Environmental Planning Policy (Major Development) 2005**

This SEPP was gazetted on 25 May 2005 and applies to all Projects satisfying nominated criteria made following this date. The purpose of this SEPP is to define those projects of state significance or proposed on state significant sites and therefore requiring Ministerial approval under the provisions of Part 3A of the *EP&A Act 1979*. This SEPP and Part 3A of the *EP&A Act 1979* is a system introduced to specifically deal with the complexity of major projects and to streamline the assessment process.

Being a coal mine, the proposed project is identified under Schedule 1 of the SEPP as a Group 2 class of development and hence is a Major Development to which Part 3A of the *EP&A Act 1979* applies.

### **State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007**

This SEPP was gazetted on 17 February 2007, in recognition of the importance to New South Wales of mining, petroleum production and extractive industries.

The SEPP specifies matters requiring consideration in the assessment of any mining, petroleum production and extractive industry development as defined in NSW legislation. **Table 3.1** presents a summary of the matters that a consent authority needs to consider when assessing a new or modified proposal (Part 3 - Clauses 12 to 17 of the SEPP) and a reference to the section in this *Environmental Assessment* where each element is addressed.

### **State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33)**

Hazardous and offensive industries, and potentially hazardous and offensive industries, relate to industries that, without the implementation of appropriate impact minimisation measures, would, or potentially would, pose a significant risk in relation to the locality, to human health, life or property, or to the biophysical environment.

The hazardous substances and dangerous goods to be held or used on the Project Site are required to be identified and classified in accordance with the risk screening method contained within the document entitled *Applying SEPP 33 Consultation Draft* (DoP, 2008). Hazardous materials are defined within *Applying SEPP 33 Consultation Draft* (DoP, 2008) as substances falling within the classification of the *Australian Code for Transportation of Dangerous Goods by Road and Rail* (Dangerous Goods Code).

The Project would involve the on-site storage of up to 120 000L of diesel fuel, Class 3 C1 combustible liquid, and small amounts of other hydrocarbons including lubricating oils and grease, Class 3 C2 combustible liquids. As is currently approved, explosive precursors would be stored and distributed on the Mine Site. The precursors include:

- ammonium nitrate emulsion (ANE): a Class 5.1 Dangerous Good;
- prilled ammonium nitrate (AN): a Class 5.1 Dangerous Good;
- diesel: a Class 3 C1 combustible liquid; and
- companion and gasser solution: not classified as dangerous goods.



**Table 3.1**  
**Application of SEPP (Mining, Petroleum Production and Extractive Industries) 2007**

Relevant SEPP Clause	Description	EA Section
12: Compatibility with other land uses	Consideration is given to:	
	- the existing uses and approved uses of land in the vicinity of the development;	4A.3
	- the potential impact on the preferred land uses (as considered by the consent authority) in the vicinity of the development; and	4B
	- any ways in which the development may be incompatible with any of those existing, approved or preferred land uses.	4B
	The respective public benefits of the development and the existing, approved or preferred land uses are evaluated and compared.	4B and 6
	Measures proposed to avoid or minimise any incompatibility are considered.	4B
13: Compatibility with mining, petroleum production or extractive industry	Consideration is given to whether the development is likely to have a significant impact on current or future mining, petroleum production or extractive industry and ways in which the development may be incompatible.	2
	Measures taken by the applicant to avoid or minimise any incompatibility are considered.	4B
	The public benefits of the development and any existing or approved mining, petroleum production or extractive industry must be evaluated and compared.	6
	- The transport of some or all of the materials from the site by means other than public road.	4B.11
	- Limitation of the number of truck movements that occur on roads within residential areas or roads near to schools.	4B.11
	- The preparation of a code of conduct for the transportation of materials on public roads.	4B.11
14: Natural resource and environmental management	Consideration is given to ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure:	4B
	- impacts on significant water resources, including surface and groundwater resources, are avoided or minimised;	4B.1 and 4B.2
	- impacts on threatened species and biodiversity are avoided or minimised; and	4B.6
	- greenhouse gas emissions are minimised and an assessment of the greenhouse gas emissions (including downstream emissions) of the development is provided.	4B.5
15: Resource recovery	The efficiency of resource recovery, including the reuse or recycling of material and minimisation of the creation of waste, is considered.	4B.12
16: Transportation	Transport-related issues are considered.	4B.11
17: Rehabilitation	The rehabilitation of the land affected by the development is considered including:	2.14 and 4B.9
	- the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated;	2.14
	- the appropriate management of development generated waste;	4B.12
	- remediation of any soil contaminated by the development; and	4B.13
	- the steps to be taken to ensure that the state of the land does not jeopardize public safety, while being rehabilitated or at the completion of rehabilitation.	2.14

As the diesel fuel and lubricating oils and greases would not be stored adjacent to any other hazardous materials of the same class, the risk screening process for SEPP 33 does not require these to be considered further. Furthermore, the quantity of diesel fuel to be delivered to the Project Site does not trigger the SEPP 33 requirement for a Preliminary Hazard Analysis. **Appendix 3** provides the risk screening undertaken in accordance with SEPP 33.

The SEPP 33 risk screening (see **Appendix 3**) identified that the quantity of ammonium nitrate (explosives) to be stored on the Project Site requires further assessment in the form of a *Preliminary Hazard Analysis* (PHA). A PHA has previously been completed for the approved facility on the Project Site (Advitech, 2008). As the proposed facility would be no closer to any Class A or Class B public work (see Section 2.8.7.2 and **Figure 2.15**), the results of the Advitech (2008) PHA have been relied upon for this assessment. The results of Advitech (2008) confirm that the proposed storage of ammonium nitrate and other explosives precursors is classified as not hazardous and thus SEPP 33 is not required to be considered further (see **Appendix 4**).

#### **State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44)**

The former local government areas of Parry and Quirindi, which form the Liverpool Plains Shire Council local government area are identified in Schedule 1 of this policy as potentially providing habitat for Koalas. The policy requires an investigation to be carried out to determine if any Koala feed trees are present within the Project Site.

“Potential Koala Habitat” is defined as areas of vegetation where the trees listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component. A Biodiversity Impact Assessment completed by Eco Logical Australia Pty Limited (ELA, 2010) has confirmed the finding of previous studies (GCNRC, 2004 and GCNRC, 2009) that one of the species listed in Schedule 2 of SEPP 44 is found within the LOM Project Site. This is *Eucalyptus albens* (White Box), a species that is dominant within many of the remnants of native vegetation present within the Project Site.

More than 15% of the trees present within the remnant native vegetation areas within the Project Site are White Box and so these areas can be regarded as "potential Koala habitat". However, fauna surveys conducted on the Project Site between 2004 and 2010 (CES, 2004, Ecotone, 2009, and ELA, 2010) have failed to identify any signs of Koala habitation of the area. As such, the Project Site is not considered core Koala habitat.

