Executive Summary

INTRODUCTION

This *Environmental Assessment* has been prepared by R.W. Corkery & Co. Pty. Limited to accompany an application for project approval by Narrabri Coal Pty Ltd ("the Proponent") to develop and operate an underground coal mine to be known as the Narrabri Coal Project. The area that encompasses the surface infrastructure associated with the project together with the boundaries of the indicative limit of the underground workings is referred to as the "Project Site".

As illustrated in **Figure A**, the Project Site is located on the western side of the Kamilaroi Highway, approximately 30km south-southeast of Narrabri and 10km north-northwest of Baan Baa. The Project Site covers an area of approximately 5 210ha within Exploration Licence (EL) 6243, held by the Proponent, with the majority of this area located on freehold agricultural land. A small area of the Project Site is located within Pilliga East State Forest. The Proponent owns the freehold title to four of the properties within the Project Site, totalling an area of approximately 1 200ha, on which all direct surface disturbing activities would be undertaken.

The Narrabri Coal Project is classified as a Major Project in accordance with the State Environmental Planning Policy (Major Projects) (2005) and, consequently, the Minister for Planning is the approval authority. As a Major Project, it will be assessed under Part 3A of the *Environmental Planning and Assessment Act 1979* and an *Environmental Assessment* report is required to be submitted to support the application for project approval.

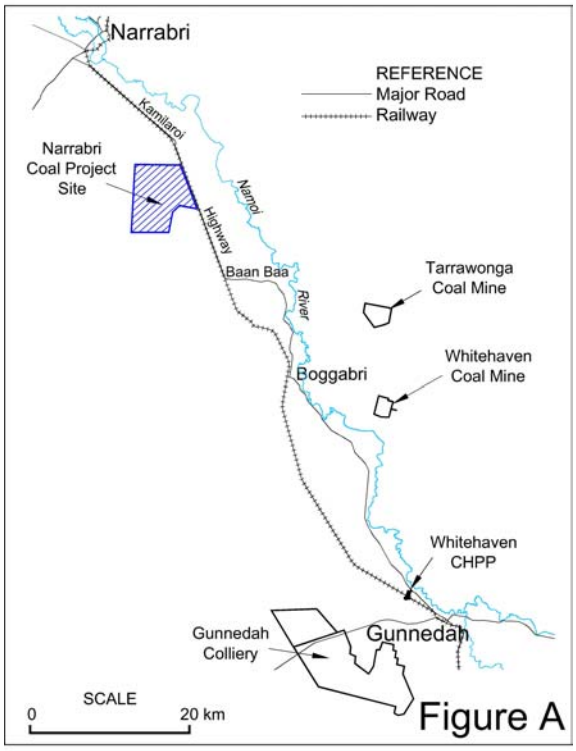


Figure A

The Narrabri Coal Project is proposed to be undertaken in two stages. Stage 1 would involve the establishment of surface facilities to support the proposed underground mine, using underground continuous miner methods. If the result of technical studies are supportive, Stage 2 would involve the conversion of the mine to a longwall mining operation, however, the changed operation would be the subject of an additional application for project approval with a new *Environmental Assessment* likely to be submitted in about 2009/2010.

This *Environmental Assessment* focuses on Stage 1 of the Narrabri Coal Project, herein referred to as "the project", where there is a considerable understanding of the mining method and environmental management requirements, from its initial establishment through to its rehabilitation in the event that none of the defined coal resource is able to be recovered by longwall mining methods.

This summary presents an overview of the project and the predicted impacts associated with the project.

THE PROPONENT

The Proponent for the Narrabri Coal Project is Narrabri Coal Pty Ltd, a private company associated with Whitehaven Coal Mining Pty Ltd (WCM) through common shareholders and directors.

The directors of Narrabri Coal Pty Ltd have considerable coal mining experience in the Gunnedah Basin, particularly since 1999 when WCM, an unlisted public company which was initially formed to explore and potentially develop the coal resources in the Gunnedah Basin, became actively involved in coal mining. WCM currently owns the Whitehaven Coal Mine (north of Gunnedah), Whitehaven Coal Handling and Preparation Plant at Gunnedah and the former Gunnedah Colliery. As part of a joint venture with Idemitsu Boggabri Coal Pty Ltd, WCM also owns the Tarrawonga Coal Mine (east of Boggabri).

The project forms part of WCM's strategy to supply low ash, high energy coal suited to export markets from within the Gunnedah Basin. This would in turn assist in its objective to expand markets for low ash and low sulphur content coal.

PLANNING CONTEXT

The Narrabri Coal project would be developed and operated in accordance with a number of State and regional planning instruments, namely:

- State Environmental Planning Policies (SEPPs) 33 and 44; and
- Orana Regional Environmental Plan (REP) No. 1.

The project is a permissible land use on the Project Site as defined in the Narrabri Local Environmental Plan (LEP) 1992.

MINE PLANNING CONSIDERATIONS

At the outset, it was recognised the coal resource within the Project Site may be suitable for extraction by longwall mining methods, however, given the absence of any local experience with longwall mining operations, the Proponent favoured a staged approach by first commencing with a continuous miner operation to ensure a safe and economic mining venture eventuated. Mine planning needed to consider economic, geological, geotechnical and environmental issues, all of which contribute to a successful mine design.

