Section 3
Issue Identification and Prioritisation

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 relevant legislation, planning documents and environmental guidelines;

(ii) a review of the project design and local environmental setting was undertaken to identify risk sources and potential environmental impacts for each environmental issue;

(iii) an analysis of 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 environmental 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.

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3.1 INTRODUCTION

In order to undertake a comprehensive *Environmental Assessment* of the proposed Sunnyside Coal 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, preliminary environmental studies and literature review was undertaken to identify relevant environmental issues and potential impacts. This was followed by an analysis of the environmental 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 issues relevant to the Sunnyside Coal Project development and operation involved a combination of consultation and background investigations and research. This included:

- consultation with State and Local government agencies;
- consultation with the local community;
- preliminary environmental studies;
- reviewing existing operations of related mining developments in the region; and
- reference to relevant NSW government policies and guidelines.

Issues identified through this process were then classified according to their impact on the regional, local, or Project Site biophysical and/or social environments. Priority was given to those aspects with a higher potential for impact or a high frequency of identification.

3.2.2 Consultation

3.2.2.1 Consultation with Surrounding Landowners and the Local Community

The area around the Project Site and the proposed coal transport route is predominantly rural with increasing light industrial and closer settlement as the coal transport route approaches the Whitehaven Coal Handling and Preparation Plant (CHPP) and Rail Loading Facility.

The light industrial area along Quia Road will not be affected by the coal transport route. The landowners around the Project Site and all landowners along the coal transport route have been contacted by the Proponent, Namoi Mining Pty Limited (NMPL), with some 25 individuals having asked for and received personal discussion.

Consultation with landholders of 12 properties immediately surrounding the Project Site commenced in early 2006. These properties were "Lilydale", "Rosmar", "Ferndale", "Inverlochie", "Flodden", "Ivanhoe", "Rockwell Creek", "Plain View", "Woodlawn", "Werona", "Sugarloaf" and "Coocooboonah". Multiple discussions were held with some landowners regarding the Project and the effects it may have on the area.

Negotiations to purchase two properties were undertaken in 2006 and one of these "Sunnyside" was secured. The other property, "Lilydale", is the nearest residence to the Project Site. The property is owned by Mr. Arthur Coddington. The Proponent has had a number of meetings and phone calls with Mr Coddington, during which a number of offers were made to him. The offers included purchase, rental and other possible alternative arrangements. No agreement has yet been reached but all other options have been left open should Mr. Coddington wish to reconsider.

Negotiations were also held with the owner of "Rosmar", Mr R. White in mid 2007 and NMPL agreed to purchase the "Rosmar" property with a settlement date of 12 December 2007. Similar negotiations are also underway with the owner of "Werona".

In general, there were several areas of concern and these mirrored those of the landholders around other similar Projects in the region. The areas of concern were:

- effects on underground water;
- noise pollution;
- dust pollution; and
- impact on property values, not only the concern for reduced values, but also of increasing values with the subsequent effect on rates.

In addition to these concerns, the potential for employment has been canvassed by a number of neighbours.

In January 2007, NMPL produced and distributed the first Sunnyside Coal Project Community Consultation Newsletter. The Newsletter contained:

- an introduction to the company proposing the Project;
- a brief overview of the proposed mine and coal transport route;
- an explanation of the approval process;
- a list of the specialist environmental consultants appointed to examine potential impacts from the mine; and
- contact details for further information.

It is planned to produce further Newsletters periodically throughout the approval process and throughout the operation of the Mine.

The Community Consultation Newsletter was mailed and hand-delivered to landowners in the area and to all potentially affected property owners along the coal transport route. In January 2007, several landowners along the coal transport route requested and received personal visits to discuss their concerns. The main issue raised was traffic noise. The proposal to confine transport to daytime hours appears to have resolved most concerns. Some residents raised concerns about the rail underpass off Quia Road and the nearby sharp turn onto Torrens Road. Road design and proposed improvements address this issue.

Consultation is continuing with several residences close to Torrens Road. Previous discussions have indicated acceptance of daytime coal transport for six days per week with none on Sundays.

3.2.3 Consultation with Government Agencies

The following State and local Government agencies were consulted by the Proponent, Olsen Environmental Consulting Pty Limited and/or the specialist consultants prior to and/or during the preparation of the *Environmental Assessment*.

- Department of Planning (DoP) - (Sydney)*
- Gunnedah Shire Council* - Gunnedah
- Department of Environment and Conservation (DEC) now Department of Environment and Climate Change (Armidale)*
- Department of Natural Resources (DNR) now Department of Water and Energy (Tamworth and Gunnedah)*
- Department of Primary Industries - Mineral Resources (DPI-MR) - (Maitland)*
- NSW Roads and Traffic Authority (RTA) (Northern Region) - Grafton

One or more representatives of those agencies identified with an asterisk (*) attended a Planning Focus Meeting held on 17th October 2006 in Gunnedah convened and co-ordinated by the Department of Planning.

The Planning Focus Meeting provided each agency with an opportunity to gain an understanding of the Project and to inspect the Project Site prior to formally providing their written requirements for the *Environmental Assessment*.

All agencies subsequently forwarded their written requirements to DoP which in turn forwarded them to NMPL as the Director-General's requirements. A tabulated summary of the Director General's requirements and all government agency requirements is included in **Appendix 2**, together with a reference to where each requirement is addressed in the *Environmental Assessment*.

Two presentations about the Project have been made to Gunnedah Shire Council to keep Councillors and senior staff informed of the developments and proposals. There have been numerous articles about the Project in the locally distributed newspapers.

