

Mt Arthur Coal

Preliminary Environmental Assessment - Mt Arthur Coal South Pit Extension Project

March 2006




Umwelt
Environmental Consultants

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1.0 INTRODUCTION

Mt Arthur Coal Pty Ltd (Mt Arthur Coal) operates the Mt Arthur Coal open cut coal mine south of Muswellbrook in the upper Hunter Valley of NSW. Mt Arthur Coal is a wholly owned subsidiary of BHP Billiton Hunter Valley Energy Coal and holds mining and exploration titles for open cut and underground coal reserves south of Muswellbrook in the Upper Hunter Valley of NSW. The company supplies thermal coal for both export and domestic markets. Mt Arthur Coal includes the areas formerly known as Mount Arthur North (MAN) mine and Bayswater Colliery. Mining has occurred at the Mt Arthur Coal site in the former Bayswater Colliery area since the 1960s, whilst mining in the MAN area started in 2002.

The existing Mt Arthur Coal operations consist of three mining areas, the Bayswater No. 2 mining area (extraction complete), the Bayswater No. 3 mining area and the MAN mining area (refer to **Figure 1.1**). Mt Arthur Coal propose to extend the currently approved MAN South Pit further south into the Bayswater No. 3 Mining Lease (ML) in order to maximise resource recovery, maximise productivity of their mining equipment and improve overburden handling efficiencies and rehabilitation outcomes. This project is known as the South Pit Extension Project.

The additional area of coal proposed to be extracted as part of the South Pit Extension Project (refer to **Figure 1.2**) is surrounded by existing mining operations undertaken by Mt Arthur Coal and Drayton. The existing approved MAN South Pit is extracting the same coal seams occurring within the extension area and will provide ready access into the extension area, allowing economic recovery of the resource. Based on current economics, it is considered unlikely that the coal within the South Pit Extension area would be able to be economically recovered as a stand-alone operation and therefore is likely to be sterilised if not extracted by Mt Arthur Coal.

The South Pit Extension project is classed as a 'Major Project' under Part 3A of the *Environmental Planning and Assessment Act 1979* (refer to **Section 3.0**), requiring the preparation of an Environmental Assessment report. The Minister for Planning will be the consent authority for the project.

This Preliminary Environmental Assessment has been prepared by Umwelt (Australia) Pty Limited (Umwelt), on behalf of Mt Arthur Coal, to brief the relevant government agencies about the proposed development (that is, the Project Description Report), introduce the environmental assessments conducted to date and identify key issues to be addressed in the Environmental Assessment report prepared to support the project application.

2.0 DESCRIPTION OF PROPOSED DEVELOPMENT

2.1 EXPLORATION HISTORY AND RESOURCE DESCRIPTION

The project area has been subject to a number of separate exploration programs between 1968 and the start of the most recent exploration program undertaken by Mt Arthur Coal in 2004. A total of 104 boreholes were drilled as part of the historic exploration programs in the general vicinity of the South Pit project area, with an additional 168 holes drilled by Mt Arthur Coal as part of the most recent exploration program. An aerial magnetic survey has also been flown over the project area. This extensive exploration work has given Mt Arthur Coal further knowledge of the coal resource in the project area, in addition to the resource information gathered from their adjacent open cut mining operations.

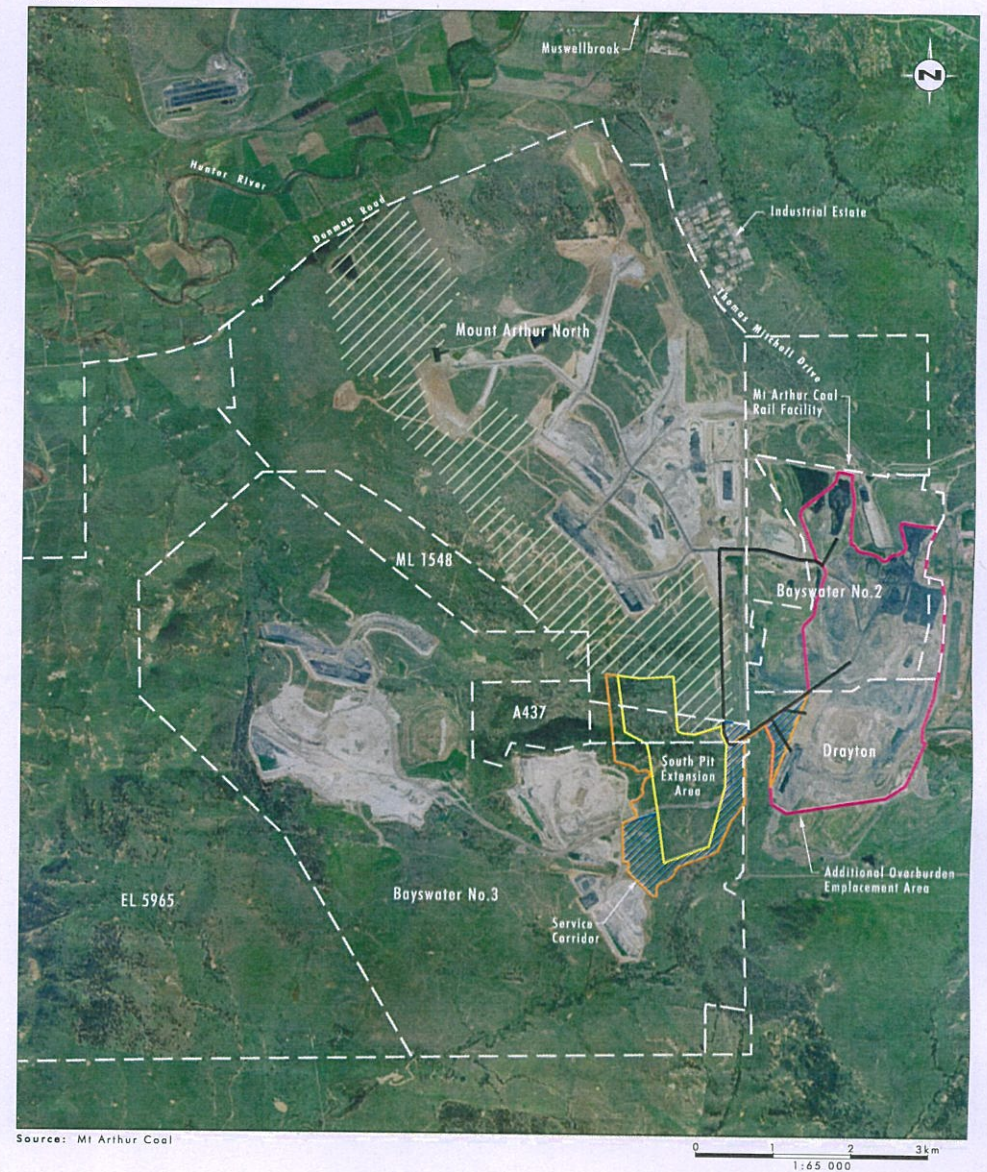
The target coal seams are Upper Permian in age and are contained within the Wittingham Coal Measures. The Wittingham Coal Measures contain in excess of 14 coal seams, or seam groups in the local area. Nine of these coal seams are currently considered as potential open cut mining resource targets in the project area as shown on the stratigraphic column included as **Figure 2.1**. In the project area the target seams steeply dip from east to west (14° - 21°). There are a number of



Legend
Mining and Exploration Lease Boundary

FIGURE 1.1
Mt Arthur Coal Operations

File Name (A4): R05_V1/2000_084.dgn



Legend
Mining and Exploration Lease Boundary
Approved Mining Area
Additional Overburden Emplacement Area
South Pit Extension Mining Area
Main Haul Roads
Proposed Service Corridor
Approximate New Disturbance Footprint

File Name (A4): R05_V1/2000_071.dgn

FIGURE 1.2
Proposed South Pit Extension Project

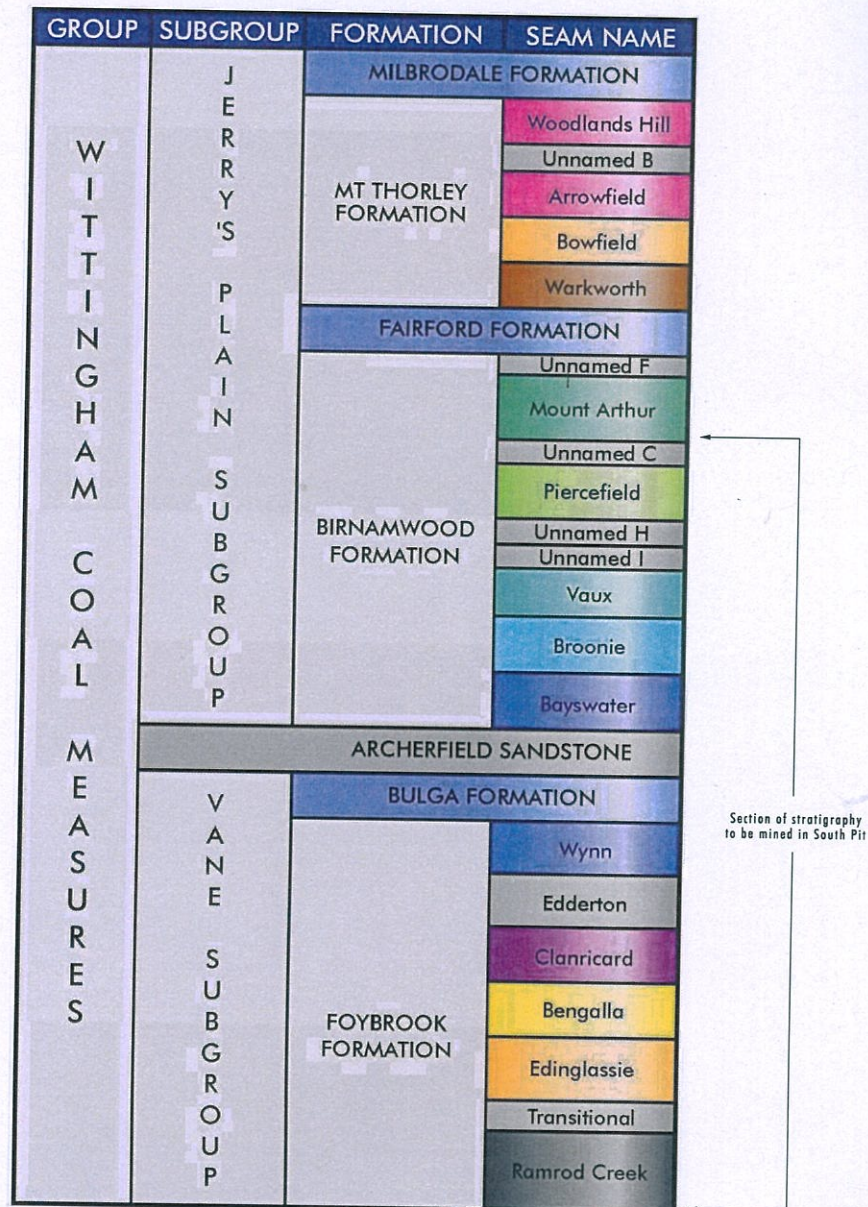


FIGURE 2.1
Stratigraphic Column

Source: Mt Arthur Coal 2005
File Name (A4): R05_V1/2000_088.dgn

faults and igneous intrusions within the project area however none of these structures are considered a significant constraint to the proposed mining operation.