Geological

The exploration results identified that the coal resource included a sufficiently large area which appeared to be free of major structural disturbance and accordingly these areas would support a high production continuous miner operation.

The geological data compiled enabled the definition of the eastern-most and shallowest area where the Hoskissons Coal Seam is present. This area then assisted with defining the location of the box cut for the portals for the transport drift and conveyor drift and the Pit Bottom Area.

Geotechnical

A range of geotechnical studies were conducted to assist in the design and planning of the project. A geotechnical risk interpretation of structural factors that may influence mining conditions was carried out using the assembled geological and geophysical data. Analysis of the available data was used to formulate mine design parameters to restrict subsidence to less than 20mm.

Environmental

The major surface disturbing activities for the project would be associated with the construction and establishment of surface facilities and a rail loop within the Pit Top Area as well as the Site Access Road. The following environmental considerations influenced the overall location and orientation of these project components.

Agricultural Land: The Pit Top Area was positioned close to the Kamilaroi Highway and nearby rail corridor in order to minimise fragmentation of agricultural land.

Ecology: The Pit Top Area was located within cleared paddocks to minimise clearing of native vegetation through the use of already disturbed land. The main components within the Pit Top Area, including the Site Access Road, were located and orientated to avoid or minimise interaction with surface water drainage lines and any associated riparian habitat corridors and to minimise clearing and fragmentation of existing wildlife habitat corridors.

Aboriginal Heritage: The surface structures within the Pit Top Area and Ventilation Shaft Area have been positioned to avoid disturbance to the identified Aboriginal archaeological sites and areas where the potential for other sites is high.

Noise: Acknowledging the proximity of a number of non-project related residences both within and beyond the Project Site, the Proponent has incorporated a perimeter amenity bund around sections of the Pit Top Area and Ventilation Shaft Area.

Water Resources: Beyond the early years of the mine life, the quantity of groundwater likely to flow into the underground workings is likely to be greater than that required for operational purposes and, due to its saline nature, would require storage and segregation from natural surface water drainage on the Project Site. Therefore, four evaporation/storage ponds have been designed within the rail loop to provide an area for the storage and evaporation of the dewatered groundwater. Additional contingency management strategies have been considered should the capacity of the evaporation/storage ponds be identified to be insufficient for the volume of water to be dewatered. In any event, these contingencies would not be required for at least 15 to 20 years, even under worst case dewatering rates.

The project has been designed following consideration of potential impacts on the water quality, flow rates and flooding patterns of local tributaries of Kurrajong Creek.

PROJECT DESCRIPTION

The project, if approved, would involve the establishment of surface and underground infrastructure. Once the "site establishment" phase is completed, the mining, crushing / sizing and transportation of coal would proceed as the "operations" phase.

Site Establishment

The 12 month site establishment phase would include limited vegetation clearing, soil stripping and the following.

- Construction of surface infrastructure within the Pit Top Area including offices, car park, water storages, workshops, bulk supplies, fuel storage and amenities.
- Erection of the crushing / sizing plant and construction of the run-of-mine (ROM) and product coal stockpile areas.
- Construction of a box cut, transport drift and a conveyor drift to provide access to the Pit Bottom Area.
- Construction of 3.6km of a perimeter amenity bund (4m high) around part of the Pit Top Area.

- Establishment of the Pit Bottom Area.
- Construction of a rail loop from the North Western Branch Railway and an overhead rail load-out bin.
- Construction of a range of water management structures including the first two interconnected evaporation / storage ponds.
- Establishment of a vertical ventilation shaft.
- Construction of a Site Access Road between Kurrajong Creek Road to the Pit Top Area.
- Construction of an upgraded inter-section between Kurrajong Creek Road and the Kamilaroi Highway and an upgraded rail crossing.

Figure B locates the component activities described above that are located within the Pit Top Area.

Operations

Following the establishment of surface and underground infrastructure, the project would enter the operations phase which would involve the following activities.

- Mining of coal from the Hoskissons Coal Seam using continuous miner methods.
- Transportation of the mined coal to the ROM coal stockpile area via a conveyor system within the conveyor drift.
- Crushing and sizing of the ROM coal through the crushing / sizing plant and stockpiling on the product stockpile.
- Loading of product coal into train wagons via the rail load-out bin for transportation to Port Newcastle.

Stage 1 Mining Operations

The proposed continuous miner mining operations are depicted on **Figure C**. Mining would commence in the panel roadways of the West Main (Area A) where the continuous miner would extract coal in a "room and pillar" arrangement, ie. pillars are retained as roof support. The continuous miner would mine the coal in a series of rectangular tunnels and transfer the coal directly onto a shuttle car from where it would be conveyed to an underground breaker feeder. The breaker feeder would reduce the coal in size, and then feed the broken coal onto a conveyor system to transfer it to the surface ROM coal stockpile area via the conveyor drift.

Annual production for the project would be in the order of 2.5 million tonnes per year.

The continuous miner method would be used in Areas A, B and C (depicted on **Figure C**).

Area A:

- driving of panel roadways within the West Main; and
- first workings (ie. large stable pillars remain).