#### **3.2.3.3 Regional Planning Issues**

The LOM Project site was originally included in the draft Orana Regional Environmental Plan (REP) No 1 – Siding Spring. This REP was finalised and published on the 1<sup>st</sup> January 2008. The current plan’s boundaries are defined as “*all land within the Shires of Coonabarabran, Coonamble and Gilgandra and the City of Dubbo, being part of the area declared on 14 April 1986*”. The Project Site is not situated within these areas and therefore the Orana Regional Environmental Plan No1 – Siding Spring is not relevant to this Project.

A search was conducted in other council areas to determine if another REP included the land on which the LOM Project is situated. No REPs in surrounding council areas included the LOM Project Site.



### 3.2.3.4 Local Planning Issues

The LOM Project Site lies entirely within the Liverpool Plains Local Government Area, however, the majority occurs within the former Quirindi Shire with planning control covered by the Quirindi Local Environmental Plan 1991. The remainder of the Project Site lies within an area comprising part of the former Parry Shire which is covered by the Parry Local Environmental Plan 1987.

#### Quirindi Local Environmental Plan (LEP) 1991

The area of the LOM Project Site within the former Shire of Quirindi and covered by the Quirindi LEP 1991 is zoned as Zone No. 1(a) (Rural "A" Zone). Development for the purpose of mining is not prohibited within the zone and therefore permissible with consent.

#### Parry Local Environmental Plan (LEP) 1987

That part of the Project Site north of Escott Road, including the Rail Load-out Facility, Coal Product Storage Area and small section of the Rail Load-out Road, is covered by Parry LEP 1987. This area is zoned as 1(a) (General Rural Zone), with the development of mines permissible and consistent with objective (f) of this zone, with development consent.

### 3.2.3.5 Environmental Guidelines

The DGRs require that in assessing the identified key assessment requirements, reference be made to one or more guideline documents. In addition, a number of the government agencies consulted in relation to the Project required reference to other environmental guideline documents. Each of these guidelines was obtained, reviewed and where appropriate forwarded to the relevant specialist consultant for incorporation into the specialist environmental studies.

## 3.2.4 Review of Previous Environmental Studies and Environmental Monitoring

### 3.2.4.1 Previous Environmental Studies

There have been a number of environmental studies completed for the Werris Creek Coal Mine since the original approval (DA-172-7-2004) was granted. Areas of assessment have included:

- surface water resources;
- soils and land capability;
- fauna;
- noise and vibration;
- visual impacts;
- groundwater resources;
- flora;
- Aboriginal and European heritage;
- air quality; and
- traffic and transportation.

The most recent studies were completed in 2009 for Modification 5 of DA-172-7-2004 to extend the mining footprint to the north of the existing approved footprint (referred to as “The Northern Extension”). The summary below focuses on the studies completed for the *Statement of Environmental Effects* for the Northern Extension as they give the best reflection of the current environment. The 2009 studies identified that while the Northern Extension could be undertaken with acceptable impacts on the local environment, the following issues were identified as requiring careful and/or ongoing management.

- Mining and associated activities require the disturbance to native vegetation, including an area classified as a variant of the White Box Yellow Box Blakely’s Red Gum Woodland Endangered Ecological Community (EEC). Approval of the Northern Extension required a biodiversity offset strategy to be established. This currently includes the conservation of native vegetation on the Mine Site and surrounding lands of the “Eurunderee” and “Railway View” properties.
- Dewatering of the underground workings to the north of the current open cut is likely to result in changes to local hydrogeology. These impacts could include:
  - reduction in local groundwater level of the coal measures, potentially affecting the availability of groundwater within the one local bore owned by the Proponent. Groundwater monitoring to date has confirmed the impact of the mining operations on the surrounding basalt and alluvial groundwater levels in the bores of neighbouring landholders has been negligible; and/or
  - a possible reduction in groundwater flows to Quipolly Creek (within the Quipolly Creek Alluvium).
- Noise levels received at a limited number of neighbouring residences may exceed the 35dB(A) noise criterion. Notably, the two residences at which exceedances were predicted (“Cintra” and Zeolite Australia) have since been purchased by the Proponent.
- Air quality modelling suggests that there may be some increases in dust and particulate matter resultant from the extended mining operations. However, it is noted that the modelling completed was highly conservative, reflecting the absolute worst-case scenario, and still predicts compliance with the nominated criteria on all but very limited occasions.
- The overburden emplacement of the mine site may be more noticeable from vantage points to the south and east of the mine site.

#### 3.2.4.2 Environmental Monitoring

Since the commencement of construction at the Werris Creek Coal Mine, the Proponent has monitored the impact of the operations on a number of environmental parameters (see Section 1.5.10.3). The mining operation has changed significantly in the last 12 months and thus monitoring data from this time period best reflects the current operations performance. The following provides a summary of the results for the previous 12 months and their evaluation.



- **Noise.** Between April 2009 and October 2010 there has only been two noise exceedance at non-mine owned properties or properties whose owners had not entered into a noise agreement. Another five elevated noise results were recorded during noise enhancing atmospheric conditions when winds speeds were greater than 3m/s and/or there was a temperature inversion of more than +3°C/100m. The operation's current Environment Protection Licence conditions indicate that compliance with noise emission criteria is not applicable under these conditions due to the noise enhancing meteorological conditions.
- **Air Quality.** The Proponent maintains a network of deposited dust gauges and high volume air samplers (HVAS) to monitor total suspended particulate matter (TSP) and the <10µm component of airborne particulate matter (PM<sub>10</sub>). As noted in Section 1.5.10.3, dust and airborne particulate matter monitoring results for the last 12 months indicate that the Werris Creek Coal Mine did not at anytime exceed its development consent conditions as a result of operations at any non project-related residences where monitoring was conducted.
- **Groundwater.** Groundwater levels are measured quarterly at 14 groundwater monitoring bores (three piezometers and 11 privately owned bores) surrounding the Werris Creek Coal Mine. Monitored groundwater levels have remained relatively stable since the commencement of mining in 2005. Electrical conductivity and pH in all monitoring bores has remained fairly stable since the commencement of monitoring.
- **Surface Water.** As discussed in Section 1.5.10.3 surface water quality is monitored both on the Project Site and in receiving waters during (or following) discharge events. Since alterations to the water management system in 2008, there have been a total of six discharges from the existing operations. All discharge events complied with the conditions of EPL 12290.
- **Blasting** -All blasts at the mine are monitored in accordance with a Blast Monitoring Program (BMP). With limited exceptions, all blasts have achieved the airblast overpressure and ground vibration criteria nominated in DA 172-7-2004. During the last 12 months, there have been no exceedances of blast criteria at residences on privately owned land.

### 3.2.4.3 Significant Environmental Issues

The LOM Project would increase the overall footprint of disturbance associated with the Werris Creek Coal Mine and on the basis of these most recent environmental studies and monitoring, it is evident that the following issues would require detailed assessment.

1. The impact on native vegetation, in particular the identified EEC(s) of the Project Site (including assessment of additional offset arrangements).
2. The management of noise generated by open cut mining operations moving in a northerly direction towards the town of Werris Creek.