3.2.4 Review of Planning issues and Environmental Guidelines

3.2.4.1 Introduction

A number of State and regional planning instruments apply to the 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* (see **Table A2-2**).

A brief summary of each relevant planning instrument is provided in Sections 3.2.5.1 and 3.2.5.2. The application and relevance of planning instruments related to specific environmental issues have been assessed in the relevant specialist consultant assessments. Section 3.2.5.3 briefly outlines the approach taken to referencing and reviewing environmental guideline documents.

3.2.5 State Planning Issues

A total of four State Environmental Planning Policies are relevant to the assessment of the proposed Sunnyside Coal Project. It is noted that the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 was gazetted on 16 February 2007, ie following the date when the application for the Sunnyside Coal Project was lodged. Hence, this policy is not applicable to the Sunnyside Coal Project in accordance with Clause 19 of the policy.

State Environmental Planning Policy (Major Projects) 2005

This SEPP is relevant to the Sunnyside Coal Project in that it identifies development to which the assessment and approval process under Part 3A of the *Environmental Planning and Assessment Act 1979* applies. The Project is being assessed in accordance with Part 3A of the Act.

State Environmental Planning Policy No. 11 (SEPP 11) – Traffic Generating Developments

Clause 7 of SEPP 11 requires that certain applications are referred to the NSW Roads and Traffic Authority (RTA). Mining is listed under paragraph (m), Schedule 1 of this SEPP and hence this proposal must be referred to the RTA.

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

The aims and objectives of this development are:

(a) to amend the definitions of hazardous and offensive industries where used in environmental planning instruments;

(b) to render ineffective a provision of any environmental planning instrument that prohibits development for the purpose of a storage facility on the grounds that the facility is hazardous or offensive if it is not a hazardous or offensive storage establishment as defined in this SEPP;

(c) to require development consent for hazardous or offensive development proposed to be carried out in the Western Division;

(d) to ensure that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account;

(e) to ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact; and

(f) to require the advertising of applications to carry out any such development.

Hazardous and offensive industries and potentially hazardous and offensive industries are defined as follows.

Hazardous Industry. Means a development for the purpose of an industry which, when the development is in operation and when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example, measures to isolate the development from existing or likely future development on other land in the locality), would pose a significant risk in relation to the locality:

- to human health, life or property; or
- to the biophysical environment.

Potentially Hazardous Industry. Means a development for the purpose of an industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would pose a significant risk in relation to the locality:

- to human health, life or property; or
- to the biophysical environment,

and includes a hazardous industry and a hazardous storage establishment.

Offensive Industry. Means a development for the purposes of an industry which, when the development is in operation and when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example, measures to isolate the development from existing or likely future development on other land in the locality), would emit a polluting discharge (including, for example, noise) in a manner which would have significant adverse impact in the locality or on the existing or likely future development on other land in the locality.

Potentially Offensive Industry. Means a development for the purposes of an industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would emit a polluting discharge (including, for example, noise) in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land, and includes an offensive industry and an offensive storage establishment.

In accordance with the risk screening method contained within the document entitled "Applying SEPP 33", 2nd Edition, (DUAP 1997), all hazardous substances and dangerous goods to be held or used on the Project Site are to be identified and classified, with an assessment undertaken as to whether the proposed development represents a hazardous or offensive, or potentially hazardous or offensive, development The hazardous substances and dangerous goods to be used or stored on the Project Site would be restricted to diesel fuel and the components of the explosives to be used for blasting as part of the mining activities.

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

The Gunnedah Local Government Area (LGA) is listed in Schedule 1 of this SEPP as an area that could provide habitat for Koalas. The SEPP requires an investigation be carried out to determine if core or potential Koala habitat is present on the areas of the Project Site likely to be disturbed. Core Koala habitat comprises land with a resident population of Koalas, whereas potential Koala habitat comprises land with native vegetation with known Koala feed trees constituting at least 15% of the total number of trees present on a site.

3.2.5.1 Regional Planning Issues

Orana Regional Environmental Plan (REP) No 1 – Siding Spring

The Project Site lies within a new region, called Siding Spring Observatory Dark Skies Region, declared by the Minister for Infrastructure and Planning to better protect the observing conditions at the Siding Spring Observatory. The new region includes all local government areas within 200km of the Observatory. While the Project Site is approximately 104km from

Siding Spring and lies within 200km of the Observatory, no consultation or concurrence is required with the Observatory Director. Under Section 8 of the Draft REP, consultation or concurrence is only required for locations within 100km of the Observatory.

Additionally, the lighting proposed for the Project Site which would be soft lighting to minimise visual intrusion to the surrounding landholders would be turned off by 10:00pm or soon after Monday to Friday. As such, this lighting would not significantly impact on the Siding Spring Observatory given the separation distance.

The CSIRO operates the Culgoora Observatory approximately 80km north-northwest of the Sunnyside Project Site. The observatory conducts continuous optical and radio observations of the sun every day of the year. The operators confirmed that the operation of the observatory is not affected by any potential lighting affects at night.

3.2.5.2 Local Planning Issues

The areas to be developed within the Project Site and the coal transport route lie within the Gunnedah Shire with planning control covered by the *Gunnedah Local Environmental Plan 1998* (as amended) (LEP 1998). The Project Site is zoned 1(a) Rural (Agricultural Protection) in accordance with LEP 1998.

Mining is permissible within this zone with development consent.