Area B:

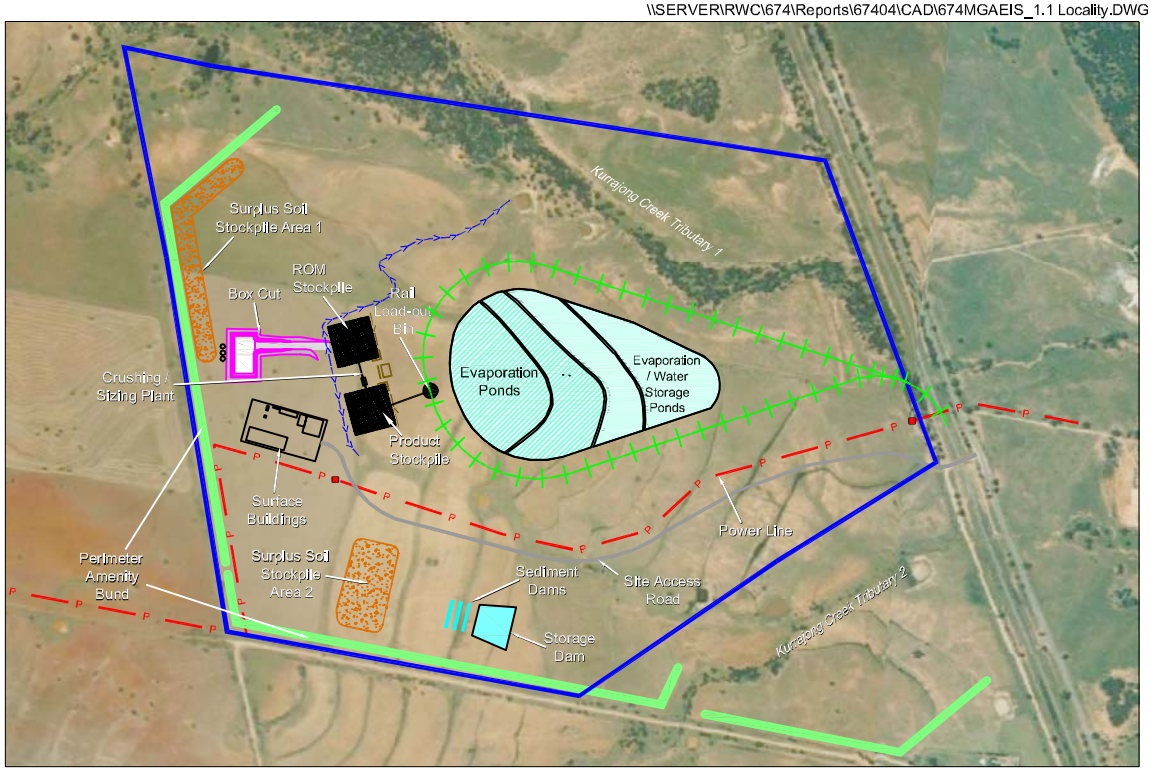
- driving of panel roadways; and
- partial extraction between roadways, whereby pillar sizes are reduced from the first workings pillars, but nevertheless large enough to ensure that they are stable and competent and surface subsidence is less than 20mm.

Area C:

- ongoing continuous miner driveage of roadways and secondary partial extraction leaving stable pillars, similar to those left in Area B.