3. As the LOM Project would involve the dewatering of the underground workings of the former Werris Creek Colliery, which may have impacts on local groundwater resources, adequate management of groundwater resources, i.e. ensuring that no local groundwater users are adversely impacted, is seen as an important part of the LOM Project.
4. Impacts on local air quality. As open cut mining operations would be moving towards the town of Werris Creek, managing dust, particulate matter and gaseous emissions from the Werris Creek Coal Mine has been identified as an important component of environmental management for the LOM Project.
5. Impacts on visual amenity given the increasing proximity of the operation to the town of Werris Creek.

### 3.3 ANALYSIS OF ENVIRONMENTAL RISK AND ISSUE PRIORITISATION

#### 3.3.1 Analysis of Environmental Risk

Risk is the chance of something happening that will have an impact upon the objectives or the task, which in this case is development and operation of the LOM Project with minimal effect on the local environment. Risk is measured in terms of consequence (severity) and likelihood (probability) of the event happening. For each environmental issue identified in **Table 3.2**, the potential environmental impacts have been allocated a risk rating based on the potential consequences and likelihood of occurrence and in accordance with Australian Standards HB 203:2006 and AS/NZS 4360:2004.

The allocation of a consequence rating was based on the definitions contained in **Table 3.3**. It is noted that the assigned consequence rating represents the highest level applicable, i.e. if a potential impact is assigned a level of 4 - Major based on impact to the environment and 2 - Minor based on area of impact, the consequence level assigned would be 4 - Major (as the highest consequence). The likelihood or probability of each impact occurring was then rated according to the definitions contained in **Table 3.4**.

The risk associated with each environmental impact was assessed **without** the inclusion of any operational controls or safeguards in place and based on the qualitative assessment of consequence and likelihood, a risk ranking of either; low, medium, high or extreme was assigned to each potential impact based on the matrix of **Table 3.5**.

The four risk rankings are defined as follows.

- Low (L): requiring a basic assessment of proposed controls and residual impacts. Any residual impacts are unlikely to have any major impact on the local environment or stakeholders.
- Moderate (M): requiring a medium level assessment of proposed controls and residual impacts. It is unlikely to preclude the development of the project but may result in impacts deemed unacceptable to some local or government stakeholders.
- High (H): requiring in-depth assessment and high level documentation of the proposed controls and mitigation measures. Ultimately, this level of risk may preclude the development of the project.



Extreme (E): requiring in-depth assessment and high level documentation of the proposed controls and mitigation measures and possible preparation of a specialised management plan. Unless considered to be adequately managed by the controls and/or management plan, this level of risk is likely to preclude the development of the project.

**Table 3.2** presents the identified potential impacts that may be associated with each environmental issue based on the source or risk or potential incident, potential consequences and local receptor/surrounding environment.

**Table 3.6** provides an assessment of the **unmitigated** risk for each potential environmental impact based on the classifications and definitions provided. Where appropriate, and to provide a more realistic assessment of the risks posed by the various environmental issues, the environmental impacts have been further defined using either a level, range or scale of impact providing for the various circumstances which may apply. **Table 6.1** in Section 6 provides an analysis of risk following the implementation of operational and safeguards and/or control measures outlined in Section 4B.

### 3.3.2 Environmental Issue Prioritisation

The issues identified as requiring assessment within the *Environmental Assessment* have been prioritised based, in decreasing order, of emphasis upon the following.

- The key assessment requirements of the DGRs (see Section 3.2.2.3 and **Appendix 2**).
- Issues raised during the consultation phase, especially those issues raised with a high degree of frequency.
- Those issues identified as being significant following previous environmental studies and/or monitoring.
- Issues identified with a greater frequency of impacts with high or extreme risk ratings (see **Table 3.6**).

Based on the issues identified and the risk ratings allocated to the potential environmental impacts of these, the following order of priority has been determined. This order of priority provides for the order of assessment in Part 4B, namely:

- |                        |                              |
|------------------------|------------------------------|
| 1. Groundwater         | 6. Cultural Heritage         |
| 2. Surface Water       | 7. Soils and Land Capability |
| 3. Noise and Vibration | 8. Visual Amenity            |
| 4. Air Quality         | 9. Traffic and Transport     |
| 5. Biodiversity        | 10. Socio-economic Setting   |

It is noted that the inclusion of “Socio-economic Setting” at N<sup>o</sup> 10 is not a direct consequence of the risk analysis. Rather, it is included at N<sup>o</sup> 10 to enable all other issues to be considered prior to the consideration of the socio-economic setting as this issue invariably is inter-related with many of the preceding issues.

The sources of risk and potential environmental impacts associated with each issue are discussed within relevant subsections within Section 4B. All other issues generally allocated a “moderate” or “low” level of priority, have been addressed to the level considered appropriate throughout the *Environmental Assessment*.



Table 3.2  
Risk Sources and Potential Environmental Impacts

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Environmental Issue	Risk Source/potential incident(s)	Potential Consequences	Receptor/ Surrounding Environment	Potential Environmental Impacts
Groundwater	<ul style="list-style-type: none"> <li>Reduced yields of groundwater bores and/or springs due to dewatering of the Werris Creek Colliery underground workings.</li> </ul>	<ul style="list-style-type: none"> <li>Decrease in availability of groundwater to adjoining landowners and/or groundwater dependent ecosystems.</li> <li>Community complaints.</li> <li>Reduced reputation within the local community.</li> </ul>	<ul style="list-style-type: none"> <li>Groundwater bores and/or springs of adjoining landowners.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced availability of water to local landowners.</li> <li>Degradation of groundwater dependent ecosystems.</li> </ul>
	<ul style="list-style-type: none"> <li>Reduced inflows to surrounding creek systems due to dewatering from the Werris Creek Colliery underground workings.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced surface water flows in surrounding creek systems.</li> <li>Less water available for landowners who extract water from the surrounding creek systems.</li> <li>Reduced reputation within the local community.</li> </ul>	<ul style="list-style-type: none"> <li>Surrounding creek systems and their associated aquatic communities.</li> <li>Landowners who extract water from the surrounding creek systems.</li> </ul>	<ul style="list-style-type: none"> <li>Degradation of aquatic communities.</li> <li>Change in the hydrology/ geomorphology of the surrounding creek systems.</li> </ul>
	<ul style="list-style-type: none"> <li>Pollution of surface lands or water as a consequence of uncontrolled discharge of dewatered mine in-flows.</li> </ul>	<ul style="list-style-type: none"> <li>The risk sources and potential impacts are considered attributable to "surface water" and are considered in that section of the risk analysis.</li> </ul>		
Groundwater	<ul style="list-style-type: none"> <li>Reduction of groundwater levels due to mine in-flows.</li> </ul>	<ul style="list-style-type: none"> <li>Reduction in the quantity of water stored in aquifers intercepted by open cut mining.</li> <li>Community complaints.</li> <li>Reduced reputation within the local community.</li> </ul>	<ul style="list-style-type: none"> <li>Aquifers intercepted by open cut mining</li> <li>Surrounding landholders utilising bores or spear pumps for household or agricultural use.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced availability of water to local landowners.</li> <li>Degradation of groundwater dependent ecosystems.</li> </ul>
	<ul style="list-style-type: none"> <li>Pollution of groundwater due to hydrocarbon spills, acid or salinity generation from overburden or explosives residues.</li> </ul>	<ul style="list-style-type: none"> <li>Community complaints.</li> <li>Reduced reputation within the local community.</li> </ul>	<ul style="list-style-type: none"> <li>Surrounding landholders utilising bores or spear pumps for household or agricultural use.</li> <li>Groundwater dependent ecosystems.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced availability of water to local landowners.</li> <li>Degradation of groundwater dependent ecosystems.</li> <li>Impacts on groundwater quality.</li> </ul>