2.2 SOUTH PIT EXTENSION

2.2.1 Concept Mine Plan

The MAN South Pit was approved as part of Mt Arthur Coal's MAN Coal Mine in 2001. The extent of the currently approved MAN mining area is shown on Figure 1.2 and extends close to the southern boundary of the MAN ML. The proposed South Pit Extension project will extend the existing approved South Pit further south into the Bayswater No. 3 ML increasing resource recovery from within Mt Arthur Coal's existing mining area. The project will extend the limit of the South Pit 2.4 kilometres further south, as illustrated in Figure 1.2. This will involve the disturbance of an additional approximately 186 hectares and result in the recovery of an additional approximately 25 million tonnes of coal over the proposed 21 year lease period.

The concept mine plan staging for the project is shown in Figures 2.2 to 2.5. As shown in the stage plans, mining will progress from east to west, consistent with coal seam dip. Mining will commence at the subcrop of the Ramrod Creek coal seam, with the mining pit intercepting the other target seams as it progresses to the west. Annual production from the South Pit Extension area will be up to 3 million tonnes per annum (Mtpa) depending on mining schedules, however, total production from Mt Arthur Coal will not exceed the currently approved total production limits of approximately 20 Mtpa run-of-mine (ROM) coal (15 Mtpa ROM coal from the MAN mining area plus approximately 4.8 Mtpa ROM coal from the Bayswater No. 3 mining area).

Approval is sought to mine in the South Pit Extension area for 21 years, which will be for approximately five years beyond the currently approved life of the MAN mining area. The MAN mining area has substantial resources beyond the 21 year approval granted in the 2001 development consent (DA 144-05-2000) and is planned to continue beyond 21 years.

Mining in the proposed South Pit Extension area will be managed as part of the existing open-cut operation utilising the existing safety and environmental management systems and mining resources including approved Mt Arthur Coal equipment fleet, with no additional equipment required. All coal from the project area will be taken to Mt Arthur Coal's existing coal handling and preparation facilities for processing then transported off-site for sale using current rail loading and conveyor facilities (refer to Section 2.2.3).

2.2.2 Overburden Emplacement Areas

The majority of overburden extracted from within the extended South Pit will be emplaced in the Bayswater No. 2 mining area and also within the neighbouring Drayton West Pit, in agreement with Anglo Coal (Drayton Management) Pty Ltd. The emplacement of overburden in these two areas as part of the South Pit Extension project will allow rehabilitation of these areas to be completed, providing an improved final landform. The emplacement of additional overburden material in these areas will also assist in remediating areas currently subject to spontaneous combustion, providing a further environmental benefit as part of the project. The conceptual progression of the overburden emplacement areas is shown on Figures 2.2 to 2.5.

A sub-lease agreement is currently being finalised between Mt Arthur Coal and Anglo Coal to formalise an agreement between the two companies regarding the emplacement of overburden and associated activities on Anglo's land. Mt Arthur Coal will be responsible for the environmental management of emplacement activities undertaken within this area consistent with conditions of the agreement. This sub-lease will need to be approved by the Department of Primary Industries (DPI) who has expressed support for this proposal given the improved mining, spontaneous



- Legend**
- Mining and Exploration Lease Boundary
 - Proposed Service Corridor
 - Approved MAN Mining Area
 - Mining Area
 - Emplacement Area
 - Rehabilitated Area

File Name (A4): R05_V1/2000_080.dgn

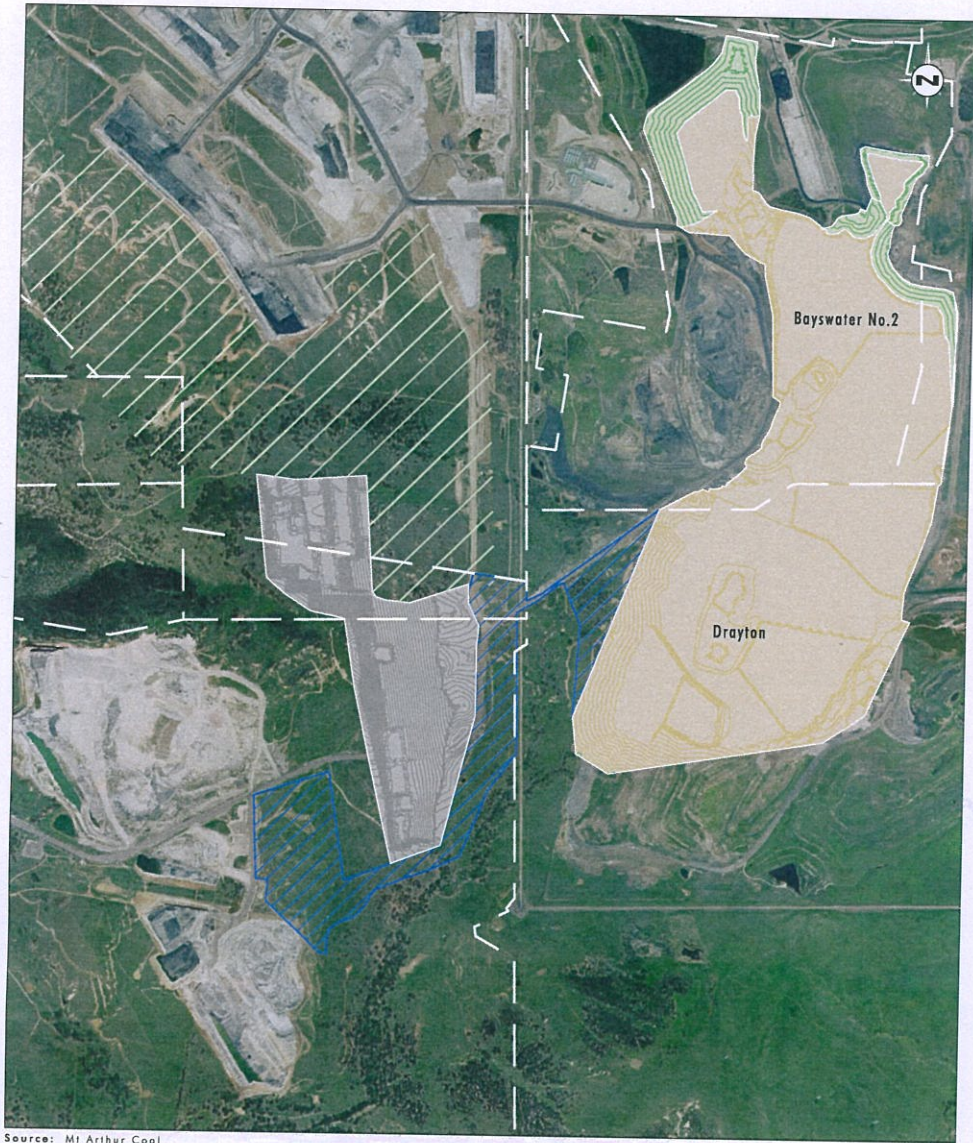
FIGURE 2.2
South Pit Extension Project
Year 5 Conceptual Mine Plan



- Legend**
- Mining and Exploration Lease Boundary
 - Proposed Service Corridor
 - Approved MAN Mining Area
 - Mining Area
 - Emplacement Area
 - Rehabilitated Area

File Name (A4): R05_V1/2000_081.dgn

FIGURE 2.3
South Pit Extension Project
Year 10 Conceptual Mine Plan



Source: Mt Arthur Coal

0 0.5 1 1.5 km
1:30 000

Legend

- Mining and Exploration Lease Boundary
- Proposed Service Corridor
- Approved MAN Mining Area
- Mining Area
- Employment Area
- Rehabilitated Area

File Name (A4): R05_V1/2000_082.dgn

FIGURE 2.4

South Pit Extension Project
Year 15 Conceptual Mine Plan



Source: Mt Arthur Coal

0 0.5 1 1.5 km
1:30 000

Legend

- Mining and Exploration Lease Boundary
- Proposed Service Corridor
- Approved MAN Mining Area
- Mining Area
- Employment Area
- Rehabilitated Area
- Nominal High Wall

File Name (A4): R05_V1/2000_083.dgn

FIGURE 2.5

South Pit Extension Project
Year 21 Conceptual Mine Plan

combustion control and rehabilitation outcomes. The sub-lease is expected to be signed in March 2006.

Overburden from the South Pit Extension area may also be emplaced in either the MAN or Bayswater No. 3 mining areas within existing approved dumping areas. Overburden from each of these mining areas may also be taken to the South Pit void or to the Bayswater No. 2 or Drayton emplacement areas to retain the overall overburden emplacement area balance.

2.2.3 Mine Infrastructure

One of the aims of the project is to maximise use of Mt Arthur Coal's currently approved equipment and infrastructure. The additional mining area will allow full utilisation of Mt Arthur Coal's mobile equipment fleet by providing additional working room. The project will also make use of the existing coal handling and preparation plant and coal transportation (rail loading and conveyor) facilities without requiring any changes to these currently approved facilities. Total coal processing will remain within the current limit of 20 Mtpa approved as part of the MAN development consent (DA 144-05-2000).