The objectives of the zone are to:

(a) promote the use and efficiency of prime agricultural land while permitting appropriate development subject to suitable subdivision controls;

(b) permit other forms of development which are ancillary to rural land uses that, as a result of their nature, require siting outside the urban area;

(c) avoid further fragmentation and alienation of useable rural land;

(d) retain the low density nature of settlement within the rural areas and ensure that any future development does not create unreasonable demands on the existing infrastructure or available services;

(e) provide for the requirements of the rural community;

(f) maintain safety and convenience along main roads by discouraging uses that are likely to generate traffic volumes which disrupt traffic flow; and

(g) ensure that the existing level of scenic amenity is maintained by requiring development to have regard for significant ridgelines and hilltops.

3.2.5.3 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 environment 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.

3.2.6 Preliminary Environmental Studies

Following the conceptual planning for the proposed Sunnyside Coal Project, environmental investigations were commissioned to broadly investigate the noise, surface water, groundwater, fauna, air quality, transport, flora, soils and cultural heritage of the area being considered as the Project Site and potentially affected surrounding areas. These environmental investigations were initiated to identify any issues that might ultimately prohibit the development of the Project. They also provided base data for the Planning Focus Meeting and enabled environmental issues to be considered in the early planning stages of the Project.

Noise

NMPL commissioned Spectrum Acoustics Pty Limited to undertake an acoustic assessment for the Project. The Project Site is located in a rural setting with noise dominated by rural activity and traffic on the nearby Oxley Highway. Initial monitoring indicated that background noise levels were likely to be less than 30dB(A). This meant that acoustic issues were a significant component of Project planning considerations.

Surface Water

NMPL commissioned the Soil Conservation Service to undertake a Surface Water Assessment for the Project. The Project Site is located within the Namoi River catchment, with surface streams draining the area flowing to the Namoi River. The Project Site is not affected by flooding of the Namoi River and is outside the alluvial aquifers of the River.

The Soil Conservation Service initially identified the following potential impacts to surface waters that could result from the Project.

- Flooding and water issues associated with surface water quality.
- Variations to pH, suspended solids, electrical conductivity, heavy metal concentrations and hydrocarbons and the subsequent potential to affect water quality.
- Soil erosion.
- Dryland salinity.

The Project would source production water from surface runoff, which would be augmented by a bore supply obtained from the nearby Gunnedah Underground Coal Mine workings. This bore would provide the start-up water supply for the Project.

Groundwater

NMPL commissioned GeoTerra Pty Limited to undertake a Groundwater Assessment for the Project. Open cut mining has the potential to intersect groundwater aquifers and affect stock and irrigation supplies. The open cut pit will be maintained in a dewatered state.

No substantial aquifers were known to be present within the proposed pit area other than groundwater of very limited yield within the Hoskissons Coal Seam. No alluvial aquifers associated with Coocooboonah Creek and Rock Well Creek will be excavated as part of the Project.

Initial investigations indicated that:

- local groundwater supplies were not generally obtained from the alluvium of Coocooboonah Creek, with the majority being obtained from the underlying rock strata; and
- Coocooboonah Creek is perched above the alluvial groundwater system and is not connected to the underlying groundwater system by a continuous saturated zone.

Fauna

NMPL commissioned Kevin Mills and Associates to undertake a Fauna Assessment of the Project. Most of the fauna habitat on the Project Site is exotic grassland, with rock outcrops and small areas of woodland on the southern part of the property. There are no wetlands in the Project Site except for a few small farm dams. Coocooboonah Creek, the main creek near the Project Site is almost always completely dry.

Initial investigations indicated that there were a number of fauna species with conservation significance that occur or are likely to occur in and around the Project Site.

There are areas of core Koala habitat within and surrounding the Project Site, along Coocooboonah Lane and in the bushland to the south of the Project Site. Kevin Mills and Associates prepared a Koala Management Plan.

Air Quality

NMPL commissioned Heggies Pty Limited to undertake an Air Quality Assessment of the Project. The Project Site is located in a rural setting with air quality dominated by agricultural activities. Open cut mining has the potential to increase air-borne dust levels.

The initial investigations confirmed that existing air quality around the Project Site was generally good. Dust deposition levels and particulate matter data from nearby monitoring stations indicated low levels of air-borne dust and particulates.

Given the rural location of the Project Site, nitrogen dioxide, sulphur dioxide and greenhouse gases were assumed to be at negligible levels.

Traffic and Transport

NMPL commissioned Constructive Solutions Pty Limited to prepare a Traffic and Transport Assessment of the Project. Initial investigations by NMPL assessed a number of coal transport route options and selected a route that minimised the impact on residents and, apart from a section of Coocooboonah Lane, which connects the coal transport route to the Oxley Highway, utilised roads already approved for B-Double haulage. In order to preserve Koala habitat, NMPL decided to re-align a section of Coocooboonah Lane for use throughout the life of the Project.

Constructive Solutions worked with Gunnedah Shire Council engineers to assess likely traffic effects and to prepare recommendations for any necessary upgrading of the coal transport route.

NMPL has begun negotiations with Gunnedah Shire Council for a Road Maintenance Agreement. The company has similar agreements for its other operations in the region.

Flora

NMPL commissioned Geoff Cunningham Natural Resource Consultants Pty Limited to undertake a Flora Assessment for the Project. The Project Site is located in a rural area that has been subject to extensive clearing. There are some remnants of native vegetation and although they are not very important in relation to the species present, they do represent important fauna habitat.

An area of White Box Community was identified in the bushland area to the south of the Project Site. This Community is listed as Endangered, although Cunningham's initial investigations could not determine whether this was a true representation of the Endangered Community.