**Table 3.2 (Cont)**  
**Risk Sources and Potential Environmental Impacts**

Environmental Issue	Risk Source/potential incident(s)	Potential Consequences	Receptor/ Surrounding Environment	Potential Environmental Impacts
Surface Water	<ul style="list-style-type: none"> <li>Reduction in environmental flows through the Project Site.</li> </ul>	<ul style="list-style-type: none"> <li>Decreased availability of water to downstream stock watering dams.</li> <li>Reduced viability of grazing lands.</li> <li>Degradation of aquatic communities.</li> <li>Change in the hydrology/ geomorphology of the surrounding creek systems.</li> </ul>	<ul style="list-style-type: none"> <li>Downstream flora and fauna.</li> <li>Downstream agricultural lands.</li> <li>Aquatic communities in surrounding creek systems.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced flows to downstream vegetation.</li> <li>Reduced flows in surrounding creek systems.</li> </ul>
	<ul style="list-style-type: none"> <li>Altered flood regimes.</li> </ul>	<ul style="list-style-type: none"> <li>Change to the structure or composition of vegetation communities and fauna habitat.</li> <li>Reduction in value of affected agricultural land.</li> </ul>	<ul style="list-style-type: none"> <li>Local communities.</li> <li>Terrestrial and aquatic ecosystems.</li> <li>Agricultural lands.</li> </ul>	<ul style="list-style-type: none"> <li>Changes to coverage and frequency of flooding.</li> </ul>
	<ul style="list-style-type: none"> <li>Dam wall failure</li> </ul>	<ul style="list-style-type: none"> <li>Reduced reputation within the local community.</li> <li>Potential health effects to either humans or livestock.</li> <li>Reduced surface water availability for existing uses.</li> <li>Reduced downstream surface water quality.</li> <li>Degradation of aquatic ecosystems.</li> <li>Changes to stream hydrology and geomorphology.</li> </ul>	<ul style="list-style-type: none"> <li>Downstream creeks and tributaries.</li> <li>Downstream flora and fauna.</li> <li>Downstream users of surface water.</li> </ul>	<ul style="list-style-type: none"> <li>Impacts on downstream water quality.</li> <li>Increased flows and/or flooding in natural drainage lines for a short period.</li> </ul>
	<ul style="list-style-type: none"> <li>Discharge of dirty, saline, contaminated water outside licence conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced reputation within the local community.</li> <li>Potential health effects to either humans or livestock.</li> <li>Reduced surface water availability for existing uses.</li> <li>Degradation of aquatic ecosystems.</li> </ul>	<ul style="list-style-type: none"> <li>Downstream creeks and tributaries.</li> <li>Downstream flora and fauna.</li> <li>Downstream users of surface water</li> </ul>	<ul style="list-style-type: none"> <li>Decreased downstream water quality.</li> </ul>

**Table 3.2 (Cont)**  
**Risk Sources and Potential Environmental Impacts**

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Environmental Issue	Risk Source/potential incident(s)	Potential Consequences	Receptor/ Surrounding Environment	Potential Environmental Impacts
Erosion / Sediment Control	<ul style="list-style-type: none"> <li>Wind and/or water erosion.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced land stability.</li> <li>Reduced ability for the land to support vegetative cover.</li> </ul>	<ul style="list-style-type: none"> <li>Project Site soil resource.</li> </ul>	<ul style="list-style-type: none"> <li>Loss of soil resources.</li> </ul>
	<ul style="list-style-type: none"> <li>Suspension of sediments within runoff.</li> </ul>	<ul style="list-style-type: none"> <li>Decreased downstream water quality.</li> <li>Degradation of aquatic ecosystems.</li> </ul>	<ul style="list-style-type: none"> <li>Downstream creeks and tributaries.</li> <li>Downstream aquatic ecosystems.</li> <li>Downstream users of surface water.</li> </ul>	<ul style="list-style-type: none"> <li>Increased sedimentation within downstream creeks.</li> <li>Potential mobilisation of heavy metals in soil.</li> </ul>
Threatened Flora and Fauna	<ul style="list-style-type: none"> <li>Removal of threatened fauna habitat due to land clearing activities.</li> </ul>	<ul style="list-style-type: none"> <li>Reduction in numbers and/or increased stress to threatened fauna whose habitat has been removed.</li> <li>Reduced food source for threatened fauna predators.</li> </ul>	<ul style="list-style-type: none"> <li>Threatened fauna habitat.</li> <li>Threatened fauna.</li> <li>Threatened fauna predators.</li> </ul>	<ul style="list-style-type: none"> <li>Reduction in species diversity.</li> <li>Loss of threatened fauna habitat.</li> </ul>
	<ul style="list-style-type: none"> <li>Removal of threatened vegetation species or communities due to land clearing.</li> </ul>	<ul style="list-style-type: none"> <li>Loss of habitat, food resource, etc. for fauna that rely on the threatened vegetation species or communities.</li> </ul>	<ul style="list-style-type: none"> <li>Threatened vegetation species or communities.</li> <li>Fauna that use the threatened vegetation species or communities for habitat, food resource etc.</li> </ul>	<ul style="list-style-type: none"> <li>Loss of threatened vegetation species or communities.</li> <li>Reduction in species diversity.</li> </ul>
	<ul style="list-style-type: none"> <li>Damage to threatened aquatic vegetation and or communities as a result of saline water discharge.</li> </ul>	<ul style="list-style-type: none"> <li>Threatened aquatic vegetation stress/death.</li> <li>Reduction in food source, habitat etc for fauna that use the threatened aquatic vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>Threatened aquatic vegetation along water discharge routes.</li> </ul>	<ul style="list-style-type: none"> <li>Reduction in threatened aquatic vegetation numbers.</li> <li>Reduction in species diversity.</li> </ul>
Threatened Flora and Fauna	<ul style="list-style-type: none"> <li>Disturbance to threatened flora and/or threatened fauna habitat as a result of project operations, e.g. noise, dust etc.</li> </ul>	<ul style="list-style-type: none"> <li>Reduction in threatened vegetation species or threatened vegetation community numbers.</li> <li>Reduction in food source, habitat etc for fauna that use the threatened vegetation species or community.</li> <li>Reduction in species diversity.</li> </ul>	<ul style="list-style-type: none"> <li>Local threatened vegetation species or communities.</li> <li>Fauna that use the threatened vegetation species or communities for habitat, food resource etc.</li> </ul>	<ul style="list-style-type: none"> <li>Threatened vegetation stress/death.</li> </ul>