The South Pit Extension will result in the removal of the existing haul road that connects the Bayswater No. 3 mining area with the MAN and Bayswater No. 2 mining areas, with this haul road needing to be relocated around the southern end of the South Pit. The haul road will be relocated within the proposed services corridor shown on **Figure 1.2**, with this corridor also providing sufficient space for placement of other Mt Arthur Coal operational infrastructure such as water pipelines and powerlines which will need to be relocated as the South Pit progresses further south.

The former coal handling and preparation plant, industrial area and deployment facilities at Bayswater No. 2 will be decommissioned to allow for emplacement of overburden in these areas as part of this project. Preliminary assessment of the decommissioning strategy for this infrastructure will be prepared as part of the Environmental Assessment.

2.2.4 Reject and Tailings Disposal

As all coal will be handled as part of the existing CHPP, coarse reject and tailings will be disposed of in accordance with existing approved methods, which is use of voids during early years of the MAN project and then co-disposal in overburden dumps. Given these disposal techniques, there is considered to be sufficient capacity for reject and tailings disposal in existing disposal areas and future overburden emplacement areas.

2.2.5 Workforce and Hours of Operation

As total coal production, processing and equipment fleets will remain the same as currently approved, there will be no significant change to the currently approved workforce as part of this project. The proposed mining operations and associated facilities are planned to operate seven days per week, 24 hours per day, in accordance with current approvals.

2.3 ALTERNATIVES AND JUSTIFICATION

2.3.1 Alternatives considered to Date

During the development of the conceptual mine plan a number of alternative mine plans were considered. Minimising environmental impacts and maximising economic resource recovery have been major considerations in the evaluation of alternative options. Alternative options considered have included:

- the mining footprint area;
- mining method (pit layout, sequence of mining); and
- overburden disposal locations and emplacement area designs.

The key alternative mine plan considered was to extend the mining pit further south which would have involved mining through Saddlers Creek. Although there is coal below Saddlers Creek, it was decided that given the nature of the resource in this area and the extent of environmental impacts associated with mining through the creek, this alternative was not desirable. The concept mine plan was therefore revised to avoid directly impacting on Saddlers Creek and the associated riparian zone (40 metres from top of bank).

Another alternative mine plan considered was to dispose of all overburden from the extension area within existing disturbance areas at Mt Arthur Coal, primarily at Bayswater No. 2 and MAN. The preferred mine plan, however, has sought to maximise mining productivity and environmental outcomes by emplacing overburden primarily within the former mining areas at Bayswater No. 2 and neighbouring Drayton mine. This preferred mine plan will result in improved capping of areas currently affected by spontaneous combustion and will fill existing mine voids providing a more amenable final landform than currently proposed for these areas.

Further discussion of the alternatives considered will be included in the Environmental Assessment report for the project.

The alternative of not proceeding has also been considered, however this option is not considered appropriate as it is considered that the environmental and social impacts of the project can be effectively managed and not proceeding would result in the loss of the benefits of the project including:

- the opportunity to effectively rehabilitate areas affected by spontaneous combustion at Bayswater No. 2 and Drayton and achieve a sustainable landform in these areas;
- continued employment opportunities;
- the loss in State and Federal government revenue; and
- a coal resource not being recovered and potentially sterilised.

This alternative is not considered appropriate as the proposed development will not significantly alter the current environmental impacts associated with Mt Arthur Coal operations.

2.3.2 Justification for Project

The South Pit Extension project will provide substantial economic benefits at Federal, State and local levels through payment of taxes and royalties, and through purchase of goods and services.

The additional area of coal proposed to be extracted as part of the South Pit Extension project is surrounded by existing mining operations undertaken by Mt Arthur Coal and Drayton. Based on current economics, it is considered unlikely that the coal within the project area would be able to be economically recovered as a stand-alone operation and therefore is likely to be sterilised if not extracted by Mt Arthur Coal.

The project will also provide substantial operational benefits to Mt Arthur Coal by allowing full utilisation of Mt Arthur Coal's currently approved mobile equipment fleet by providing additional working room and a safer working environment. The flexibility of greater working room and

overburden emplacement areas will also assist Mt Arthur Coal in actively managing environmental impacts (e.g. noise impacts) by providing greater flexibility to change operations in high risk periods (e.g. adverse climatic conditions).

The proposed extension area is located centrally within existing mining areas and is further away from residential receivers than existing operations, helping to minimise the potential impact of the project on the local community. The emplacement of overburden material at Bayswater No. 2 and Drayton will assist in remediation of areas currently subject to spontaneous combustion and will result in an improved final landform in these areas, providing an environmental benefit as part of the project.

A key design driver for the project has been to conduct operations in a manner that will not increase the external impacts of Mt Arthur Coal's operations above current approved limits and to implement proven existing environmental management practices in the project area. As indicated in this Preliminary Environmental Assessment, there are a number of key issues that require further detailed assessment, however at this stage of the project, it is anticipated that the potential environmental and community impacts of the project can be appropriately managed.

3.0 PLANNING CONSIDERATIONS AND CONSULTATION

3.1 PLANNING CONSIDERATIONS

The project requires approval under Part 3A of the *Environmental Planning and Assessment Act* 1979 (EP&A Act) as it is of a class of development listed in Schedule 1 of the State Environmental Planning Policy (SEPP) (Major Projects) 2005. The listing in Schedule 1 of the SEPP that applies to this project is:

'Development for the purpose of mining that is coal or mineral sands mining'

In addition to approval under Part 3A of the EP&A Act, the project may also require approvals under a number of additional Acts or assessment under State planning policies. The additional Acts and policies relevant to this project are listed in **Table 3.1** below with an indication of any approvals likely to be required.

Table 3.1 – Other Potentially Relevant Acts and State Planning Policies

Planning Provision	Comments	Relevant Licences/ Approvals/Assessments
Commonwealth Legislation		
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	A number of migratory species listed in the EPBC Act were recorded in the project area and an assessment of the impacts of the project on these species is required. This assessment will be completed as part of the ecological assessment, however, it is considered unlikely that there will be a significant impact on any of these species.	As the impact of the project on listed migratory species is considered unlikely to be significant, the approval of the Commonwealth Minister for Environment and Heritage is unlikely to be required.

Table 3.1 – Other Potentially Relevant Acts and State Planning Policies (cont)

Planning Provision	Comments	Relevant Licences/ Approvals/Assessments
NSW Legislation – State Environmental Planning Policies		
State Environmental Planning Policy 11	<i>SEPP No. 11</i> requires that the RTA is made aware of and given the opportunity to make representations in respect of, developments listed in Schedule 1 of the SEPP.	As mining is listed in Schedule 1 the RTA need to be consulted regarding the project, however, there will not be any change to traffic volumes as a result of this project.
State Environmental Planning Policy 33	<i>SEPP No. 33</i> requires the consent authority to consider whether an industrial proposal is a potentially hazardous industry or a potentially offensive industry. A hazard assessment is completed for potentially hazardous development to assist the consent authority to determine acceptability.	Mt Arthur Coal's existing operations are not classed as hazardous or offensive and as this project is only an extension of existing mining operations, it is not considered hazardous or offensive. A hazard assessment is therefore considered unnecessary.
State Environmental Planning Policy 44	<i>SEPP No. 44</i> restricts a Council from granting development consent for proposals on land identified as core koala habitat without preparation of a plan of management.	A koala habitat assessment will be completed as part of the ecological assessment, however no core koala habitat is expected in this area.
State Environmental Planning Policy (Major Projects)	As discussed above, this project is of a class of development listed in the SEPP. The project therefore requires approval under Part 3A of the EP&A Act and the Minister for Planning will be the consent authority.	Assessment under Part 3A of the EP&A Act.
NSW Legislation – Acts & Regulations		
<i>Mining Act 1992</i>	Under this Act a ML is required before any mining can take place. A Mining Operations Plan (MOP) is required to be submitted to the Department of Primary Industries (DPI) for their approval prior to the commencement of mining.	Mt Arthur Coal currently holds MLs over the project area with exception of the proposed emplacement area at Drayton. Mt Arthur Coal will be seeking approval of a sub-lease over this area from DPI. This matter has been discussed with DPI who has expressed support for the project. Approval of a Mining Operations Plan will be required by DPI.
<i>Environmentally Hazardous Chemicals Act 1985</i>	The Department of Environment & Conservation (DEC) is granted power under the <i>Environmentally Hazardous Chemicals Act 1985</i> to assess and control chemicals and declare substances to be chemical wastes. A licence is required for any storage, transport or use of prescribed chemicals.	This project will not require any change to chemicals stored and used by Mt Arthur Coal. Approval is not required under this Act.

Table 3.1 – Other Potentially Relevant Acts and State Planning Policies (cont)

Planning Provision	Comments	Relevant Licences/ Approvals/Assessments
<i>Protection of the Environment Operations Act 1997</i>	The PoEO Act is administered by DEC and requires licences for environmental protection including waste, air, water and noise pollution control.	Mt Arthur Coal currently holds an Environment Protection Licence for open cut mining operations in the Bayswater No. 3 ML plus a licence for the MAN mining area. These licences will be modified to include the mining operations associated with this project. Drayton area.
<i>Roads Act 1993</i>	The <i>Roads Act 1993</i> is administered by the Roads and Traffic Authority (RTA), local council or the Department of Lands; the RTA has jurisdiction over major roads, the local council over minor roads, and the Department of Lands over road reserves. The Act requires that applications for the closure of Crown roads be made to the Minister. A licence under Section 138 of the Roads Act is required in order to undertake works within a road reserve.	The approval of the Minister of Lands will be required for the closure of Crown roads in the project area. No other Roads Act provisions apply.
<i>Crown Lands Act 1989</i>	The Act provides for the administration and management of Crown land in the eastern and central divisions of the State. Crown land may not be occupied, used, sold, leased, dedicated, reserved or otherwise dealt with unless authorised by this Act or the <i>Crown Lands (Continued Tenures) Act 1989</i> .	The approval of the Department of Lands will be required for any works within Crown road reserves, should they not be closed prior to these works as discussed above.