During the field investigations, no endangered flora species were located. No critical habitat was located on the Project Site and no endangered flora populations were identified.

Soils

NMPL commissioned Geoff Cunningham Natural Resource Consultants Pty Limited to undertake a Soil and Land Use Assessment for the Project. The open cut area and surface facilities are located in agricultural land and they will impact existing natural soils. The soils will need to be managed in a way that enables successful rehabilitation of the area and to establish successful land use.

The initial investigations revealed that three soil mapping units were present and that soil depths over the Project Site vary from 56cm on the upper slopes through to being in excess of 250cm on the lower slopes. A small area of soils near the southern end of the Coocooboonah Lane re-alignment was identified to be cracking soils. Initial visual inspections did not reveal any obvious properties of the soils that would make them unsuitable for rehabilitation. These initial findings were subsequently confirmed with laboratory analyses.

Cultural Heritage

NMPL commissioned Archaeological Surveys and Reports Pty Limited to undertake an Archaeological Investigation for the proposed Project. The Project Site is located in an area that had not been subject to much archaeological investigation. Consequently, there were no known archaeological sites within the Project Site. Some Aboriginal activity and occupation would be expected and an assessment was required to determine any potential impacts on the archaeological record. The field assessment work was undertaken with the assistance of representatives of the Red Chief Local Aboriginal Land Council and the Bigundi Biame Gunnedar Traditional People.

Four sites were recorded during the site investigation. These included an axe grinding groove, two isolated artefacts and an artefact scatter. All were located on or above the escarpment to the south of the open cut area and will not be impacted by the Project.

Social Impact

NMPL believes the Project can be implemented with very minor impact to the local social environment. There will be 24 full time jobs and 7 part time jobs created at the Mine and a further 12 jobs associated with coal transport and train loading. Olsen Environmental Consulting Pty Limited assessed the likely social impact of the Project.

Aesthetics

The Project has the potential to impact on the visual environment during and after the mining operation. Olsen Environmental Consulting Pty Limited assessed the visual impact of the Project.

3.2.7 Summary of Environmental Issues and Impacts

Through the consultation and review process described in Sections 3.2.2 to 3.2.4, the various environmental issues requiring coverage within the *Environmental Assessment* were identified. These are presented in the left hand column (Column 1) of **Table 3.1**.

The Project design, local environment and other factors, were then reviewed to identify all the potential risk sources (Column 2 of **Table 3.1**), consequences (Column 3 of **Table 3.1**), environmental receptors (Column 4 of **Table 3.1**) and corresponding potential environmental impacts (Column 5 of **Table 3.1**). **Table 3.1** presents these identified risk sources and potential impacts that may be associated with each environmental issue.

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 Project with minimal affect 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 3.1**, the potential environmental impacts have been allocated a risk rating based on the potential consequences and likelihood of occurrence[1].

The likelihood or probability of each impact occurring was then rated according to the definitions contained in **Table 3.2**.

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, ie. 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.

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 3.4**.

[1] The risk rating has been determined in accordance with Australian Standards HB 203:2006 and AS/NZS 4360:2004 and through consideration of the potential consequence(s) of the environmental impacts.