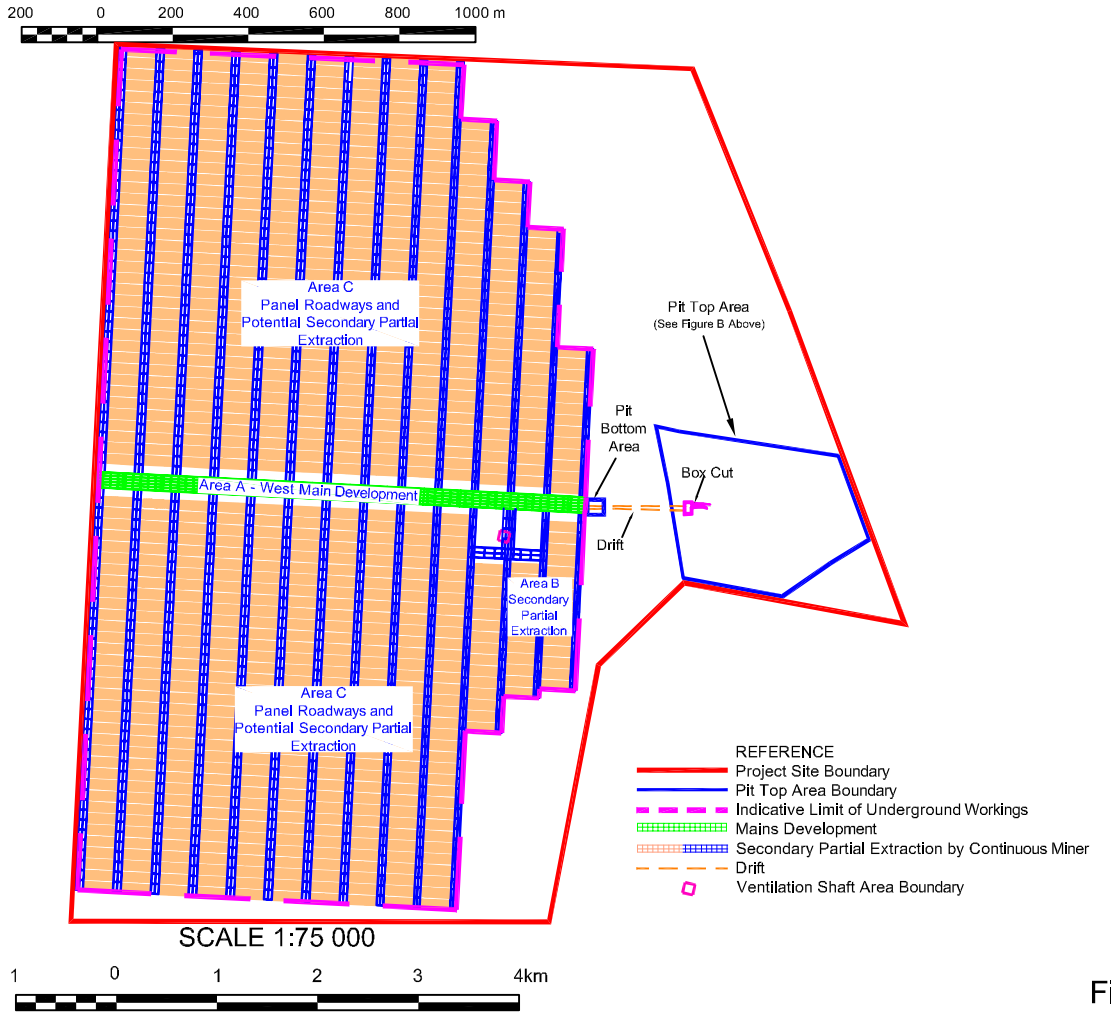
Stage 2 Mining Operations

In the event the technical and economic assessment of a potential longwall mining operation confirms it is feasible for a



SCALE 1:20 000

Figure B



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1 0 1 2 3 4km

Figure C

longwall mining operation to proceed, the Proponent would seek project approval for the operation. The Stage 2 operation would involve underground mining of Area C coal blocks by longwall retreat extraction methods. Annual production from Stage 2 would be in the order of 6 million tonnes per year, if it proceeds.

Coal Stockpiling, Crushing and Sizing

Coal mined and broken (to approximately <150mm) underground would be transferred onto the conveyor belt system to the ROM coal surface stockpile area, via the conveyor drift and portal. ROM coal would be stockpiled before being loaded into the crusher feed hopper via a reclaimer. The coal would then crushed by a double roll crusher with a capacity of approximately 2 000tph and sized to <50mm. After crushing, the coal would be stockpiled by a stacking conveyor onto the product stockpile area (see **Figure B**).

Both the ROM and product coal stockpile areas would have a capacity of approximately 150 000t and be designed to encompass a stockpile of up to 10m high. A bulldozer would be used for stockpile management.

Due to the high quality of the coal to be mined and its recovery by continuous miners, coal washing would not be required.

Coal Loading to Trains

The product coal would be reclaimed from beneath the product stockpile and loaded into the rail load-out bin (see **Figure B**). All surface conveyors would be partly enclosed to minimise dust creation in periods of windy weather. Water sprays would be provided to control dust on stockpile areas. On arrival of a train via the rail loop, the coal would be loaded into to the rail wagons over a period of approximately 1 hour.

While daytime loading of the trains would be preferable, it may not always be possible given the operation and timing of trains along the North Western Branch Railway is governed by State Rail. As such, the project requires 24 hour, 7 days a week train operation to ensure the flexibility to operate within the train paths allocated to Pacific National. In reality, it is likely that trains would arrive and depart at consistent times of the day once regular slot times are established.

At an anticipated maximum mining rate of 2.5Mtpa and a train capacity of 3 100t, an average of two to three trains would be loaded and despatched each day of the week. However, the rate of despatch would vary to meet shipping arrival schedules at Port Newcastle.

Road

While no coal would be transported from the Project Site by road, light vehicles of project employees and contractors and heavy vehicles delivering equipment and consumables would require access to the Project Site via the existing Kurrajong Creek Road railway close to its intersection with the Kamilaroi Highway. A maximum of 200 light vehicle and 20 heavy vehicle traffic movements per day are expected with most light vehicles travelling to and from the Pit Top Area before and after shift change-overs. The Site Access Road would be sealed and the intersection between Kurrajong Creek Road and the Kamilaroi Highway and the existing level crossing would be upgraded. All upgrading works would be designed to satisfy the efficiency and safety standards of both the RTA and Country Rail Infrastructure Corporation.

Services

All potable water required for ablutions and related uses would be imported to site on a regular basis and stored in water tanks located adjacent to the relevant surface infrastructure.

Up to 120ML of water would be required annually for operational purposes, primarily for dust suppression both underground and in the coal handling areas and unsealed roads within the Pit Top Area. This water would preferentially be sourced from dewatered groundwater from the underground workings.

During the initial site establishment activities, power would be provided by up to two generators. Permanent mains power would be installed for the operations within approximately 12 months of the commencement of site establishment via a 66kV spur line and substation for conversion to 11kV.

Sewage treatment would be undertaken by one or more self irrigating eco-cycle septic system(s) installed near the surface buildings.