**Table 3.2 (Cont)**  
**Risk Sources and Potential Environmental Impacts**

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Environmental Issue	Risk Source/potential incident(s)	Potential Consequences	Receptor/ Surrounding Environment	Potential Environmental Impacts
Aboriginal Heritage	<ul style="list-style-type: none"> <li>Removal or destruction of Aboriginal sites and/or artefacts due to progressing mining activities.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced reputation within the local Aboriginal community.</li> <li>Loss of Aboriginal heritage values.</li> <li>Loss of archaeological knowledge.</li> </ul>	<ul style="list-style-type: none"> <li>Local archaeological context.</li> <li>Local Aboriginal community</li> </ul>	<ul style="list-style-type: none"> <li>Disturbance to or destruction of Aboriginal sites or artefacts.</li> </ul>
Noise	<ul style="list-style-type: none"> <li>Elevated noise levels resulting from construction, mining, transport and processing activities moving closer to the town of Werris Creek and operations running 24 hours a day.</li> <li>Elevated overpressure (noise) from blasting operations as mining operations move closer to the town of Werris Creek.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced reputation within the local community.</li> <li>Community complaints.</li> <li>Decreased land values.</li> <li>Community complaints.</li> <li>Reduced reputation within the local community.</li> </ul>	<ul style="list-style-type: none"> <li>Residents, landowners and leaseholders of properties on and surrounding the Mine Site.</li> <li>Livestock located on properties on and surrounding the mine site.</li> </ul>	<ul style="list-style-type: none"> <li>Health related issues.</li> <li>Sleep deprivation.</li> <li>Impacts on livestock.</li> <li>Reduced amenity of the local area.</li> </ul>
Vibration	<ul style="list-style-type: none"> <li>Elevated levels of vibration from blasting as mining operations move closer to the town of Werris Creek.</li> <li>Elevated vibration levels from surface operations, including rail transport.</li> <li>Low level vibration from the crushing facility.</li> </ul>	<ul style="list-style-type: none"> <li>Community complaints.</li> <li>Reduced reputation within the local community.</li> <li>Reduced agricultural production.</li> <li>Community complaints.</li> <li>Reduced reputation within the local community.</li> <li>Reduced agricultural production.</li> <li>Community complaints.</li> <li>Reduced reputation within the local community.</li> <li>Health issues relating to low level vibration.</li> </ul>	<ul style="list-style-type: none"> <li>Surrounding residences, buildings and other structures.</li> <li>Local livestock.</li> <li>Surrounding residences, buildings and other structures.</li> <li>Local livestock.</li> <li>Surrounding residences, buildings and other structures.</li> <li>Local livestock.</li> <li>Surrounding residents.</li> </ul>	<ul style="list-style-type: none"> <li>Structural damage to buildings and structures.</li> <li>Nuisance/amenity impacts on surrounding landowners / residents.</li> <li>Structural damage to buildings and structures.</li> <li>Nuisance/amenity impacts on surrounding landowners / residents.</li> <li>Structural damage to buildings and structures.</li> <li>Nuisance/amenity impacts on surrounding landowners / residents.</li> <li>Sleep deprivation.</li> <li>Nuisance/amenity impacts on surrounding landowners / residents.</li> </ul>



**Table 3.2 (Cont)**  
**Risk Sources and Potential Environmental Impacts**

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Environmental Issue	Risk Source/potential incident(s)	Potential Consequences	Receptor/ Surrounding Environment	Potential Environmental Impacts
Air Pollution – Dust, Odour, Greenhouse Gases, NOx, other	<ul style="list-style-type: none"> <li>Excessive dust generation resulting from construction, mining, transport and processing activities (including wind erosion from stockpiles and disturbed surfaces) moving closer to the town of Werris Creek.</li> </ul>	<ul style="list-style-type: none"> <li>Nuisance/amenity impacts from dust deposited on window sills, cars, surfaces etc.</li> <li>Adverse health impacts (if PM<sub>10</sub> levels are excessive).</li> <li>Reduced water quality in rainwater tanks.</li> <li>Reduced ability for evapotranspiration in vegetation.</li> <li>Community complaints.</li> <li>Reduced reputation within the local community.</li> </ul>	<ul style="list-style-type: none"> <li>Local airshed.</li> <li>Residents, landowners and leaseholders of properties on and surrounding the Mine Site.</li> <li>Vegetation communities surrounding the mine site.</li> </ul>	<ul style="list-style-type: none"> <li>Increased deposited dust levels and suspended particulate matter concentration.</li> </ul>
	<ul style="list-style-type: none"> <li>Spontaneous combustion outbreak.</li> </ul>	<ul style="list-style-type: none"> <li>Community complaints.</li> <li>Reduced reputation within the local community.</li> <li>Reduced amenity.</li> <li>Minor health impacts.</li> </ul>	<ul style="list-style-type: none"> <li>Residents, landowners and leaseholders of properties on and surrounding the Mine Site.</li> </ul>	<ul style="list-style-type: none"> <li>Release of sulphur dioxide and its associated odour.</li> </ul>
	<ul style="list-style-type: none"> <li>The exposure of coal and vehicle emissions during mining operations.</li> </ul>	<ul style="list-style-type: none"> <li>Contribution to the greenhouse effect.</li> </ul>	<ul style="list-style-type: none"> <li>Local air-shed.</li> <li>Global air-shed.</li> </ul>	<ul style="list-style-type: none"> <li>Greenhouse and other gas emissions.</li> </ul>
	<ul style="list-style-type: none"> <li>The production of a large amount of nitrogen oxide from blasting operations.</li> </ul>	<ul style="list-style-type: none"> <li>Community complaints.</li> <li>Increased contribution to the greenhouse effect.</li> </ul>	<ul style="list-style-type: none"> <li>Residents, landowners and leaseholders of properties on and surrounding the Mine Site.</li> <li>Local air-shed.</li> <li>Global air-shed.</li> </ul>	<ul style="list-style-type: none"> <li>Minor health impacts.</li> <li>Increased greenhouse emissions.</li> <li>Reduced local amenity.</li> </ul>
	<ul style="list-style-type: none"> <li>Emissions resulting from the transport and burning of the mined and sold coal.</li> </ul>	<ul style="list-style-type: none"> <li>Contribution to the greenhouse effect.</li> </ul>	<ul style="list-style-type: none"> <li>Local air-shed.</li> <li>Global air-shed.</li> </ul>	<ul style="list-style-type: none"> <li>Increased greenhouse and other gas emissions.</li> </ul>