Table 3.1
Risk Sources and Potential Environmental Impacts

Environmental Issue	Risk Source/potential incident(s)	Potential Consequences	Receptor/ Surrounding Environment	Potential Environmental Impacts
Groundwater	• Pollution of groundwater due to hydrocarbon spills. • Pollution of groundwater due to other contaminants, eg. Explosives residues, overburden etc. • Pollution from the adjacent old underground mine workings	• Decreased groundwater quality.	• Surrounding landholders utilising bores or spear pumps.	• Reduced groundwater quality causing reduced availability for existing uses.
	• Reduction of groundwater levels due to mine seepage and associated drawdown.	• Reduction in quantity of water stored in local aquifers. • Decrease in availability of groundwater to adjoining landowners and/or groundwater dependent ecosystems.	• Adjoining groundwater management areas. • Adjoining groundwater aquifers. • Groundwater bores of adjoining landowners.	• Reduction in water flows to the embargoed Great Artesian Basin. • Reduction in groundwater levels. • Reduced yields of local groundwater bores. • Degradation of groundwater dependent ecosystems.
Greenhouse Emissions	• Onsite vehicle emissions • Fugitive emissions (methane) during coal extraction operations • Road and Rail transport emissions • End-use of Coal	• Increased greenhouse and other gas emissions	• Local air-shed • Coal transport route air-shed • End-user emissions	• Increased contribution to green house effect
Air Pollution – Dust, Odour, other	• Dust generation resulting from mining operations • Wind action on disturbed areas, overburden emplacements and stockpiles.	• Increased deposited and suspended particulates.	• Surrounding residences and buildings.	• Nuisance/amenity impacts from dust deposited on window sills, cars, surfaces etc. • Adverse health impacts (if PM_{10} levels are excessive). • Stress of native vegetation, and indirect impacts on fauna habitat.
Erosion and Sedimentation	• Erosive actions of wind and water. • Elevated concentration of suspended sediments within runoff resulting from erosion of disturbed areas	• Loss of topsoil. • Increased sedimentation within downstream creeks and Namoi River.	• Project Site soils. • Local creeks and their tributaries. • Namoi River.	• Soil erosion. • Increased sediment load in drains and/or waterways.
	• Increase in deposited dust and particulate matter concentration.	• See "*air pollution*" above.	• See "*air pollution*" above.	• See "*air pollution*" above.
Surface Water / Flooding	• Reduction in environmental flows through on-site capture of water.	• Reduced flows to downstream vegetation. • Decreased availability of water to downstream stock watering dams.	• Downstream flora and fauna. • Downstream agricultural lands.	• Reduced natural surface water flows resulting in stress to native vegetation and degradation of fauna habitats and/or reduced viability of grazing lands.
	• Discharge of dirty, saline or contaminated water.	• Decreased water quality. • Impacts on local soils and vegetation.	• Local creeks and tributaries. • Project Site soils and vegetation.	• Reduced quality of downstream waters. • Indirect impacts on soil quality and vegetation.
	• Altered flood regimes.	• Altered flood regimes.	• Local communities and ecosystems.	• Changes to local flooding patterns and indirect impacts on native vegetation communities and ecosystems.
Flora and Fauna Protection	• Removal of Koala habitat and other native vegetation due to land clearing activities.	• Removal of habitat and disturbance to threatened species.	• Vegetation within Project Site and area of influence.	• Loss of, or alteration to, existing habitats. • Direct adverse impact on threatened species.
	• Disturbance to general fauna and fauna habitat as a result of project operations, eg. noise, dust etc.	• Reduction in biodiversity of the Project Site.	• Local communities and ecosystems.	• Reduced biodiversity. • Direct adverse impact(s) on threatened species, populations or communities.
Noise	• Increased noise levels resulting from operation of onsite mobile equipment, crushing and screening equipment and product transportation.	• Decreased amenity. • Health related issues. • Impacts on livestock. • Decreased land values.	• Surrounding residents, landowners and livestock.	• Increased noise and levels associated with construction and operational activities causing annoyance, distractions, ie. amenity impacts. • Increased noise and/or vibration levels associated with the project road and rail traffic causing annoyance, distractions, ie. amenity impacts. • Sleep disturbance as a result of maximum noise levels. • Increased noise levels associated with the Project leading to reduced agricultural production, ie. impacts on livestock.
Vibration	• Increased levels of vibration from mine blasting. • Increased vibration levels from surface operations, including rail transport.	• Structural damage to buildings and structures. • Reduced local amenity. • Reduced production from livestock.	• Surrounding residences, buildings and other structures. • Local livestock.	• Structural damage to buildings and structures. • Nuisance/amenity impacts on surrounding landowners / residents. • Reduced agricultural production.
Rehabilitation, Final Landform & Biodiversity Offsets	• Modified landform on completion of the Project. • Modified land uses on the Project Site.	• Reduced amenity of the Project Site. • Reduced agricultural capability of Project Site lands.	• Project Site lands. • Surrounding land, eg. Neighbouring properties.	• Reduced amenity of altered Project Site landform. • Reduced access to agricultural lands. • Increase in areas designated for native vegetation conservation.

Source: Modified after HB203:2006 - Table 3

Table 3.1 (Cont'd)
Risk Sources and Potential Environmental Impacts

Environmental Issue (see Table 3.1)	Risk Source/potential incident(s)	Potential Consequences	Receptor/ Surrounding Environment	Potential Environmental Impacts
Visual Amenity	• Changes in visual characteristics of the Project Site.	• Changed visual outlook during operation	• Surrounding residents and local motorists.	• Decreased visual amenity.
	• Lighting influencing effectiveness of the Siding Springs Observatory.	• Reduced effectiveness of the Siding Springs Observatory.	• Siding Springs Observatory.	• Reduced effectiveness of the Siding Springs Observatory.
Aboriginal Heritage	• Removal or destruction of Aboriginal sites and/or artefacts due to Project Site construction and mining activities.	• Loss or damage to Aboriginal artefacts.	• Local Aboriginal community	• Impact on identified sites and/or artefacts of Aboriginal cultural heritage as a result of the proposed construction and mining activities. • Impact on unidentified sites and/or artefacts of Aboriginal cultural heritage as a result of subsidence.
European Heritage	• Removal or destruction of sites of heritage significance due to project activities.	• Loss or damage to heritage sites.	• Identified heritage sites.	• Loss or destruction to/of items of heritage significance.
Traffic and Transport	• Construction of re-aligned Coocooboonah Lane to Oxley Highway.	• Impacts associated with road construction (noise, dust, ecology, heritage etc.).	• See "*air pollution*", "*flora and fauna protection*", "*noise*" and "*Aboriginal heritage*" above.	• See "*air pollution*", "*flora and fauna protection*", "*noise*" and "*Aboriginal heritage*" above.
	• Increased traffic levels due to movement of workforce and contractors. • Increased heavy vehicle movements for product transportation to the Whitehaven Siding. • Additional rail movements between the Whitehaven Siding and Newcastle.	• Increased vehicle movements (especially heavy vehicles) on local roads. • Increased rail movements on local rail network.	• Local road and rail network. • Existing road and rail users.	• Increased road and traffic congestion. • Elevated risk of accident/incident on local roads. • Road pavement deterioration. • Elevated risk of rail related accident/incident. • Increased rail haulage impact on rail track capacity
Waste Management	• Production of contaminating or polluting materials, eg. acid producing overburden, waste oils, saline water, general rubbish.	• Contamination of downstream surface waters. • Contamination of groundwater. • Contamination of downstream lands. • Reduced visual amenity.	• Project Site land and water resources. • Downstream land and water resources. • Local and regional groundwater.	• Hydrocarbon or other pollutant contamination of surface water. • Hydrocarbon or other pollutant contamination of groundwater. • Acid generation from overburden used in construction of overburden emplacements. • Reduced amenity of Project Site due to poor rubbish, litter management.
Soil and Land Capability	• Reduction in soil quality and availability through poor management practices.	• Structural damage to soils through poor soil management practices. • Reduced biological activity of soils.	• Project Site soils.	• Insufficient soil quantities for rehabilitation. • Reduced soil quality.
	• Increased erosion or erosion potential of soils	• See "*erosion and sedimentation*" above.	• See "*erosion and sedimentation*" above.	• See "*erosion and sedimentation*" above.
	• Decreased land capability in final landform.	• Reduced productivity of Project Site agricultural land.	• Project Site soils.	• Decreased land and agricultural capability of the final landform.
Land Contamination	• Mining and other excavations exposing previously contaminated materials.	• Transfer of contaminated materials to non-contaminated areas.	• Areas receiving contaminated material (including surface waters).	• Transfer of contaminated material. • Surface water contamination.
Bushfire	• Initiation of fire on the Project Site and spread to adjoining agricultural lands.	• Health and safety impacts to project personnel. • Damage to Project Site equipment. • Damage to adjoining agricultural lands and/or native vegetation.	• Project Site personnel and equipment. • Project Site and adjoining land.	• Injury or health impacts on project personnel. • Operational constraint posed by damaged equipment. • Crop and/or pasture damage. • Destruction / damage of native vegetation and fauna habitat.
Spontaneous Combustion	• Spontaneous combustion event.	• Uncontrolled fire event.	• Coal stockpiles, Project Site and surrounding environs.	• See "*bushfire*" above.
Socio-Economic Impacts	• Alteration of social activities or employment due to employment generation and capital expenditure.	• Reduced unemployment and increased local spending.	• Local community and businesses	• Improved economic activity and related social impacts attributable to reduced unemployment
	• Perceived or real impacts on local amenity of neighbouring properties.	• Reduced property values.	• Surrounding property owners.	• Reduced quality of life (actual or perceived). • Reduced property values.
Property Values	• Reduction in property values due to presence of mining operation.	• Changed property values	• Surrounding landowners	• Possible short-term reduction in land values versus increases from increased economic growth.
Source: Modified after HB203:2006 - Table 3				