Fuel storage and refuelling facilities for the mobile equipment would comprise a self-bunded fuel tank and an adjacent refuelling bay, located adjacent to the surface buildings.

Any bulk explosives used for blasting during the construction of the box cut for the transport drift and conveyor drift, would be used and stored according to legislative requirements.

Project Life and Hours of Operation

The Stage 1 mine life is estimated to be 50 years based upon an annual production rate of 2.5 million tonnes.

The hours of operation for the project would be as follows.

Hours of Operation

Activity	Hours/Days
Site Establishment	
Vegetation clearing / soil removal	7:00am to 6:00pm 7 days
Surface Infrastructure and Pit Top Area construction	7:00am to 10:00pm 7 days
Pit Bottom Area development	24 hours / 7 days
Raw materials / supply delivery	7:00am to 10:00pm 7 days
Mining Operations	
Underground mining	24 hours / 7 days
Crushing / sizing and stockpiling	24 hours / 7 days
Rail loading and transportation	24 hours / 7 days
Surface maintenance	24 hours / 7 days
Raw materials / supply delivery	7:00am to 10:00pm 7 days

Employment

During the site establishment phase, an estimated workforce of up to 80 full-time equivalent persons would be employed.

Based upon the operation of two continuous miners, the project would directly employ 94 persons. When a third continuous miner is introduced, total employment would rise to approximately 113 persons. The mining workforce would be employed directly by the Proponent, with some specialist services contracted.

Rehabilitation and Decommissioning

As the only proposed surface disturbance would occur within the Pit Top Area and Ventilation Shaft Area, which would be present for the life of the project, there would be no opportunity or need to undertake progressive rehabilitation, other than that required during the site establishment phase. The Proponent's rehabilitation objectives for all areas of mine-related surface disturbance can be defined in either the short term and long term.

In the short term, the objectives would be to stabilise all earthworks, drainage lines and disturbed areas no longer required for mine-related activities in order to minimise erosion and sedimentation, and to reduce the visibility of the activities from adjacent properties and the local road network.

In the longer term, the Proponent's objectives are to provide a low maintenance, stable and safe landform that blends with the surrounding topography and which maximises the return of agricultural land with an agricultural land suitability comparable to the existing levels. To accomplish this, the material contained with a section of the perimeter amenity bund constructed during site establishment would be reclaimed and used to back-fill the box cut.

Unless required / requested by a future land owner, the following project infrastructure would be decommissioned and removed from site prior to final rehabilitation.

- The coal crushing / sizing plant.
- Various fuel storages, workshops and offices.
- The evaporation ponds.
- Rail load-out bin.
- Infrastructure related to the transport drift and conveyor drift.
- Surface infrastructure related to the ventilation shaft.
- Internal roads not to be maintained in the final landform.

It is envisaged that both the rail loop and Site Access Road would remain beyond the end of the mine life and used for a subsequent activity. However, the Proponent would decommission these facilities in the event they are not required beyond the life of the mine.

The Proponent's commitment to effective rehabilitation would involve an ongoing monitoring and maintenance program throughout and beyond the operation of the project.

ISSUE IDENTIFICATION AND PRIORITISATION

In order to undertake a comprehensive *Environmental Assessment* of the Narrabri 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. These issues (and their potential impacts) were identified through a program of community and government consultation, preliminary environmental studies and literature review. This was followed by an analysis of the risk posed by each potential impact in order to prioritise the assessment of the identified environmental issues within the *Environmental Assessment*.

Consultation

Consultation with the local community involved:

- individual discussions with the landowners / residents of properties surrounding the Pit Top Area;
- newspaper articles and community newsletters;
- advertising the "Application for the Project Approval" with the associated Project Description Report in the local press (also available on the websites for the Department of Planning and Whitehaven Coal Mining for public viewing).

Issue Prioritisation

Based on the environmental issues raised throughout the consultation process, a review of the project design and local environmental features was undertaken to identify risk sources and potential environmental impacts for each environmental issue. 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, ie. in the absence of any mitigation measures. Through a review of the allocated risk ratings and the frequency with which each issue was identified, the relative priority of each issue was determined, with this priority used to provide an order of assessment and depth of coverage within the *Environmental Assessment*.

Based on the issues identified and the risk ratings allocated to the potential environmental impacts of these, the following order of priority has been determined.

1. Surface Water / Flooding
2. Groundwater
3. Flora and Fauna
4. Aboriginal Heritage
5. Soils and Land Capability
6. Visual Amenity
7. Air Quality
8. Traffic and Transport
9. Noise and Vibration
10. Subsidence Management
11. Social Impact

ENVIRONMENTAL SAFEGUARDS AND IMPACTS

The components and features of the existing environment on and around the Project Site have been studied in detail and the project designed to avoid or minimise impacts on that environment. A brief overview of the main components of the surrounding environment, the proposed safeguards and the assessed level of impact are set out below.

Surface Water

The Project Site is located in the Namoi River catchment and within the catchments of three of its tributaries, namely Kurrajong Creek, Pine Creek and Tulla Mullen Creek. All three creeks are ephemeral, generally flowing for short periods after significant rainfall events or protracted wet periods. The Namoi River flows in a northwesterly direction approximately 3km to 5km to the east of the eastern boundary of the Project Site.