3.2 AUTHORITY CONSULTATION

The authority consultation process for the project has commenced with initial briefing meetings held with the Department of Planning (DoP), Muswellbrook Shire Council (MSC) and the Department of Natural Resources (DNR), with discussions also held with DEC regarding the Aboriginal archaeology assessment and with the Department of Lands regarding Crown Road reserves in Mt Arthur Coal's operational area. Consultation with DPI has also been ongoing throughout the project planning phase with a Conceptual Mine Plan meeting held with DPI on 22 November 2005. The next phase of the consultation process is the lodgement of the Project Application and this Preliminary Environmental Assessment with DoP who will consult with relevant agencies regarding the Environmental Assessment Requirements for the project.

DoP have indicated that a Planning Focus Meeting will not be required for this project. DPI has stated in writing that they support this position. Following their review of the Project Application, this Preliminary Environmental Assessment and consultation with relevant agencies, DoP will issue the Environmental Assessment Requirements for the project.

In addition to the DoP, the key agencies for this project will be:

- MSC;
- DPI;
- DEC;

- Department of Lands;
- DNR; and
- Roads and Traffic Authority (SEPP 11).

Consultation with the above authorities will be ongoing throughout the environmental assessment phase of the project.

3.3 COMMUNITY CONSULTATION

Initial consultation with the community regarding the project has been undertaken by briefing Mt Arthur Coal's two Community Consultative Committee's (CCCs) and distribution of information regarding the project in Mt Arthur Coal's regular community newsletter. The newsletter is delivered to all addresses within the Muswellbrook LGA, plus other interested parties on Mt Arthur Coal's mailing list (a total of approximately 6,000 households).

The newsletter containing information on the project was distributed in October/November 2005 and contained the following:

- an introduction to the project;
- the project key features;
- a summary of the approval process;
- information about the community involvement program; and
- contact details for obtaining further information on the project including an invitation to arrange a meeting to discuss the project.

A reply paid feedback form was included with the newsletter, with the form including the following question relating to the project:

Do you have any feedback on issues for consideration in the proposed South Pit Extension Environmental Assessment or any other comments on the proposed extension?

A total of 32 responses were returned to Mt Arthur Coal (approximately 0.5% of total newsletters). Of these, 56% didn't respond to the above question, 13% stated they had no issues and 31% provided comments. The comments received included:

- *Hopefully it will go ahead.*
- *Yes - abort for the love of the ozone.*
- *Great to receive comprehensive info on this project, your certainly keeping us informed.*
- *Environmental impacts.*
- *Should not go ahead.*

- *Concerned about extend of open cut mining in Muswellbrook.*
- *Look after the land for our future generations.*
- *Consider pointing your lights at the ground at work in progress rather than up in the sky.*
- *Will read EIS first.*
- *Make sure the facts are true.*

In addition to the above feedback forms, one resident to the northwest of Mt Arthur Coal's operations (Roxburgh Road) also commented on the project via phone. This resident was generally opposed to the project and raised concerns regarding:

- *lack of faith in the approval process;*
- *dust, blasting and spontaneous combustion;*
- *accuracy of predictive modelling; and*
- *perceived constant changes to mines once approved.*

Further consultation will be conducted with the local community once the environmental assessment findings become available, including a further update of the Bayswater No. 3 and MAN CCCs and an overview of assessment findings in Mt Arthur Coal's community newsletter. Where requested or considered necessary, individual meetings with community members will also be undertaken.

4.0 PRELIMINARY ENVIRONMENTAL ASSESSMENT

4.1 ENVIRONMENT AND COMMUNITY CONTEXT

The climate of the Hunter Valley is described as warm temperate, characterised by seasonal variations from hot wet summers to mild dry winters. Rainfall is summer dominant, often occurring as short duration high intensity storms. The area receives an average of 638.8 mm of rainfall per annum, with the wettest month being January with an average monthly rainfall of 78.2 mm.

The topography of the project area is undulating to hilly. Elevations range from 200 mAHD within the south and southeastern extents of the project area to 340 mAHD within the northwestern portion. The higher elevations are associated with a prominent ridgeline which radiates southeast from Mt Arthur, whilst areas of lower elevation are where the project area grades into the Saddlers Creek alluvial zone. The remainder of the project area is characterised by a number of crests at approximately 240 mAHD linked by a series of saddles.

A slope analysis of the project area has previously been undertaken (Resource Planning Pty Ltd 1993) which indicates that the site consists of slopes ranging from low (0-5 degrees) within the eastern extent through to medium (5-10 degrees) and moderately high (14-17 degrees) slope classes, largely associated with the hilltops and prominent ridgeline from Mt Arthur.

Soils within the project area have been mapped by the former Department of Land and Conservation Management and consist of a mixture of soil landscapes including the Liddell, Bayswater, Bray's Hill and Ogilvie landscapes (Kovac and Lawrie 1991). Soil surveys have also

been undertaken in the project area indicating that the southeast portion of the project area consists of Non-calcic Brown soils, with Yellow Podzolics and Solodics concentrated within the eastern extent of the project area (Resource Planning Pty Ltd 1993). The northwestern extent of the project area consists of Red and Yellow Duplex Soils, with concentrated areas of predominantly loamy massive earths (URS 2000). The Yellow Podzolic, Solodic and Yellow Duplex soils are characterised by a relatively thick dispersible A2 horizon with poor structural characteristics and are generally unsuitable for used in rehabilitation works.

Coal mining is the predominant land use within the immediate vicinity of the project area, with the Mt Arthur Coal and Drayton coal mining operations bounding the project area to the west, east and north. Land use to the south of the project area consists of cleared agricultural land used for grazing, with this land also owned by a mining company. Other agricultural land uses within the vicinity of the project area include irrigated cropping and dairying within the Hunter River Floodplain, approximately 8 kilometres north of the project area, with viticulture and horse studs occurring a similar distance to the northwest and south of the project area.

Industrial land uses within the vicinity of the project area range from large infrastructure including the Bayswater Power Station, located approximately 8 kilometres east of the project area, to the Muswellbrook Industrial Estate located approximately 7 kilometres north of the project area.

The closest privately owned residential property is located approximately 6 kilometres northeast of the project area within the Antiene rural residential area. The project area is separated from this residential area by the existing Mt Arthur Coal and Drayton mining areas. Other private residences are located along Denman Road approximately 11 kilometres northwest of project area and within the Muswellbrook Township, which is located approximately 12 kilometres to the northeast.

4.2 PRELIMINARY ENVIRONMENTAL RISK ANALYSIS

To assist in identifying the key environmental and community issues that require further assessment, a preliminary environmental risk analysis has been completed for the project and is included in **Appendix 1**. The risk analysis was completed using the BHP Billiton risk assessment process, with the risk matrix, consequence table and likelihood table used for the assessment included in **Appendix 1A**. Consistent with the BHP Billiton quantitative risk assessment matrix, environmental risks have been categorised as low, medium, high or extreme. As shown in **Appendix 1**, the majority of activities are rated as low or medium level risks, with few high risks and no extreme risks. It is expected that with the completion of further studies and assessment as outlined in **Section 4.3** below, the majority of these high risks will be able to be reduced to medium level risks due to better definition of potential impacts and effective implementation of management and mitigation measures.

The preliminary environmental risk analysis included in **Appendix 1** also identifies those issues considered to require further assessment. The scope of further assessment required for these issues as part of the Environmental Assessment report is discussed in further detail in **Section 4.3** below. Where appropriate, the proposed controls contained in the preliminary environmental risk analysis will be included in the draft Statement of Commitments in the Environmental Assessment report. No further assessment is considered necessary for some potential environmental issues as indicated in **Appendix 1**.

4.3 KEY ENVIRONMENT AND COMMUNITY ISSUES

The key environment and community issues for this project have been determined through the preliminary environmental risk analysis discussed in **Section 4.2** above and through the community consultation program. These issues are discussed in **Sections 4.3.1 to 4.3.8** below, including a

description of the proposed assessment methodology. The assessment of these issues will form the impact assessment section of the Environmental Assessment report prepared for the project.

4.3.1 Ecology

Numerous previous ecological surveys and assessments have been completed across Mt Arthur Coal's operational area, including annual ecological monitoring, providing extensive background information for the ecological assessment. This includes survey work undertaken for the MAN Coal Project EIS (URS 2000), which covers the northern portion of the project area. The portion of the South Pit Extension in the Bayswater No. 3 ML has not been subject to comprehensive survey since the 1990s. Consequently, a full ecological survey over the previously un-mined portion of the project area was required.

A comprehensive ecological survey was completed in the project area in February 2005, including a plot based vegetation survey and a fauna survey including mammal trapping (1166 trap nights), bird searches, diurnal reptile and amphibian searches, spotlighting transects, nocturnal reptile and amphibian searches, Anabat II echolocation recording transects, fixed all night Anabat II echolocation recording, harp trapping and habitat assessment. The survey effort is shown on **Figure 4.1**.