Table 3.2
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 3.3
Qualitative Consequence Rating

Level	Descriptor	Description
5	Catastrophic	• Massive and permanent detrimental impacts on the environment. • Very large area of impact. • Massive remediation costs. • Reportable to government agencies. • Large fines and prosecution resulting in potential closure of operation. • Severe injuries or death.
4	Major	• Extensive and/or permanent detrimental impacts on the environment. • Large area of impact. • Very large remediation costs. • Reportable to government agencies. • Possible prosecution and fine. • Serious injuries requiring medical treatment.
3	Moderate	• Substantial temporary or minor long term impact to the environment. • Moderately large area of impact. • Moderate remediation costs. • Reportable to government agencies. • Further action may be requested by government agency. • Injuries requiring medical treatment.
2	Minor	• Minor detrimental impact on the environment. • Affects a small area. • Minimal remediation costs. • Reportable to internal management only. • No operational constraints posed. • Minor injuries which would require basic first aid treatment.
1	Insignificant	• Negligible and temporary detrimental impact on the environment. • Affects an isolated area. • No remediation costs. • Reportable to internal management only. • No operational constraints posed. • No injuries or health impacts.
Source: modified after HB 203:2006 - Table 4(B)		

Table 3.4
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)					

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 3.5 provides an assessment of the unmitigated risk for each potential environmental impact based on the classifications and definitions discussed above. 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 measures.

Table 3.5
Analysis of Unmitigated Environmental Risk

Potential Environmental Impacts (see Table 3.1)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Groundwater				
Groundwater Pollution by leaking/spilt pollutant	Contamination requiring minor recovery works	2	D	L
	Contamination requiring major recovery works	4	E	H
Drawdown of groundwater levels	Significant drawdown (>2m) beyond 100m of the Project Site boundary	2	C	M
	Major drawdown (>10m) beyond 100m of the Project Site boundary	3	C	H
	Significant drawdown (>2m) beyond 500m of the Project Site boundary	3	C	H
	Significant drawdown (>10m) beyond 500m of the Project Site boundary	4	C	E
Impacts on Groundwater Dependent Ecosystems		3	D	M
Air Quality				
Nuisance - deposited dust	Deposited dust levels attributable to the Project occasionally (for one or two months every year) above DEC guideline, affects only adjacent landholders.	2	C	M
	Deposited dust levels attributable to the Project regularly (exceedances greater than DEC guideline for >5 months per year) affects landholders some distance from the Project Site.	3	C	H
Health - PM10	PM_{10} levels attributable to the Project occasionally (once every 1 to 2 years) above the Project goal, affects only adjacent landholders.	2	C	M
	PM_{10} levels attributable to the Project occasionally (>5 times per year) above the Project goal, affects landholders some distance from Project Site.	3	C	H
Greenhouse Gas Emissions		2	B	H
Erosion and Sedimentation				
Soil erosion	Minor gully erosion of drainage lines, stockpiles or created slopes	2	B	H
	Minor sheet or gully erosion of rehabilitated landform	2	C	M
	Major gully or sheet erosion formation	3	B	H
Sediment Load and Turbidity	One-off discharge of dirty water from the Project Site	2	A	H
	Regular discharge of dirty water from the Project Site	3	C	H

Consequence of Occurrence: 1 = Insignificant; 2 = Minor; 3 = Moderate; 4 = Major; 5 = Catastrophic
Likelihood of Occurrence: A = Almost Certain; B = Likely; C = Possible; D = Unlikely; E = Rare
Risk Rating: E = Extreme; H = High; M = Moderate; L = Low