**Table 3.2 (Cont)**  
**Risk Sources and Potential Environmental Impacts**

Environmental Issue	Risk Source/potential incident(s)	Potential Consequences	Receptor/ Surrounding Environment	Potential Environmental Impacts
Visual Amenity	<ul style="list-style-type: none"> <li>Changes in visual characteristics of the mine site due to mining operations moving closer to the town of Werris Creek.</li> </ul>	<ul style="list-style-type: none"> <li>Decreased visual amenity.</li> <li>Community complaints.</li> </ul>	<ul style="list-style-type: none"> <li>Surrounding residents and local motorists.</li> </ul>	<ul style="list-style-type: none"> <li>Decreased visual amenity during the life of the mine.</li> <li>Altered visual outlook following mine closure.</li> </ul>
	<ul style="list-style-type: none"> <li>Increased lighting impacts from mining operations moving closer to the town of Werris Creek and operations running 24 hours a day.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced visual amenity.</li> <li>Community complaints.</li> <li>Reduced reputation within the community.</li> </ul>	<ul style="list-style-type: none"> <li>Residents, landowners and leaseholders of properties on and surrounding the Mine Site.</li> </ul>	<ul style="list-style-type: none"> <li>Nuisance/amenity impacts from mine lighting.</li> <li>Sleep deprivation.</li> </ul>
Traffic and Transport	<ul style="list-style-type: none"> <li>Changed traffic conditions on Werris Creek Road due to the relocation of the Project Site entrance.</li> </ul>	<ul style="list-style-type: none"> <li>Personal injury or fatalities.</li> </ul>	<ul style="list-style-type: none"> <li>Motorists using roads of the proposed road transport routes.</li> </ul>	<ul style="list-style-type: none"> <li>Potential vehicle accidents.</li> </ul>
	<ul style="list-style-type: none"> <li>Altered conditions at rail crossings due to increase in annual rail transport of coal.</li> </ul>	<ul style="list-style-type: none"> <li>Increased delays for traffic at rail crossings.</li> </ul>	<ul style="list-style-type: none"> <li>Motorists using roads on which level crossings are located.</li> </ul>	<ul style="list-style-type: none"> <li>Delays to local road traffic.</li> <li>Possible delays to emergency service (police, ambulance, etc.) response.</li> </ul>
Soil and Land Capability	<ul style="list-style-type: none"> <li>Reduction in soil quality and availability due to poor management practices.</li> </ul>	<ul style="list-style-type: none"> <li>Structural damage and reduced biological activity of soils.</li> <li>Reduced downstream water quality.</li> <li>Reduced surface water availability for existing uses.</li> <li>Degradation of aquatic ecosystems.</li> <li>Reduced rehabilitation success.</li> </ul>	<ul style="list-style-type: none"> <li>Mine Site soils.</li> <li>Rehabilitated areas.</li> <li>Local drainage lines.</li> <li>Downstream users of surface water.</li> </ul>	<ul style="list-style-type: none"> <li>Erosion of stripped, stockpiled and replaced soils.</li> <li>Insufficient soil quantities/qualities for rehabilitation.</li> </ul>
	<ul style="list-style-type: none"> <li>Decreased land capability in final landform.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced opportunity to relinquish the land at the end of the mine life.</li> </ul>	<ul style="list-style-type: none"> <li>Rehabilitated areas.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced productivity of final landform.</li> </ul>

**Table 3.2 (Cont)**  
**Risk Sources and Potential Environmental Impacts**

Environmental Issue	Risk Source/potential incident(s)	Potential Consequences	Receptor/ Surrounding Environment	Potential Environmental Impacts
Soil and Land Capability	<ul style="list-style-type: none"> <li>Hydrocarbon/chemical spills.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced rehabilitation success.</li> <li>Loss of soil resource.</li> <li>Reduced downstream water quality.</li> <li>Reduced surface water availability for existing uses.</li> <li>Degradation of aquatic ecosystems.</li> </ul>	<ul style="list-style-type: none"> <li>Existing landscape.</li> <li>Rehabilitated land.</li> <li>Surface water downstream.</li> <li>Downstream surface water users.</li> </ul>	<ul style="list-style-type: none"> <li>Contaminated soil and land.</li> </ul>
Rehabilitation, Final Landform & Biodiversity Offsets	<ul style="list-style-type: none"> <li>Final rehabilitation is not equal to or better than original landform and is not safe, stable or fit for purpose.</li> <li>Rehabilitated landform does not link or enhance surrounding native vegetation communities.</li> <li>Biodiversity offsets are not properly managed.</li> <li>Modified final land use from what was originally in place.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced land capability of the rehabilitated land.</li> <li>Rework on rehabilitated areas.</li> <li>Reduced habitat and corridors for native fauna.</li> <li>Reduced vegetative species diversity</li> <li>Unintentional land clearing within the biodiversity offset area.</li> <li>Weed infestation within the biodiversity offset area.</li> <li>Degradation of the biodiversity offset area.</li> <li>Less land available for its original use</li> </ul>	<ul style="list-style-type: none"> <li>The Project Site.</li> <li>The end land user.</li> <li>Rehabilitated land.</li> <li>Native fauna.</li> <li>Biodiversity offset areas.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced amenity of the final landform.</li> <li>Reduced productivity from the rehabilitated land.</li> <li>Reduction in native fauna species diversity.</li> <li>Reduction or degradation of biodiversity offset areas.</li> <li>Reduced species diversity.</li> <li>Reduced population native fauna populations.</li> <li>Change in structure of vegetation communities</li> <li>Change in habitat</li> </ul>
Waste Management	<ul style="list-style-type: none"> <li>Production of contaminating or polluting materials, e.g. acid producing overburden, waste oils, saline water, and general rubbish.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced reputation within the local community.</li> <li>Reduced surface water and groundwater availability for existing uses.</li> <li>Potential health effects in either humans or livestock.</li> <li>Degradation of groundwater and surface water dependent ecosystems.</li> </ul>	<ul style="list-style-type: none"> <li>Agricultural community</li> <li>Native fauna</li> <li>The mine site land and water resources.</li> <li>Downstream land and water resources.</li> <li>Groundwater.</li> <li>Downstream surface water and groundwater users.</li> </ul>	<ul style="list-style-type: none"> <li>Contamination of downstream surface waters.</li> <li>Contamination of groundwater.</li> <li>Contamination of downstream lands.</li> <li>Reduced visual amenity.</li> </ul>