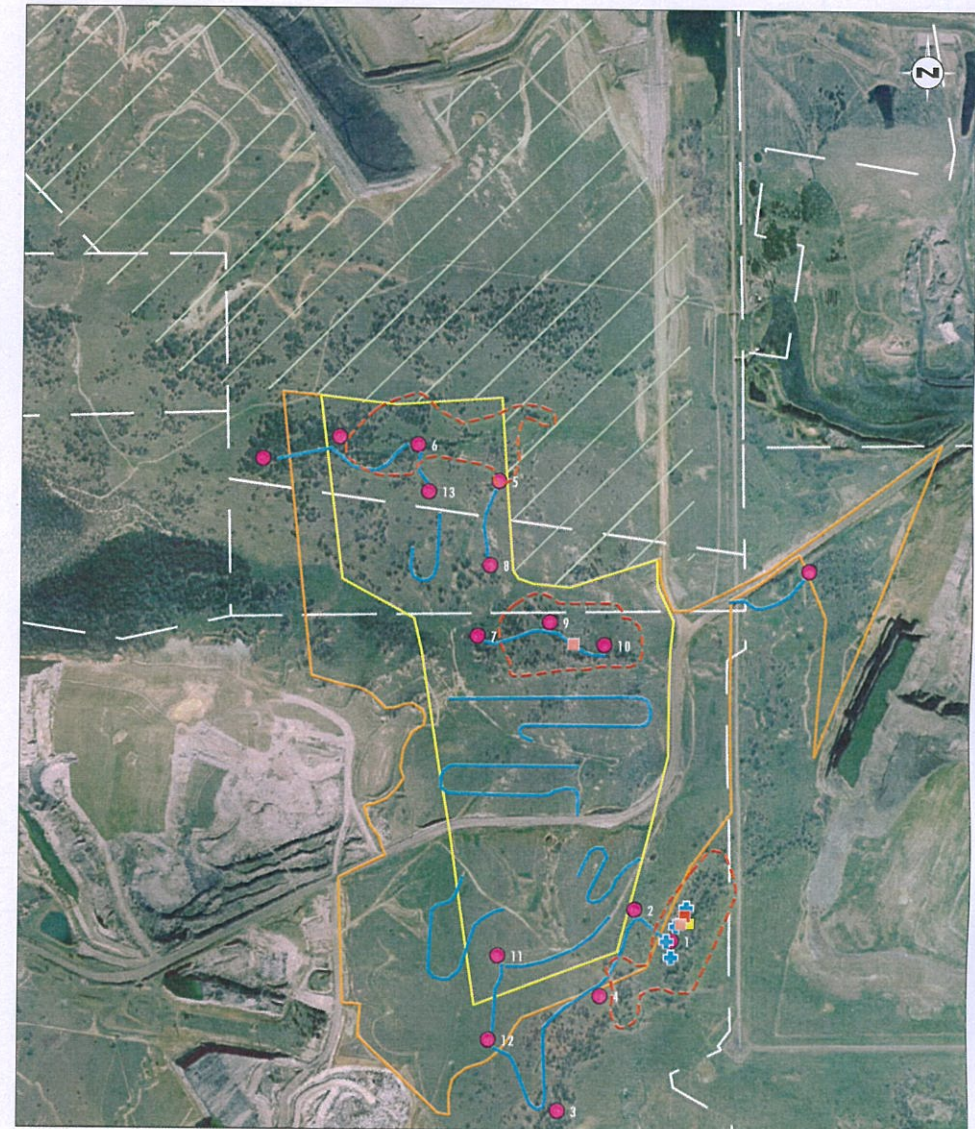
The flora survey found that the floristic diversity of the project area is low, with the area being subject to clearing for past grazing activity and for some previously approved mining related disturbances (e.g. haul roads). Despite the generally disturbed nature of the vegetation of the project area, some areas of woodland/forest vegetation remain and the floristic diversity of the project area is considered representative of similar disturbed woodlands and derived grasslands occurring widely across the Hunter Valley. The survey identified four vegetation communities within the project area being: Hunter Floodplain Red Gum Woodland Complex; Central Hunter Ironbark-Spotted Gum-Grey Box Forest; Central Hunter Bullock Regeneration and derived grassland. No threatened flora species, endangered populations or endangered ecological communities were recorded.

A total of 66 fauna species, including four species listed on the *Threatened Species Conservation Act 1995* (refer to **Figure 4.1**) and seven species listed as migratory on the *Environmental Protection and Biodiversity Conservation Act 1999*, were recorded in the project area and adjoining habitats. Threatened species recorded included the eastern cave bat (*Vespudelus troughtoni*) which was recorded to the east of Mt Arthur and the squirrel glider (*Petaurus norfolcensis*), eastern cave bat (*Vespudelus troughtoni*) and large-footed myotis (*Myotis adversus*) which were recorded along Saddlers Creek to the south of the project area. The vegetation along Saddlers Creek was included in the survey to provide baseline data to consider in mine planning, however, the final mine plan does not directly impact on this area.

An assessment of the potential impact of the project on these species, plus other species previously recorded in Mt Arthur Coal's operational area such as the grey-headed flying-fox, grey-crowned babbler and the speckled warbler, and species considered to potentially occur in the project area will be completed as part of the assessment. The assessment of significance will be undertaken using an initial screening process to identify species that may be potentially significantly impacted, with a full assessment of significance being completed for these species.

4.3.2 Cultural Heritage

The northern section of the project area has previously been comprehensively surveyed as part of the MAN Coal Project (URS, 2000) and has also been the subject of extensive archaeological excavation works (Kuskie and Clarke, 2004). The Bayswater No. 3 ML has also been subject to extensive survey and salvage work, however much of this was completed over 10 years ago, with this area therefore considered to require survey as part of this project. The required survey has been undertaken in consultation with the Aboriginal community and in accordance with the draft



Source: Mt Arthur Coal

0 0.25 0.5 1.0 km
1:20 000

Legend

- Mining and Exploration Lease Boundary
- Approved MAN Mining Area
- South Pit Extension Mining Area
- Approximate New Disturbance Footprint
- Walking Transects
- Vegetation Plots
- eastern bent-wing bat
- large-footed myotis
- eastern cave bat
- squirrel glider
- Fauna Survey Sites

File Name (A4): R05_V1/2000_090.dgn

FIGURE 4.1

Ecological Survey and Threatened Species

Part 3A assessment guideline *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation July 2005* and the *NPWS Standards and Guidelines for Archaeological Report Writing 1997*. Aboriginal consultation for the project has been undertaken in accordance with the above guidelines and following *DECs Interim Community Consultation Requirements for Applicants 2004*.

The MAN Project survey identified 15 sites within the project area (refer to **Figure 4.2**) which were assessed as having low, or low to moderate archaeological significance. These sites were identified and recorded according to archaeological terrain units and environmental and cultural contexts, with areas in which artefacts were located recorded as site loci. Earlier archaeological surveys for the Bayswater Archaeological Research Project (Davidson, James and Fife 1993) also covered part of the southern section of the project area and identified eight archaeological sites within this area. Several of these sites have since been destroyed by subsurface investigations and surface salvage under Section 90 Consents (MacDonald and Davidson 2005). The remaining sites have been re-recorded as part of the Umwelt 2005 survey. The sites recorded by Umwelt's 2005 survey have also been recorded as archaeological terrain units to allow comparison of survey results.

The Umwelt 2005 survey identified eight sites which consisted of 42 site loci within eight archaeological terrain units (refer to **Figure 4.2**). Of these, a total of 30 loci in six sites will be impacted by the project. The minimisation of impacts on Aboriginal sites was considered during the design of the conceptual mine plan, including avoiding mining through Saddlers Creek. Those sites that will not be impacted by the proposed extension will be conserved *in situ*. Five of the six sites to be impacted have been assessed as having only low to moderate archaeological significance on local and regional scales, with the sixth site assessed as having moderate to high archaeological significance due to its larger and more complex assemblage and subsequent potential for that assemblage to assist with answering contemporary research questions.

The draft archaeological assessment report recommends surface collection of the site loci to be impacted by the project due to their Aboriginal cultural heritage significance. Subsurface salvage was not assessed as warranted due to the lack of site integrity and potential archaeological deposit within the site loci and the terrain units in general and in recognition of the comprehensive archaeological investigations (including extensive subsurface investigations) undertaken of similar terrain units across the Bayswater No. 3 and MAN MLs (MacDonald and Davidson, 2005 and Kuskie and Clarke, 2004).

The draft assessment report has been provided to the sixteen registered Aboriginal community groups for comment, with all comments to be integrated into the final report and attached in an Appendix, to be included in the Environmental Assessment.

4.3.3 Hydrology and Water Quality

4.3.3.1 Surface Water

The project area is located primarily within the catchment of Saddlers Creek, with the northern portion of the project area draining north to Whites Creek. The proposed overburden emplacement areas are within Mt Arthur Coal's (and Drayton's) existing minewater catchments, with the South Pit Extension area to be included within Mt Arthur Coal's existing minewater management system. The project will require few changes to the water management system at Mt Arthur Coal with no modifications to the Hunter River water supply or discharge infrastructure currently approved and in place.

The aspects of surface water management that require further assessment include:

- the location and capacity of the required clean water diversion drain around the extended South Pit;



- a revised water balance for the Mt Arthur Coal operation to assess the adequacy of current water sources;
- the potential impacts of pit water capture on downstream flows in natural drainage lines; and
- the potential interaction of the project with the 1:100,00 year flood level along Saddlers Creek.

These aspects of surface water management will be assessed and discussed in the Environmental Assessment report for the project.

4.3.3.2 Groundwater

A detailed groundwater impact assessment is currently being completed for the project by Australasian Groundwater and Environmental Consultants (AGE). The groundwater assessment will:

- describe the existing groundwater environment in the project area;
- predict the project specific groundwater impacts for the South Pit Extension including any potential impact on Saddlers Creek;
- determine the groundwater contribution to the operations water balance; and
- assess the cumulative groundwater impacts associated with existing Mt Arthur Coal operations and other nearby mining operations.

The groundwater impact assessment modelling will be completed using a three-dimensional numerical groundwater flow model development using the FEFLOW simulation package.

4.3.4 Noise

Noise is currently a key environmental management issue for Mt Arthur Coal and will therefore be a key issue for the South Pit Extension project. Wilkinson Murray Pty Limited will undertake the noise assessment for the Environmental Assessment in accordance with the NSW Industrial Noise Policy. The noise goals adopted for the project are Mt Arthur Coal's existing noise limits as specified in the MAN development consent (DA 144-05-2000).

Preliminary noise modelling was completed early in the project to assist with mine planning, with detailed modelling of the final conceptual mine plan currently being completed. The environmental noise model will predict the noise levels from operations in the project area during neutral and adverse weather conditions.

A detailed noise impact assessment will be completed for the EA and will include:

- analysis and discussion of the existing noise environment in the project area based on existing monitoring data;
- prediction of the noise emissions for the project for three mining phases (South Pit years 5, 10 and 15) considered to be representative years;
- an assessment of the impact of the proposed development on the nearest residences in accordance with the DEC's Industrial Noise Policy;

- an assessment of the cumulative impacts associated with Mt Arthur Coal's existing open cut mining operations plus other nearby mining operations; and
- an outline of recommendations relating to noise monitoring and management.

As the project involves use of mining equipment from the MAN mining area, the most appropriate way to model the noise from the project is to remodel the entire MAN operation with the relevant equipment operating in the South Pit Extension area. This will ensure that an accurate prediction of total noise impacts is made at residential receiver locations. The receiver locations modelled will be generally the same as those used for the MAN EIS, except where these properties are now owned by mining operations.