Table 3.5 (Cont'd)
Analysis of Unmitigated Environmental Risk

Potential Environmental Impacts (see Table 3.1)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Surface Water/Flooding and Drainage				
Reduced natural surface water flows	Reduced productivity of downstream grazing lands	2	D	L
	Stressing of downstream native vegetation due to restricted flows	2	D	L
Reduced quality of downstream waters	Isolated and minor event resulting in temporary degradation of water quality in local creeks and tributaries, eg. Minor and one-off discharge of hydrocarbon	2	C	M
	Continuing discharge of contaminated water resulting in ongoing degradation of water quality in local creeks and tributaries, eg. frequent/periodic discharge of dirty water	4	D	H
	Isolated and major event resulting in temporary but wider spread degradation of water quality, eg. Large discharge of hydrocarbons	3	D	M
	Repeated major event resulting in long-term and wide spread degradation of water quality, eg. continued discharge of dirty or contaminated water	4	D	H
Changes to local flooding patterns and indirect impacts on native vegetation communities and ecosystems.		3	D	M
Threatened Flora and Fauna				
Loss of, or alteration to, existing habitats.	Disturbance to native vegetation / habitat within nominated areas	2	D	L
	Disturbance to native vegetation / habitat outside nominated areas	3	D	M
Direct adverse impact on threatened species.	Disturbance to Threatened flora / fauna and endangered communities	3	C	H
	Disturbance leading to local population reduction	4	D	H
	Disturbance leading to local extinction(s)	5	E	E
Reduced biodiversity	Local biodiversity	3	D	M
	Regional biodiversity	4	D	H
Noise and Vibration				
Increased noise levels associated with Project Site activities causing annoyance, distractions, ie. amenity impacts.	Occasional minor exceedance of noise criteria (1-2dB(A))	2	B	H
	Regular minor exceedance of noise criteria (1-2dB(A))	3	C	H
	Occasional marginal exceedance of noise criteria (3-5dB(A))	3	B	H
	Regular marginal exceedance of noise criteria (3-5dB(A))	3	C	H
	Occasional major exceedance of noise criteria (>5dB(A))	4	B	E
	Regular major exceedance of noise criteria (>5dB(A))	4	C	E
Increased noise / vibration levels associated with project traffic activities causing annoyance, distractions, ie. amenity impacts.	Occasional minor exceedance of noise criteria (1-2dB(A))	2	C	M
	Regular minor exceedance of noise criteria (1-2dB(A))	3	D	M
	Occasional marginal exceedance of noise criteria (3-5dB(A))	2	C	M
	Regular marginal exceedance of noise criteria (3-5dB(A))	3	D	M
	Occasional major exceedance of noise criteria (>5dB(A))	2	C	M
	Regular major exceedance of noise criteria (>5dB(A))	3	D	M

Consequence of Occurrence: 1 = Insignificant; 2 = Minor; 3 = Moderate; 4 = Major; 5 = Catastrophic
Likelihood of Occurrence: A = Almost Certain; B = Likely; C = Possible; D = Unlikely; E = Rare
Risk Rating: E = Extreme; H = High; M = Moderate; L = Low

Table 3.5 (Cont'd)
Analysis of Unmitigated Environmental Risk

Potential Environmental Impacts (see Table 3.1)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Noise and Vibration (Cont'd)				
Maximum noise levels resulting in sleep disturbance.		3	B	H
Increased noise levels associated with the project leading to reduced production, ie. impacts on livestock.		3	E	M
Noise and Vibration from blasting impacting on local amenity		3	D	M
Noise and Vibration from blasting impacting on local livestock		3	E	M
Vibration from blasting resulting in damage to Non-Project-related buildings and structures		3	E	M
Traffic and Transport				
Increased traffic congestion		3	D	M
Increased noise levels at residences along proposed coal transport route		**See "noise and vibration"**		
Road pavement deterioration		3	C	H
Elevated risk of accident/incident on local roads	Minor accident – no injury	2	C	M
	Minor accident – minor injury	3	D	M
	Major accident –moderate injuries requiring hospitalisation	4	E	H
	Severe accident – severe injuries or death injury	5	E	H
Rehabilitation, Final Landform & Biodiversity Offsets				
Reduced access to agricultural lands.		2	D	L
Increase in areas designated for native vegetation conservation		n/a	n/a	n/a
Aboriginal Heritage				
Impact on identified sites and/or artefacts of Aboriginal cultural heritage as a result of the proposed construction and mining activities and without the permission of LALC or DECC		4	C	E
Impact on unidentified sites and/or artefacts of Aboriginal cultural heritage as a result of subsidence and without the permission of LALC or DECC		3	C	H
European Heritage				
Impact on identified sites of European cultural heritage		2	E	L
Visual Amenity				
Reduced amenity of altered Project Site landform	Temporary disturbance to landform	1	A	H
	Marginally identifiable change to landscape	3	B	H
	Highly identifiable change to landscape	3	C	H
Impacts on the effectiveness of the Siding Springs Observatory		2	D	L
Waste Management				
Contamination by waste oil.	Contamination requiring minor recovery works	2	D	L
	Contamination requiring major recovery works	3	E	M
Acid generation from overburden used in construction of overburden emplacements.		3	E	M
Reduced amenity of Project Site due to poor rubbish, litter management		1	C	L
Soil and Land Capability				
Insufficient soil quantities for rehabilitation.		2	C	M
Reduced soil quality	Temporary disturbance to soil	1	B	M
	Degradation of soil quality	2	C	M
Elevated erosion or erosion potential.		2	C	M
Decreased land and agricultural capability of the final landform		3	C	H