The Pit Top Area, where the majority of project-related surface disturbance would occur is traversed by two tributaries of Kurrajong Creek with the surface facilities, Site Access Road and rail loop designed and oriented to minimise impacts on these and the natural drainage lines which feed them. Further surface water management controls, including a clean water retention pond, dirty water sediment pond, saline water evaporation/storage ponds and diversion banks, drains and culverts, were designed based on the recommendations of WRM (2007) and the following principles.

- The diversion of clean water away from disturbed areas.
- The capture of sediment-laden water and treatment to ensure any discharge meets relevant DEC and ANZECC guidelines.
- The storage, management, evaporation, and if necessary, conditioning of saline mine in-flows dewatered from the underground workings.
- The capture and treatment of contaminated water prior to discharge from and/or re-use within the Pit Top Area.
- The prevention of erosion and sedimentation through the maintenance of vegetation cover within natural and constructed drainage lines.

Based on rainfall data collected over a period of 116 years, the predicted mine in-flow rates and the proposed operational water requirements of the project, WRM (2007) undertook a review of the project water balance in dry, median and wet years. The water balance indicated that should the dewatering requirements for the project approximate those predicted by GHD (2007), the capacity of the evaporation / storage ponds would eventually be exceeded. The predicted exceedance would not, however, occur in the initial years of project development and operation allowing actual mine in-flows to be measured and suitable alternative water management strategies investigated and implemented, if required. The Proponent has investigated one such alternative as part of this assessment and if required, would construct and operate a water conditioning plant within the Pit Top Area. A conceptual design and management plan for the water conditioning plant is included in this *Environmental Assessment*.

Based on the proposed water management controls and structures, the project would be unlikely to have a significant impact on either the quantity or quality of water available to downstream landholders and the local environment. Notwithstanding this, the Proponent would implement a comprehensive monitoring program of water levels and quality within the Pit Top Area storages and natural drainage features of the Project Site.

Groundwater

The Triassic, Jurassic and Quaternary sequences contain differentiated aquifers which have been defined by the Department of Natural Resources as groundwater management areas (GWMAs).

(i) The Upper Namoi GWMA (004) which is contained in the unconsolidated sediments of the Namoi River and its tributaries.

(ii) Great Artesian Basin GWMA (601) which is defined by the easterly extent of the Surat Basin sequence which includes the following formations.

- Pilliga Sandstone.
- Purlawaugh Formation.
- Garawilla Volcanics.

(iii) GWMA (604) which is comprised of the Permo-Triassic Gunnedah Basin sequence and includes the following formations.

- Napperby Formation (Mid Triassic).
- Digby Formation (Early Triassic).
- Black Jack Group (Late Permian) which includes the Hoskissons Coal Seam, Arkarula, Brigalow and Pamboola Formations below the Project Site.

GHD (2007) developed and ran a peer-reviewed groundwater model to predict the impact of the project on local groundwater levels (drawdown) and dewatering requirements as a result of groundwater in-flow to the underground workings.

Groundwater drawdown as a consequence of the project is predicted to be largely limited to the lower formations of the Gunnedah GWMA, with minimal drawdown within the formations of the Great Artesian Basin GWMA. While this water is generally quite saline, the saturated thickness within five registered bores across the Project Site was predicted to decrease by in excess of 15% (the DNR specified criteria for acceptable impact). Two of these bores are on land owned by the Proponent, with mitigation or compensatory measures likely to be ultimately required for the owners of the remaining three bores. The Proponent would monitor groundwater levels and the saturated thicknesses of constructed and existing bores within the Project Site to validate the above predictions. The Proponent has proposed a

contingency plan in the event the predicted impacts are realised on the non-project related properties.

Based on measured and historically recorded permeability values of the formations of the Project Site, mean permeability values were established and based on these, mine inflows were predicted to gradually increase from 30ML/year during the first year, reaching a maximum of 818ML/year prior to Year 25 and then declining and stabilising around 690ML/year for the remaining life of the project.

Based on the predicted mine groundwater in-flows, the evaporation/storage ponds of the Pit Top Area would provide storage for the initial years of project development and operation. During this time, the model predictions would be validated against actual mine in-flows, and if required, alternative water management strategies would be further investigated and implemented. As noted above, one such strategy considered provides for the construction and operation of a water conditioning plant, a conceptual design for which is included in the Environmental Assessment.

Flora

A total of five vegetation communities were identified within the Project Site, three of which are native vegetation communities and two are artificial (cleared/semi-cleared or cultivated) communities.

The vegetation of the Project Site has little significance with respect to threatened species legislation, as none of the vegetation communities constitute any of the listed endangered ecological communities, and similarly, no areas of critical habitat were identified on, nearby or associated with the Project Site.

Only one flora species, *Bertya* sp. Cobar-Coolabah, is regarded as having potential to occur within the Project Site on the basis of suitable habitat and proximity of recent records. It is highly unlikely that this species would be present in the proposed areas of disturbance within the Pit Top Area and Ventilation Shaft Area.

Fauna

A total of 86 fauna species were identified within the Project Site and surrounds, including 21 mammal, 8 frog, 5 reptile and 52 bird species. Seven of these species were introduced species, including farm animals.