**Table 3.2 (Cont)**  
**Risk Sources and Potential Environmental Impacts**

Environmental Issue	Risk Source/potential incident(s)	Potential Consequences	Receptor/ Surrounding Environment	Potential Environmental Impacts
Land Contamination	<ul style="list-style-type: none"> <li>Mining and other excavations exposing previously contaminated materials.</li> </ul>	<ul style="list-style-type: none"> <li>Transfer of contaminated materials to non-contaminated areas.</li> <li>Reduced reputation with the local community.</li> <li>Potential health effects to either humans or livestock.</li> <li>Reduced surface water availability for existing uses.</li> <li>Degradation of downstream aquatic ecosystems.</li> </ul>	<ul style="list-style-type: none"> <li>Areas receiving contaminated material (including surface waters).</li> </ul>	<ul style="list-style-type: none"> <li>Surface water and land contamination.</li> <li>Reduced availability of soils.</li> </ul>
Spontaneous Combustion	<ul style="list-style-type: none"> <li>Spontaneous combustion event.</li> </ul>	<ul style="list-style-type: none"> <li>Release of sulphur dioxide.</li> <li>Loss of coal resource.</li> <li>Injury resultant from fire.</li> <li>Impact on vegetation resultant from spreading fire.</li> </ul>	<ul style="list-style-type: none"> <li>Coal stockpiles of the mine site.</li> <li>Residents, landowners and leaseholders of properties on and surrounding the Mine Site.</li> </ul>	<ul style="list-style-type: none"> <li>Odour and subsequent emission of sulphur dioxide.</li> <li>Uncontrolled fire event.</li> </ul>
Bushfire	<ul style="list-style-type: none"> <li>Fire initiated on the Project Site resulting in spread to neighbouring properties</li> </ul>	<ul style="list-style-type: none"> <li>Damage to property.</li> <li>Injury or fatality.</li> <li>Injury or death of livestock.</li> <li>Injury, harm or death of native biota.</li> </ul>	<ul style="list-style-type: none"> <li>Project Site lands and surrounding properties.</li> <li>Employees, residents and livestock of the Proponent and surrounding properties.</li> </ul>	<ul style="list-style-type: none"> <li>Destruction of equipment or assets.</li> <li>Injury or fatality to employees or surrounding residents.</li> <li>Injury or death of livestock.</li> <li>Adverse impact on native biota.</li> </ul>
Socio-Economic Impacts	<ul style="list-style-type: none"> <li>Alteration of social activities or employment due to capital expenditure.</li> </ul>	<ul style="list-style-type: none"> <li>Change in employment rates and local spending.</li> <li>Change in density of local traffic.</li> <li>Change in the risk of accident/incident on local roads.</li> <li>Change in traffic noise.</li> <li>Change vehicle emissions.</li> </ul>	<ul style="list-style-type: none"> <li>Local community and businesses.</li> <li>Roads.</li> </ul>	<ul style="list-style-type: none"> <li>Changed economic activity and related social impacts.</li> </ul>

**Table 3.2 (Cont)**  
**Risk Sources and Potential Environmental Impacts**

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Environmental Issue	Risk Source/potential incident(s)	Potential Consequences	Receptor/ Surrounding Environment	Potential Environmental Impacts
Socio-Economic Impacts	<ul style="list-style-type: none"> <li>Perceived or real impacts on local amenity of neighbouring properties due to mining operations moving closer to the town of Werris Creek.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced property values.</li> <li>Community complaints.</li> <li>Reduced quality of life (actual or perceived).</li> <li>Changed demand for goods and services in the local community.</li> </ul>	<ul style="list-style-type: none"> <li>Surrounding property owners.</li> <li>Local community.</li> </ul>	<ul style="list-style-type: none"> <li>Changed socio-economic structure of the local community.</li> </ul>
	<ul style="list-style-type: none"> <li>Reduction in property values due to mining operations moving towards the town of Werris Creek.</li> </ul>	<ul style="list-style-type: none"> <li>Changed makeup of the local community.</li> <li>Changed demand for goods and services in the local community.</li> </ul>	<ul style="list-style-type: none"> <li>Local community.</li> <li>Local suppliers to the community.</li> </ul>	<ul style="list-style-type: none"> <li>Changed socio-economic structure of the local community.</li> </ul>

Source: Modified after template provided by HB203:2006 - Table 3



**Table 3.3**  
**Qualitative Consequence Rating**

Level	Descriptor	Description
5	Catastrophic	<ul style="list-style-type: none"> <li>Massive and permanent detrimental impacts on the environment.</li> <li>Very large area of impact.</li> <li>Massive remediation costs.</li> <li>Reportable to government agencies.</li> <li>Large fines and prosecution resulting in potential closure of operation.</li> <li>Severe injuries or death.</li> </ul>
4	Major	<ul style="list-style-type: none"> <li>Extensive and/or permanent detrimental impacts on the environment.</li> <li>Large area of impact.</li> <li>Very large remediation costs.</li> <li>Reportable to government agencies.</li> <li>Possible prosecution and fine.</li> <li>Serious injuries requiring medical treatment.</li> </ul>
3	Moderate	<ul style="list-style-type: none"> <li>Substantial temporary or minor long term detrimental impact to the environment.</li> <li>Moderately large area of impact.</li> <li>Moderate remediation costs.</li> <li>Reportable to government agencies.</li> <li>Further action may be requested by government agency.</li> <li>Injuries requiring medical treatment.</li> </ul>
2	Minor	<ul style="list-style-type: none"> <li>Minor detrimental impact on the environment.</li> <li>Affects a small area.</li> <li>Minimal remediation costs.</li> <li>Reportable to internal management only.</li> <li>No operational constraints posed.</li> <li>Minor injuries which would require basic first aid treatment.</li> </ul>
1	Insignificant	<ul style="list-style-type: none"> <li>Negligible and temporary detrimental impact on the environment.</li> <li>Affects an isolated area.</li> <li>No remediation costs.</li> <li>Reportable to internal management only.</li> <li>No operational constraints posed.</li> <li>No injuries or health impacts.</li> </ul>

Source: modified after HB 203:2006 - Table 4(B)

**Table 3.4**  
**Qualitative Likelihood Rating**

Level	Descriptor	Description
A	Almost Certain	Is expected to occur in most circumstances.
B	Likely	Will probably occur in most circumstances.
C	Possible	Could occur.
D	Unlikely	Could occur but not expected.
E	Rare	Occurs only in exceptional circumstances.

Source: HB 203:2006 - Table 4(A)

**Table 3.5**  
**Risk Rating**

Likelihood	Consequences				
	Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
A (Almost Certain)	H	H	E	E	E
B (Likely)	M	H	H	E	E
C (Possible)	L	M	H	E	E
D (Unlikely)	L	L	M	H	E
E (Rare)	L	L	M	H	H

Note: Rating modified after HB 203:2006 - Table 4(C)



**Table 3.6**  
**Analysis of Unmitigated Environmental Risk**

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Potential Environmental Impacts (see Table 3.2)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if <u>not Mitigated</u>	Likelihood of Occurrence if <u>not Mitigated</u>	<u>Unmitigated</u> Risk Rating
<b>Groundwater</b>				
Reduced groundwater availability for existing uses	Impacts restricted to groundwater bores on Proponent owned land	3	C	H
	Reduction in water level < 15% of non-project related bores	3	D	M
	Reduction in water level > 15% of non-project related bores	3	E	M
Degradation of groundwater dependent ecosystems	Impacts restricted to groundwater bores on Proponent owned land	1	C	L
	Impacts to local groundwater dependent ecosystems	2	D	L
	Impacts to regional groundwater dependent ecosystems	2	E	L
Change in the hydrology/ geomorphology of the surrounding creek systems	Minor changes to hydrology/ geomorphology of the local creek systems	1	C	L
	Moderate changes to hydrology/ geomorphology of the local creek systems	2	C	M
	Large scale changes to hydrology/ geomorphology of the local creek systems	3	D	M
Impacts on groundwater quality		2	C	M
Reduced availability of water to local landowners		2	C	M
Degradation of aquatic communities	Impacts restricted to aquatic communities on Proponent owned land	1	B	M
	Impacts to local aquatic communities	2	C	M
	Impacts to regional aquatic communities	3	D	M
<b>Surface Water</b>				
Reduced downstream surface water quality	Impacts restricted to surface water on Proponent owned land	2	B	H
	Localised impacts to surface water	3	B	H
	Regional impacts to surface water	4	D	H
Reduced flows to downstream vegetation due to a reduction of environmental flows through the mine site		3	C	H
Reduced flows in surrounding creek systems due to a reduction of environmental flows through the mine site		2	C	M
Changes to the coverage and frequency of flooding due to altered flood regimes		3	B	H
Increased flows and/or flooding in natural drainage lines for a short period due to dam failure.		3	C	H
Uncontrolled discharge of dirty, saline, contaminated water outside licence conditions		3	B	H