Mt Arthur Coal has an extensive noise monitoring program including a number of directional noise monitoring stations. This monitoring data has been used to undertake a noise model calibration exercise to ensure that noise model predictions are as accurate as possible. The calibration was undertaken using monitoring results from winter periods and actual equipment locations. This calibration exercise has found that the most accurate representation of actual operational noise levels occurs using a temperature inversion value of 4°/100 metres. This temperature inversion value will therefore be used in all modelling undertaken for this project and further details of the calibration exercise will be included in the noise assessment.

As total annual coal processing and export will remain within the currently approved limits, there will not be any change to rail transport as a result of this project. As there is no change to rail movements, rail movements will not be remodelled as part of this project.

4.3.5 Air Quality

The air quality assessment will consider the potential impacts of the project on the existing air quality environment. As discussed for noise above, the air quality assessment will involve remodelling the entire MAN operation with the South Pit Extension operations included. The assessment will be completed in accordance with current DEC guidelines.

The air quality assessment will include the following components:

- an assessment of existing air quality in the project area through a review of air quality monitoring data for dust deposition and concentrations of PM₁₀;
- the development of an emissions inventory for three mining phases (South Pit years 5, 10 and 15);
- the assessment of impacts on nearest residences using a dispersion model and relevant meteorological data to predict dust deposition rates and concentrations of PM₁₀ (24-hour and annual average) and TSP (annual average). The predicted values will be compared with current NSW DEC criteria;
- an assessment of the cumulative dust impacts associated with emissions from nearby mines; and
- recommendations relating to the management and minimisation of dust.

4.3.6 Spontaneous Combustion

Spontaneous combustion has been a key management issue for Mt Arthur Coal in the Bayswater No. 2 area and Drayton Coal in the Drayton West Pit. Overburden emplacement is proposed in both of these areas as part of the South Pit Extension Project with one of the key aims being to

rehabilitate areas currently affected by spontaneous combustion. Management of spontaneous combustion in these areas as part of this project will be undertaken using existing site management systems and will be discussed in further detail in the Environmental Assessment.

The proposed South Pit Extension area contains the same coal seams mined in the MAN mining area and spontaneous combustion in the mining area is not considered a high risk with existing management controls in place.

4.3.7 Greenhouse Gas

Coal mining results in the emission of carbon dioxide during the combustion of diesel fuel used in diesel powered equipment, through blasting, indirectly in the use of electricity to power mining equipment and through exposed coal seams. In addition, carbon dioxide is added to the atmosphere when customers burn the coal.

Given that total production at Mt Arthur Coal will remain within currently approved limits as a result of the project, the projected greenhouse gas emissions from Mt Arthur Coal's operations will be generally consistent with those discussed in the MAN EIS (URS, 2000). As discussed in Section 2.2, however, approval is sought for 21 years operation in the South Pit Extension area which is for five years beyond the currently approved life of MAN. Therefore, an assessment of the greenhouse gas emissions during this five year period is planned to be completed as part of the Environmental Assessment report.

4.3.8 Visual Impact

The general scenic amenity of the area and potential views from surrounding residences will be addressed in the Environmental Assessment report. Based on initial contour analysis, views of the extended South Pit will be limited due to surrounding topography, however, the overburden emplacement areas may be visible from some locations in the South Muswellbrook, Antiene and Roxburgh Road areas. To assess the potential visual impact of the project, a transect analysis will be completed for these locations, with recommendations made where necessary to minimise potential visual impacts.

It should be noted that the project will result in an improved final landform in the Bayswater No. 2 and Drayton west pit areas and that any medium term impacts associated with earthworks in these areas are considered likely to be offset by the long-term rehabilitation outcomes.

4.3.4 Rehabilitation and Site Decommissioning

The preliminary environmental risk analysis identified the issues of topographic change and decommissioning of the Bayswater No. 2 CHPP and workshop facilities prior to overburden emplacement, as issues requiring further assessment. The issue of topographic change relates to final void implications of the project and will be subject to further discussion in the Environmental Assessment report. With respect to the final void, the objective in mine design work completed to date has been to minimise the size and number of any final void by building on existing approved final void concepts.

General rehabilitation measures will also be discussed in the Environmental Assessment report focussing on final land use objectives. As discussed earlier, significant improvements in rehabilitation outcomes are proposed as part of this project with some existing voids at Bayswater No. 2 and Drayton to be filled and additional inert capping material emplaced above areas affected by spontaneous combustion.

The closure and decommissioning of the former Bayswater No. 2 CHPP and workshop will require detailed planning as part of the revision of the Bayswater No. 2 Mining Operations Plan should the

project be approved. A decommissioning strategy will be included in the Environmental Assessment report so that any key decommissioning issues can be identified and assessed.

5.0 PROJECT SCHEDULE

Mt Arthur Coal intends to lodge the draft Environmental Assessment for the proposed South Pit Extension Project in the second quarter of 2006. Approval for the project is sought by the last quarter of 2006, allowing the commencement of operations in early 2007. It is due to this timing that it is not possible to combine the approval process for this project with the approval process for the Mt Arthur Coal Underground Project for which a Planning Focus Meeting will be held in late February 2006.

6.0 REFERENCES

- Davidson, I R James and R Fife 1993. *Archaeological Investigations Proposed Bayswater No. 3 Colliery Authorisation area (A437)*. Report prepared for Resource Planning Pty Ltd.
- Davidson, I and K MacDonald 1998. *The Bayswater Archaeological Research Project. School of Human and Environmental Studies, University of New England, Armidale, NSW. Volume 1*. Unpublished report.
- Kuskie, P J and E A Clarke 2004. *Salvage of Aboriginal Heritage Sites in the Mount Arthur North Coal Mine Lease, Hunter Valley, New South Wales. Volume A*. Report to BHP Billiton – Hunter Valley Energy Control.
- URS Australia Pty Limited 2000. *The Mount Arthur North Coal Project Environmental Impact Statement*. Prepared for Coal Operations Australia Limited.
- Resource Planning Pty Limited 1993. *Bayswater No. 3 Coal Mine Project Environmental Impact Statement*. Prepared for Bayswater Colliery Company Pty Limited.

APPENDIX 1

Potential Environmental Risk Analysis

Mt Arthur Coal South Pit Extension Project

Preliminary Environmental Risk Analysis

Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
MINING								
Vegetation Clearance & Topsoil Removal (inc. mining areas, haul roads, water management structures etc)	European heritage	Disturbance of sites of European heritage significance	There are no known European heritage sites within the proposed disturbance area. No sites were identified during a field survey undertaken by archaeologists across the project area.	1	A	L	No further assessment is required.	No
	Ecology	Loss of native flora and fauna	Ecological survey completed in the project area with four threatened species recorded. A full assessment of the potential impacts of the project on ecological values will be completed.	3	C	H	An assessment of the potential impacts of the project on ecological values is required.	Yes
	Cultural heritage	Disturbance of Aboriginal places or objects	A survey of the area has been conducted with representatives of the Aboriginal community. Twenty-three sites have been identified within the proposed disturbance area, during this survey. A draft impact assessment report has been prepared and provided to the Aboriginal community.	3	D	H	An assessment of the potential impacts of the project on cultural heritage values of the site is required. The assessment will be completed in consultation with the local Aboriginal community.	Yes
	Erosion and sediment runoff	Sedimentation of local waterways	All topsoil stripping and stockpiling will be undertaken in accordance with Mt Arthur Coal's approved topsoil stripping plan. Appropriate erosion and sediment controls will be designed and constructed for all clearing and topsoil stripping areas in accordance with <i>Soils & Construction</i> (Landcom, 2004).	1	A	L	Due to effective mitigation of this potential impact further assessment is not required.	No

Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
	Clean Water Management	Contamination of clean water	Diversion drains will be constructed to divert all clean waters away from disturbed areas. The location and concept design of these drains will be included in the Environmental Assessment report.	2	B	L	The proposed location and concept design of drains will be included in the Environmental Assessment report.	Yes
	Water Balance	Water demand for dust suppression.	There is expected to be minimal change to the existing Mt Arthur Coal water balance as a result of this project, with existing water supplies considered likely to be sufficient. A mass water balance will be undertaken to confirm supply adequacy.	2	B	L	A mass water balance will be undertaken to confirm supply adequacy.	Yes
	Dust Generation	Degradation of air quality	Dust impacts are currently a key issue for Mt Arthur Coal and although the contribution of the South Pit Extension is considered unlikely to significantly change current dust impacts, a detailed assessment of dust impacts associated with the project will be completed.	2	C	M	A detailed dust assessment is to be completed.	Yes
	Noise Generation	Degradation of noise amenity (cumulative)	Noise impacts are a current key issue for Mt Arthur Coal and although the contribution of the South Pit Extension is considered unlikely to significantly change current noise impacts, a detailed assessment of noise impacts associated with the project will be completed.	2	C	M	A detailed noise assessment is to be completed.	Yes
	Visual amenity	Aesthetics of exposed earthworks and top soil stockpiles	The proposed mining area is surrounded by existing mining operations and located over 6 kilometres from the nearest residence. The surrounding topography will prevent potential views of the clearing and topsoil stripping areas.	1	A	L	No further assessment is required.	No

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Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
	Land Capability	Loss/deterioration of land capability	Mapping of the land capability of the area was completed by the then Soil Conservation Service and was provided in digital format by DNR in early 2004. The mapping indicates that the previously undisturbed land within the project area consists of Class V land Class VI land. These land classes are primarily suitable for grazing. The area is not currently used for any agricultural activity due to its proximity to mining areas. Rehabilitation of disturbed areas will result in the restoration of landforms capable of supporting future grazing activity and the impact of the project on long-term land capability is therefore not considered significant.	1	A	L	No further assessment is required.	No
	Agricultural Suitability	Loss/deterioration of agricultural suitability	The agricultural suitability of the existing land has been mapped by the Department of Environment and Planning (1981) showing that the project area consists of classes 3, 4 and 5 land indicating that the land is primarily suitable for grazing activity. The area is not currently used for any agricultural activity due to its proximity to mining areas. Rehabilitation of disturbed areas will result in the restoration of landforms capable of supporting future grazing activity and the impact of the project on agricultural suitability is therefore not considered significant.	1	A	L	No further assessment is required.	No