Two State-listed vulnerable species, the Yellow-bellied Sheathtail Bat and the Grey-crowned Babbler were identified on, or in the vicinity of, the Project Site.

Two endangered fauna populations (Schedule 1, Part 2 of the TSC Act) are listed for the bioregions within 10km of the Project Site (Nandewar and Brigalow Belt South), namely:

- the Tusked Frog population in the Nandewar and New England Tablelands Bioregions; and
- an Australian Bush Turkey population in the Nandewar and Brigalow Belt South Bioregions.

The Project Site layout has been designed to minimise the clearing of native vegetation, particularly with the Pit Top Area located on agricultural land with only scattered trees. The ventilation shaft would be constructed in an area already largely disturbed by previous quarry activities within an area of existing vegetation. Additionally, Kurrajong Creek Tributary 1, which supports native riparian vegetation along its banks, would not be disturbed by the project.

Other operational safeguards to be implemented by the Proponent to minimise impacts on flora and fauna would include:

- undertaking pre-clearing surveys for threatened fauna in areas of native vegetation;

- any hollow-bearing trees removed are to be re-sited and re-erected where practicable into these revegetation areas to avoid any net loss of hollow resources,
- regular programs would be conducted to control noxious weeds and feral animals.

An assessment of the impacts of the project on the identified or potentially occurring threatened species found there would be no significant impact. The areas surveyed were not considered core Koala habitat and the project was assessed as unlikely to enhance the adverse impacts of key threatening processes.

Aboriginal Heritage

A predictive model, based on knowledge of site patterning and site types across the landscape, was compiled to identify the archaeological sensitivity of the Project Site. The model divided the Project Site into the following three zones.

- **Zone 1: Watercourses:** *Archaeological Potential – High*. This zone comprises about 15% of the Project Site. Sites are more likely to be found close to sources of water.
- **Zone 2: Agricultural Areas:** *Archaeological Potential – Low.* This zone, which is largely flat, featureless and devoid of water, comprises about 50% of the Project Site.
- **Zone 3: Native Vegetation Zone:** *Archaeological Potential – Low.* This Zone is an area of dense woodland with low, sandy soil hills and some outcropping rocky surfaces and comprises about 35% of the Project Site.

A total of seven Aboriginal archaeological sites were identified during a surface archaeological survey of the Project Site. Six sites were located within or close to the boundary of the Pit Top Area and one site identified near the western boundary of the Project Site. Project activities are not planned to occur in the areas of the identified sites, however, the Proponent would implement operational safeguards and controls recommended by the consultant archaeologist and the Narrabri Local Aboriginal Land Council, to protect these sites from any project-related disturbance.

Soils and Land Capability

Three separate soil types were identified within the areas of proposed surface disturbance. These varied from moderately saline, highly dispersive soils that pose a moderate erosion risk (if not managed appropriately), to soils that were non-saline, only slightly dispersive soils of generally relatively low erosion risk. Consequently, various management strategies would be employed to manage the differing soil types. For instance, the soils declared saline and erosive would (preferentially) not be stripped.

All soils would be handled as little as possible by ensuring the area to be stripped and the area of stockpiling is clearly identified. All topsoil would be stripped and re-used in site rehabilitation, with the stripping and use of subsoil in rehabilitation or other works restricted to those soils identified as amenable for this purpose. Topsoil stockpiles would not exceed 2m in height, while the subsoil stockpiles would not exceed 3m in height.

The land capabilities of the surface disturbance areas within the Project Site range from Class III land within the Pit Top Area, and lower slopes around the proposed ventilation shaft, to Class VII land on the upper slopes at the Ventilation Shaft Area. It is proposed that of the 47.1ha of existing Class III land, 35.7ha would be retained long term.

The agricultural land suitability of the surface disturbance areas within the Project Site includes Class 2, Class 3 and Class 5. It is proposed that of the 40.2ha of existing Class 3 land, 30.4ha would be retained, while 5.3ha of Class 2 would be retained from the existing 6.9ha.

The reduction in area of land with the nominated capabilities or suitabilities would be attributable to the possible long term retention of the rail loop for a future industry.

Visibility

The Pit Top Area is located in an area visible from the adjoining properties and sections of the local road network whereas the Ventilation Shaft Area is already well shielded within a vegetated area.

The project would incorporate the following visual controls to limit the visual intrusiveness of the various site components.

- A 4m high perimeter bund around sections of the Pit Top Area.
- Any disturbed areas not required for long term operations would be revegetated.
- The load-out bin and site buildings would be painted in a green / grey hue.
- A high standard of housekeeping would be adopted.

The changes to the landscape and the new activities within the Pit Top Area will be noticeable to local residents. However, the controls adopted would limit the impact(s) of those changes.

Air Quality

The air quality assessment concluded that the adoption of air quality control measures including the dust suppression, progressive rehabilitation and minimisation of clearing in advance of operational activities would ensure any minor increases to $PM_{2.5}$, PM_{10}, and dust deposition would satisfy DEC and other government agency environmental and health criteria.

Emissions of nitrogen dioxide and sulphur dioxide would also be well within the air quality goals. All greenhouse gas emissions arising from the on-site and off-site activities and from the use of the coal would account for 0.023% of the total baseline international emissions. Based on previous research, the predicted dust levels would not have any significant impact on either local livestock or pasture.