**Table 3.6(Cont)**  
**Analysis of Unmitigated Environmental Risk**

Potential Environmental Impacts (see Table 3.2)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if <u>not Mitigated</u>	Likelihood of Occurrence if <u>not Mitigated</u>	<u>Unmitigated</u> Risk Rating
<b>Erosion and Sedimentation</b>				
Loss of soil resources		2	A	H
Increased sedimentation within downstream creeks		2	A	H
Mobilisation of heavy metals		3	D	M
<b>Biodiversity</b>				
Loss of threatened fauna habitat		2	A	H
Threatened vegetation stress/death		1	C	L
Reduction in species diversity		2	A	H
Loss of threatened vegetation species communities		2	A	H
Reduction in threatened aquatic vegetation numbers	Increased stress to threatened aquatic fauna	1	C	L
	Reduction in localised numbers of aquatic threatened fauna	2	D	L
	Reduction in regional numbers of aquatic threatened fauna	3	E	M
<b>Aboriginal Heritage</b>				
Disturbance to or destruction of Aboriginal sites or artefacts	Destruction of a minor Aboriginal site or artefact	2	C	M
	Destruction of a significant Aboriginal site or artefact	3	D	M
	Loss of archaeological knowledge	3	E	M
<b>Non-Aboriginal Heritage</b>				
Disturbance to or destruction of a site or object of historic /heritage significance	Destruction of a site or object which holds minor historic or local heritage significance	1	C	L
	Destruction of a site or object which holds major historic or wider heritage significance	3	E	M
<b>Noise</b>				
Health related issues to noise impacts		3	B	H
Sleep deprivation from noise impacts		3	A	E
Noise impacts on livestock		1	B	M
Nuisance/ amenity impacts on the surrounding landowners/ residents		3	B	H
Structural damage to buildings or structures from airblast overpressure	Minor damage to buildings or structures	2	C	M
	Significant damage to buildings or structures	3	D	M

**Table 3.6 (Cont)**  
**Analysis of Unmitigated Environmental Risk**

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Potential Environmental Impacts (see Table 3.2)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if <u>not Mitigated</u>	Likelihood of Occurrence if <u>not Mitigated</u>	<u>Unmitigated</u> Risk Rating
<b>Vibration</b>				
Damage to buildings and structures	Minor damage to buildings or structures	2	C	M
	Significant damage to buildings or structures	3	D	M
Nuisance/ amenity impacts to surrounding landowners		2	B	H
<b>Air Pollution</b>				
Increased deposited dust levels and suspended particulate matter concentration		3	A	E
The release of sulphur dioxide and its associated odour relating to a spontaneous combustion outbreak		1	B	M
Reduced local amenity due to the production of nitrogen oxide from blasting operations		1	B	M
Greenhouse and other gas emissions		3	A	E
Minor health impacts associated with emissions of sulphur dioxide and nitrogen oxide		2	C	M
<b>Visual Amenity</b>				
Decreased visual amenity during the life of the mine		3	A	E
Altered visual outlook following mine closure		3	C	H
Nuisance/ amenity impacts from mine lighting		2	A	H
Sleep deprivation from mine lighting		2	A	H
<b>Traffic and Transport</b>				
Potential vehicle accidents		3	D	M
Altered conditions at rail crossings resulting in:	Delays to local road traffic.	2	D	L
	Possible delays to emergency service (police, ambulance, etc.) response.	3	D	M
<b>Soil and Land Capability</b>				
Erosion of stripped, stockpiled and replaced soils		2	A	H
Insufficient soil quantities/ qualities for rehabilitation		2	A	H
Reduced productivity of the final landform		3	B	H
Contaminated soil and land due to hydrocarbon/ chemical spills		2	C	M



**Table 3.6 (Cont)**  
**Analysis of Unmitigated Environmental Risk**

Potential Environmental Impacts (see Table 3.2)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if <u>not Mitigated</u>	Likelihood of Occurrence if <u>not Mitigated</u>	<u>Unmitigated</u> Risk Rating
<b>Rehabilitation, Final Landform and Biodiversity Offsets</b>				
Reduced amenity of the final landform		2	A	H
Reduced productivity of the rehabilitated land	<10% reduction in expected productivity	1	B	M
	10 – 50% reduction in expected productivity	2	B	H
	>50% reduction in expected productivity	3	C	H
Reduction in native fauna species diversity	<10% reduction in fauna species diversity	1	B	M
	10 – 50% reduction in fauna species diversity	2	B	H
	>50% reduction in fauna species diversity	3	D	M
Reduction or degradation of biodiversity offset areas	< 10% reduction or degradation	1	C	L
	10 – 50% reduction or degradation	1	D	L
	>50% reduction or degradation	2	E	L
Reduced vegetative species diversity within the Biodiversity Offset		2	D	L
Reduced native fauna populations within the biodiversity offset areas		2	D	L
Change in the structure of vegetation communities in rehabilitated areas from original structure		3	A	E
Change in habitat in rehabilitated areas from original structure		3	A	E
<b>Waste Management</b>				
Contamination of downstream surface waters		2	C	M
Contamination of groundwater		2	D	L
Contamination of downstream lands		2	D	L
Reduced visual amenity		2	C	M

**Table 3.6 (Cont)**  
**Analysis of Unmitigated Environmental Risk\***

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Potential Environmental Impacts (see Table 3.2)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if <u>not Mitigated</u>	Likelihood of Occurrence if <u>not Mitigated</u>	<u>Unmitigated</u> Risk Rating
<b>Land Contamination</b>				
Surface water and land contamination	Minor surface water and land contamination	2	C	M
	Moderate surface water and land contamination	2	D	L
	Significant surface water and land contamination	3	E	M
Reduced availability of soils	<10% loss of soil resource	1	B	M
	10 – 50% loss of soil resource	2	C	M
	>50% loss of soil resource	2	D	L
<b>Bushfire</b>				
Destruction of equipment or assets.		3	D	M
Injury or fatality to employees or surrounding residents.		5	E	H
Injury or death of livestock.		4	E	H
Adverse impact on native biota.		3	C	H
<b>Spontaneous Combustion</b>				
Uncontrolled fire event		3	C	H
Odour and subsequent emission of sulphur dioxide		1	B	M
<b>Socio-Economic Impacts</b>				
Changed economic activity and related social impacts		N/A	N/A	
Change in the socio economic structure of the local community	Minor change in the local community	1	A	H
	Moderate change in the local community	2	B	H
	Significant change in the local community	3	D	M



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