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Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
	Soils	Loss of productive topsoil.	Previous soil assessment has indicated soils within the project area are mildly dispersive, and that some subsoils are dispersive. Soil stripping and management will be undertaken in accordance with the approved MAN Topsoil Stripping Plan which will ensure effective recovery and storage of topsoil prior to re-use.	1	B	L	Due to effective management of this potential impact further assessment is not required.	No
	Greenhouse Gas emissions	Degradation of air quality	All vegetation clearing and topsoil removal operations will be undertaken utilising the approved Mt Arthur Coal equipment fleet. In addition, production rates will not increase above existing approved limits as part of this project. The project will, if approved continue mining in the South Pit Extension area beyond the currently approved limit of operations at MAN and an assessment of the contributions of this extended period is required.	2	C	M	Calculation of the greenhouse gas emissions resulting from the continued mining in the South Pit Extension area beyond the currently approved life of the MAN mining area is required.	Yes
Drill and Blast	Noise Generation	Degradation of noise amenity (cumulative)	All drilling activities will be undertaken in a manner that minimises noise emissions in accordance with the Mt Arthur Coal EMS. Noise is, however, currently a key issue for Mt Arthur Coal and although the noise contribution of the South Pit Extension is expected to be minimal, a detailed assessment of noise impacts associated with the project will be completed.	2	C	M	A detailed noise assessment is to be completed.	Yes
	Dust Generation	Degradation of air quality	All drilling activities will be undertaken in a manner that minimises dust emissions in accordance with the Mt Arthur Coal EMS. Appropriate blasting controls (including restricting blasting during specific weather conditions etc) will be implemented consistent with Mt Arthur Coal's EMS to minimise potential dust generation. Dust is, however, currently a key issue for Mt	2	C	M	A detailed dust assessment is to be completed.	Yes

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Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
			Arthur Coal and although the contribution of the South Pit Extension to overall dust generation is expected to be minimal, a detailed assessment of dust impacts associated with the project will be completed.					
	Airblast Overpressure	Degradation of noise amenity.	Blasting will managed in accordance with Mt Arthur Coal's existing procedures to minimise potential impacts. The South Pit Extension area is significantly further away from residential receivers than existing mining areas with blasting impacts therefore able to be managed within Mt Arthur Coal's existing limits.	2	B	L	As blasting impacts can be effectively managed using existing systems, further assessment is not required.	No
	Ground Vibration	Damage to property and infrastructure	Blasting will managed in accordance with Mt Arthur Coal's existing procedures to minimise potential impacts. The South Pit Extension area is significantly further away from residential receivers than existing mining areas with blasting impacts therefore able to be managed within Mt Arthur Coal's existing limits.	2	B	L	As blasting impacts can be effectively managed using existing systems, further assessment is not required.	No
	Fumes	Degradation of visual amenity	Blasting will be undertaken in accordance with existing blasting procedures outlined with Mt Arthur Coal EMS to minimise the potential for fume generation. The project area is further away from receiver locations than existing mining areas and therefore the potential impact of fume is expected to be minimal.	1	B	L	Further assessment is not required.	No
	Storage & transport of explosives	Public safety hazard and environmental hazard.	Explosives will be stored and transported in accordance with relevant legislation and standards, as per current practice at Mt Arthur Coal.	2	B	L	As there will be no change to current explosives handling practice at Mt Arthur Coal, no further assessment is required.	No

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Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
	Greenhouse Gas emissions	Degradation of air quality	All drilling will be undertaken utilising the approved Mt Arthur Coal equipment fleet. In addition, production rates will not increase above existing approved limits as part of this project. The project will, if approved, continue mining in the South Pit Extension area beyond the currently approved limit of operations at MAN and an assessment of the contributions of this extended period is required.	2	C	M	Calculation of the greenhouse gas emissions resulting from the continued mining in the South Pit Extension area beyond the currently approved life of the MAN mining area is required.	Yes
Overburden Removal & Transport and ROM Coal Removal & Transport	Topography	Alteration of existing topography	Mining will impact the existing landform by creation of a void. This void is planned to be used for emplacement of overburden, however the potential for a final void to remain requires further investigation. The rehabilitation and closure of this area will be considered as part of Mt Arthur Coal's life of mine planning and closure planning.	3	C	H	Further assessment of mine rehabilitation and closure is required.	Yes
	Groundwater	Degradation of natural groundwater flow and quality	Given the surrounding mining areas, the potential cumulative impact of the project on groundwater aquifers is considered unlikely to be significant, however a groundwater impact assessment will be completed.	3	B	M	A groundwater impact assessment will be completed.	Yes
	Noise generation	Degradation of noise amenity (cumulative)	Noise impacts are currently a key issue for Mt Arthur Coal and although the contribution of the South Pit Extension is considered unlikely to significantly change current noise impacts, a detailed assessment of noise impacts associated with the project will be completed.	2	C	M	A detailed noise assessment will be completed.	Yes
	Dust generation	Degradation of air quality	Dust impacts are currently a key issue for Mt Arthur Coal and although the contribution of the South Pit Extension is considered unlikely to significantly change current dust impacts, a detailed assessment of dust impacts associated with the project will be completed.	2	C	M	A detailed dust assessment will be completed.	Yes

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Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
	Clean Water Management	Contamination of clean water	Diversion drains will be constructed to divert all clean waters away from disturbed areas. The location and concept design of these drains will be included in the Environmental Assessment report.	2	B	L	The proposed location and concept design of drains will be included in the Environmental Assessment report.	Yes
	Surface water capture	Alteration of surface drainage	The project will result in capture of surface water within the mining area. This water will be used for mining purposes (e.g. dust suppression). The capture of surface waters will result in a reduction of flows in the natural drainage systems. Although the incremental impact on these drainage systems is expected to be minimal, further assessment will be completed.	3	B	M	Further assessment of the impacts of surface water capture on flows in natural drainage lines will be completed.	Yes
	Surface water flows	Flooding	The project has been designed to not directly impact on Saddlers Creek, however due to the proximity of the proposed service corridor to the creek, the potential impacts of flooding in a 1:100 year event needs to be assessed.	3	B	M	The potential for a 1:100 year flood event to impact on the project requires further assessment.	Yes
	Pit water management system	Impacts on natural drainage systems	The mining pit will be internally draining and collected mine water will be incorporated within the existing Mt Arthur Coal dirty water management system. The potential for accidental release of minewater from this system is minimal.	1	A	L	No further assessment is required.	No
	Erosion and sediment runoff	Sedimentation of local waterways	The mining pit will be internally draining and therefore any sediment mobilised will be contained within the pit.	1	A	L	No further assessment is required.	No
	Water Balance	Water demand for dust suppression.	There is expected to be minimal change to the existing Mt Arthur Coal water balance as a result of this project, with existing water supplies considered likely to be sufficient. A mass water balance will be undertaken to confirm supply adequacy.	2	B	L	A mass water balance will be undertaken to confirm supply adequacy.	Yes

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Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
	Greenhouse Gas emissions	Degradation of air quality	All mining will be undertaken utilising the approved Mt Arthur Coal equipment fleet. In addition, production rates will not increase above existing approved limits as part of this project. The project will, if approved, continue mining in the South Pit Extension area beyond the currently approved limit of operations at MAN and an assessment of the contributions of this extended period is required.	2	C	M	Calculation of the greenhouse gas emissions resulting from the continued mining in the South Pit Extension area beyond the currently approved life of the MAN mining area is required.	Yes
Overburden Emplacement	Visual amenity	Degradation of visual amenity	A preliminary visual assessment has been undertaken for this project. Based on topography alone the overburden emplacement areas at Bayswater No. 2 may potentially be viewed from the South Muswellbrook, Antiene and Roxburgh Road areas. The overburden emplacement in this area will assist in the completion of rehabilitation and will result in a long-term improvement of visual amenity, however, further assessment of impacts during the completion of these areas is required.	2	B	L	Further assessment of potential views of emplacement areas from South Muswellbrook, Antiene and Roxburgh Road is required.	Yes
	Topography	Alteration of existing topography	The emplacement of overburden will result in an improved final landform. The rehabilitation of this area will be considered as part of Mt Arthur Coal's life of mine planning and closure planning.	2	B	L	Further assessment of mine rehabilitation and closure is required.	Yes
	Noise generation	Degradation of noise amenity (cumulative)	Noise impacts are currently a key issue for Mt Arthur Coal and although the contribution of the South Pit Extension is considered unlikely to significantly change current noise impacts, a detailed assessment of noise impacts associated with the project will be completed.	2	C	M	A detailed noise assessment is to be completed.	Yes

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Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
	Dust generation	Degradation of air quality	Dust impacts are currently a key issue for Mt Arthur Coal and although the contribution of the South Pit Extension is considered unlikely to significantly change current dust impacts, a detailed assessment of dust impacts associated with the project will be completed.	2	C	M	A detailed dust assessment is to be completed.	Yes
	Clean Water Management	Contamination of clean water	The overburden emplacement areas will all be within existing disturbed areas and are within the existing mine water management system. No 'clean water' will be impacted.	1	A	L	No further assessment is required.	No
	Surface water capture	Alteration of surface drainage	The overburden emplacement areas will all be within existing disturbed areas and are within the existing mine water management system. Therefore there will be no additional surface water capture.	1	A	L	No further assessment is required.	No
	Pit water management system	Impacts on natural drainage systems	The overburden emplacement areas will all be within existing disturbed areas and are within the existing mine water management system. The potential for accidental release of mine water from this system is minimal.	1	A	L	No further assessment is required.	No
	Erosion and sediment runoff	Sedimentation of local waterways	Appropriate erosion and sediment controls will be designed and constructed for all emplacement areas in accordance with <i>Soils & Construction</i> (Landcom, 2004). The final design of these structures will be included in the Mining Operations Plan prepared for the emplacement areas.	2	B	L	The design criteria for these structures has been established and the final design will be completed as part of the Mining Operations Plan process once the final design of the emplacement area is completed.	Yes
	Water Balance	Water demand for dust suppression.	There is expected to be minimal change to the existing Mt Arthur Coal water balance as a result of this project, with existing water supplies considered likely to be sufficient. A mass water balance will be undertaken to confirm supply adequacy.	2	B	L	A mass water balance will be undertaken to confirm supply adequacy.	Yes