Consequence of Occurrence: 1 = Insignificant; 2 = Minor; 3 = Moderate; 4 = Major; 5 = Catastrophic
Likelihood of Occurrence: A = Almost Certain; B = Likely; C = Possible; D = Unlikely; E = Rare
Risk Rating: E = Extreme; H = High; M = Moderate; L = Low

Table 3.5 (Cont'd)
Analysis of Unmitigated Environmental Risk

Potential Environmental Impacts (see Table 3.1)	Level / Scale of Impact (if applicable)	Consequence of Occurrence if not Mitigated	Likelihood of Occurrence if not Mitigated	Unmitigated Risk Rating
Land Contamination				
Transfer of contaminated material	Small area affected (<0.01ha)	2	D	L
	Large area affected (>0.01ha)	3	D	M
Contamination of surface water as a result of exposing contaminated lands	Minor and temporary contamination of water quality in local creeks and tributaries	2	C	M
	Minor and continuing contamination of water quality in local creeks and tributaries	3	D	M
	Major and temporary contamination of water quality in local creeks and tributaries	3	D	M
	Major and continuing contamination of water quality in local creeks and tributaries	5	E	H
Bushfire				
Initiation of fire leading to impacts on the Project Site	Minor disturbance to Project Site lands and equipment resulting in temporary suspension of operations	2	D	L
	Major damage to Project Site lands and equipment resulting in long-term or complete suspension of operations	4	E	H
	Impacts on health and safety of project personnel	5	E	H
Initiation of fire leading to impacts outside the Project Site	Minor disturbance to lands and property external to the Project Site	2	D	L
	Major disturbance to lands and property external to the Project Site.	4	E	H
	Impacts on health and safety of local landowners, residents and the general public	5	E	H
Spontaneous Combustion				
Injury sustained as a consequence of fire	Minor injury	2	D	L
	Moderate injury requiring first aid	3	E	M
	Injury requiring hospitalisation	4	E	H
	Severe injury or death	5	E	H
Impacts on native flora and fauna in the event of fire spreading beyond coal stockpiles	Small fire within Project Site	2	D	L
	Moderate fire extending beyond the Project Site	3	E	M
	Large fire extending far beyond the Project Site	4	E	H
Socio-Economic Impacts and Property Values				
Improved economic activity and related social impacts attributable to reduced unemployment		n/a	n/a	n/a
Reduced quality of life (actual or perceived)		3	D	M
Reduced property values	Temporary decrease in property values	2	C	M
	Moderate term decrease in property values	3	C	H
	Long term decrease in property values	3	D	M

Consequence of Occurrence: 1 = Insignificant; 2 = Minor; 3 = Moderate; 4 = Major; 5 = Catastrophic
Likelihood of Occurrence: A = Almost Certain; B = Likely; C = Possible; D = Unlikely; E = Rare
Risk Rating: E = Extreme; H = High; M = Moderate; L = Low

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 issues raised within the DGRs (see Section 3.2.3 and **Appendix 2**).
- Issues identified with a greater frequency of impacts with high or extreme risk ratings (see **Table 3.6**).
- Issues with a high frequency of identification.

Table 3.6
Environmental Issue Prioritisation

	Extreme		High		Combined	
	frequency	**%**	**frequency**	**%**	**frequency**	**%**
1. Groundwater	1	10.0%	6	60.0%	**7**	**70.0%**
2. Flora & Fauna	1	14.3%	3	42.3%	**4**	**56.6%**
3. Aboriginal Heritage	1	50.0%	1	50.0%	**2**	**100.0%**
4. Noise and Vibration	2	11.7%	5	29.4%	**7**	**41%**
5. Surface Water / Erosion and Sedimentation	0	0.0%	6	50.0%	**6**	**50.0%**
6. Visual Amenity	0	0.0%	3	75.0%	**3**	**75.0%**
7. Traffic	0	0.0%	3	50.0%	**3**	**50.0%**
8. Air Quality	0	0.0%	3	60.0%	**3**	**60.0%**
9. Fire (Bushfire & Spontaneous Combustion)	0	0.0%	7	53.8%	**7**	**53.8%**
10. Socio-economic Climate	0	0.0%	1	25.0%	**1**	**25.0%**
11. Soil and Land Capability	0	0.0%	2	18.2%	**2**	**18.2%**
12. Waste Management	0	0.0%	0	0.0%	**0**	**0.0%**
13. European Heritage	0	0.0%	0	0.0%	**0**	**0.0%**

By considering both the number and respective proportion of higher environmental risk impacts or potential incidents and proportion, the issues as requiring assessment within the *Environmental Assessment* have been prioritised. **Table 3.6** presents these issues in decreasing order of priority following consideration of the number and proportion of high and extreme risk impacts and incidents.

On consideration of the issues identified by the DGRs and through consultation, preliminary investigation, and unmitigated environmental risk assessment, the order of priority was assessed to be as listed below. This order of priority provides the order of assessment in Section 4, namely:

1. Groundwater
2. Noise and Vibration
3. Fauna
4. Surface Water

5. Air Quality
6. Traffic
7. Aboriginal Heritage
8. Flora
9. Visual Amenity
10. Soil and Land Capability
11. Fire (Bushfire and Spontaneous Combustion)
12. Waste Management
13. Socio-Economic Climate
14. European Heritage

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