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Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
	Ecology Cultural heritage European heritage	Loss of flora and fauna Disturbance of Aboriginal places or objects Disturbance of European heritage sites	Overburden emplacement areas will be located within existing mining areas and as such will not involve disturbance of currently undisturbed land.	1	A	L	No further assessment is required.	No
	Land Capability Agricultural Suitability	Loss/deterioration of land capability Loss/deterioration of agricultural suitability	Overburden emplacement areas will be located within existing mining areas and as such will not involve disturbance to existing undisturbed land. Rehabilitation of these areas will provide an improvement in land capability and agricultural suitability.	1	A	L	No further assessment is required.	No
	Soils	Rehabilitation outcomes	Overburden emplacement areas will be located within existing mining areas and as such will not involve disturbance to any areas with topsoil. Soil availability for use in rehabilitation, and techniques to meet rehabilitation objectives will be discussed in detail in the Mining Operations Plan prepared for the area should this project will be approved. On this basis, no further assessment is required at this stage of the project.	2	B	L	No further assessment is required.	No
	Decommissioning of former Bayswater No. 2 CHPP and Workshop Facilities	Potential contamination issues. Waste management. Efficient use of resources.	The location of the former Bayswater No. 2 CHPP and workshop facilities will be covered by overburden as part of the South Pit Extension Project. Prior to this emplacement, the facilities need to be decommissioned. A preliminary contamination assessment will be undertaken to identify any potential contamination issues and a decommissioning strategy developed.	2	C	M	Completion of a Phase I contamination assessment. Development of a decommissioning strategy.	Yes

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Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
	Greenhouse Gas emissions	Degradation of air quality	All overburden emplacement will be undertaken utilising the approved Mt Arthur Coal equipment fleet. In addition, production rates will not increase above existing approved limits as part of this project. The project will, if approved, continue mining in the South Pit Extension area beyond the currently approved limit of operations at MAN and an assessment of the contributions of this extended period is required.	2	C	M	Calculation of the greenhouse gas emissions resulting from the continued mining in the South Pit Extension area beyond the currently approved life of the MAN mining area is required.	Yes
COAL HANDLING PREPARATION & PRODUCT COAL TRANSPORT								
CHPP Operation	Noise generation	Degradation of noise amenity	Existing CHPP and transport facilities will be utilised for this project. Production levels will not increase above existing approved levels and no changes to the existing facilities will be required. Noise is, however, a key issue for Mt Arthur Coal and the cumulative impacts of the operation including the South Pit Extension will be assessed, including contributions from CHPP and rail facility operations.	2	L	M	A detailed noise assessment is to be completed.	Yes
	Dust generation	Degradation of air quality	Existing CHPP and transport facilities will be utilised for this project. Production levels will not increase above existing approved levels and no changes to the existing facilities will be required. Dust generation is, however, a key issue for Mt Arthur Coal and the cumulative impacts of the operation including the South Pit Extension will be assessed, including contributions from CHPP and rail facility operations.	2	C	M	A detailed dust assessment is to be completed.	Yes

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Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
	Visual	Degradation of visual amenity	Existing CHPP and transport facilities will be utilised for this project, with no changes. As such, there will be no impact on visual amenity associated with these facilities as part of this project.	1	A	L	No further assessment is required.	No
	Greenhouse Gas emissions	Degradation of air quality	All coal processing and transportation will be undertaken utilising existing equipment. In addition, production rates will not increase above existing approved limits as part of this project. The project will, if approved, continue operations in the South Pit Extension area beyond the currently approved limit of operations at MAN and an assessment of the contributions of this extended period is required.	2	C	M	Calculation of the greenhouse gas emissions resulting from the continued operations in the South Pit Extension area beyond the currently approved life of the MAN mining area is required.	Yes
	Clean Water Management Dirty Water Management	Contamination of clean water Contamination of waterways from mine water	Existing CHPP and transport facilities will be utilised for this project, with no changes. The existing water management system is effective will remain in place.	1	A	L	No further assessment is required.	No
	Cultural heritage European heritage Ecology	Disturbance of Aboriginal places or objects Disturbance of European heritage sites Loss of flora and fauna	Existing CHPP and transport facilities will be utilised for this project, with no changes. There will be no impact on cultural heritage, European heritage or ecological values.	1	A	L	No further assessment is required.	No
Coarse Reject Disposal	Noise generation	Degradation of noise amenity	Existing equipment and facilities will be utilised for this project with no changes. Noise is, however, a key issue for Mt Arthur Coal and the cumulative impacts of the operation including the South Pit Extension will be assessed, including contributions from coarse reject disposal operations.	2	C	M	A detailed noise assessment is to be completed.	Yes

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Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
	Dust generation	Degradation of air quality	Existing equipment and facilities will be utilised for this project with no changes. Dust generation is, however, a key issue for Mt Arthur Coal and the cumulative impacts of the operation including the South Pit Extension will be assessed, including contributions from coarse reject disposal operations.	2	C	M	A detailed dust assessment is to be completed.	Yes
	Clean Water Management Dirty Water Management	Contamination of clean water Contamination of waterways from mine water	There will be no change to existing coarse reject management as part of this project. Existing water management systems are effective and will be utilised for this project.	1	A	L	No further assessment is required.	No
	Cultural heritage European heritage Ecology	Disturbance of Aboriginal places or objects Disturbance of European heritage sites Loss of flora and fauna	Existing disposal locations will be utilised for this project. As such there will not be any disturbance to cultural heritage, European heritage or ecological values.	1	A	L	No further assessment is required.	No
Tailings Management & Disposal	Water management	Contamination of waterways and aquifers	There will be no change to existing tailings management as part of this project. Existing water management systems are effective and will be utilised for this project.	1	A	L	No further assessment is required.	No
	Noise generation	Degradation of noise amenity	Existing equipment and facilities will be utilised for this project with no changes. Noise is, however, a key issue for Mt Arthur Coal and the cumulative impacts of the operation including the South Pit Extension will be assessed, including contributions from tailings disposal operations.	2	C	M	A detailed noise assessment is to be completed.	Yes

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Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
	Dust generation	Degradation of air quality	Existing equipment and facilities will be utilised for this project with no changes. Dust generation is, however, a key issue for Mt Arthur Coal and the cumulative impacts of the operation including the South Pit Extension will be assessed, including contributions from tailings disposal operations.	2	C	M	A detailed dust assessment is to be completed.	Yes
	Cultural heritage European heritage Ecology	Disturbance of Aboriginal places or objects Disturbance of European heritage sites Loss of flora and fauna	There will be no change to disposal locations as part of this project. As such there will not be any disturbance to cultural heritage, European heritage or ecological values.	1	A	L	No further assessment is required.	No
ANCILLARY ACTIVITIES AND ISSUES								
Waste Management	Waste Disposal	Pollution/contamination due to incorrect disposal. Inefficient use of resources.	All wastes generated as part of this project will be managed by Mt Arthur Coal's existing integrated waste management system and in accordance with the Mt Arthur Coal EMS. No new wastes or significant changes to current waste volumes will occur.	1	A	L	No further assessment is required.	No
	Oil, grease & fuel storage	Soil and/or water contamination from spills or leaks	All fuels, oils, grease etc will be collected and handled using existing systems which are designed and operated in accordance with relevant legislation and standards. No changes to these facilities are required as part of this project.	2	B	L	No further assessment is required.	No
Workforce & Amenities	Transport and access of employees to site	Impact on existing transport infrastructure	Employment levels will not increase to above that of the existing approved Mt Arthur Coal operations. Impacts associated with workforce levels will therefore not change.	1	A	L	No further assessment is required.	No

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Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
	Local services	Impact on services/local infrastructure.	Employment levels will not increase to above that of the existing approved Mt Arthur Coal operations. Impacts associated with workforce demand for services and on local infrastructure will therefore not change.	1	A	L	No further assessment is required.	No

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Appendix 1A

Quantitative Risk Assessment Matrix

Likelihood or Frequency	Consequence Severity				
	Low (1)	Minor (2)	Moderate (3)	Major (4)	Critical (5)
E – Almost Certain	High	High	Extreme	Extreme	Extreme
D – Likely	Moderate	High	High	Extreme	Extreme
C – Possible	Low	Moderate	High	Extreme	Extreme
B – Unlikely	Low	Low	Moderate	High	Extreme
A – Rare	Low	Low	Moderate	High	High

Consequence Table

Severity Level	Natural Environment	Social/Cultural Heritage	Community/Govt Reputation/Media
1	Limited damage to minimal area of low significance.	Low-level repairable damage to commonplace structures.	Public concern restricted to local complaints.
2	Minor effects on biological or physical environment.	Minor medium-term social impacts on local population. Minor damage to structures/items of some significance. Mostly repairable.	Minor, adverse local public or media attention and complaints.
3	Moderate, short-term effects but not affecting ecosystem function.	Ongoing social issues. Permanent damage to items of cultural significance.	Attention from media and/or heightened concern by local community. Criticism by NGOs.
4	Serious medium term environmental effects.	On-going serious social issues. Significant damage to structures/items of cultural significance.	Significant adverse national media/public/NGO attention.
5	Very serious, long term environmental impairment of ecosystem function.	Very serious, widespread social impacts. Irreparable damage to highly valued items.	Serious public or media outcry (international coverage).

Likelihood Table

Likelihood	Description in context of a task	Frequency Description	Per year equivalent frequency
A - Rare	Consequence may occur under exceptional circumstances, or could occur elsewhere at similar facilities	Occurs once every 1000 – 10000 years	Occurs once every 1000 - 10000 years
B – Unlikely	Consequence may occur at some time	Occurs once every 100 - 1000 years	Occurs once every 100 – 1000 years
C – Possible	Consequence could occur at some time	Occurs once every 10 - 100 years	Occurs once every 10 - 100 years
D – Likely	Consequence will probably occur in most circumstances	Occurs once every 1 – 10 years	Occurs once every 1 – 10 years
E – Almost Certain	Consequence expected to occur in most circumstances	Occurs more than once every month – year	Occurs 1 – 12 times per year
		Occurs once every week – month	Occurs 12 – 52 times per year
		Occurs more than once per week	Occurs more than 52 times per year

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