Transportation Aspects

The Pit Top Area is accessed via the Kamilaroi Highway (SH 29), a RTA highway commencing at Willow Tree and passing through Gunnedah, Boggabri, Baan Baa and Narrabri before terminating at Bourke. Pavement conditions of the Kamilaroi Highway are considered good at the intersection with Kurrajong Creek Road and both north and south of the intersection.

Access to the Pit Top Area would involve the use of an 80m section of Kurrajong Creek Road, an unsealed local road approximately 13km in length that provides access between the Project Site and Baan Baa on the western side of the Kamilaroi Highway. Kurrajong Creek Road intersects with the Kamilaroi Highway approximately 40m west of a level crossing with the North Western Branch Railway. The level crossing is currently controlled by a “Stop” sign and flashing lights.

As product coal would be despatched from the Pit Top Area by rail, the project would not generate a significant increase in heavy vehicle traffic levels on these roads. During the period when the level crossing is in use by a train travelling to and from the Pit Top Area, it would be necessary for vehicles to wait in safe lanes for up to 6 minutes when approaching the crossing from either the highway or Kurrajong Creek Road. The Proponent has committed to constructing a

suitable intersection between the Kamilaroi Highway and Kurrajong Creek Road which includes channelised right and left turn lanes with storage sufficient for the maximum volume of traffic likely during the use of the level crossing (see **Figure D**).

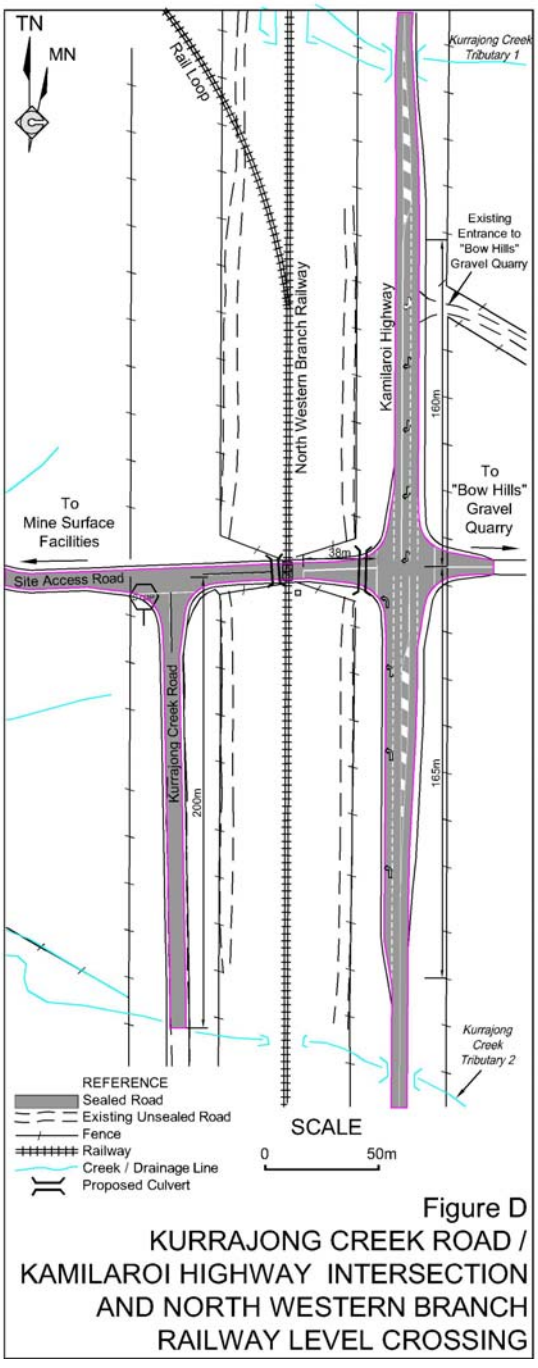

Figure D
KURRAJONG CREEK ROAD / KAMILAROI HIGHWAY INTERSECTION AND NORTH WESTERN BRANCH RAILWAY LEVEL CROSSING

A display board would be mounted on the Kamilaroi Highway and Kurrajong Creek Road notifying road users of indicative level crossing closure times. This board would be updated daily.

Considering the proposed intersection treatment and traffic projection figures for the Kamilaroi Highway, average traffic levels generated by the project would represent 10.3% of all light vehicle traffic in 2007. As road traffic levels would not increase through Stage 1 of the project, this percentage of Kamilaroi Highway traffic would reduce to 6.0% and 1.0% for light and heavy vehicle traffic respectively. The predicted increase in traffic as a consequence of the project would not have any noticeable impact on traffic flows or congestion on the Kamilaroi Highway.

Adherence to all other operational safeguards and controls would ensure that the project does not have a significant impact on traffic volumes, flows and safety levels for road and rail transport.

Noise

The sources of noise around the Project Site are typical of a rural environment with contributions from farming activities, insect noise, livestock, wind through vegetation and vehicles on local roads.

The criteria for noise generated by the project have been established as:

- an $L_{Aeq(15min)}$ of 5dB(A) above the assumed 30dB(A) background level for mine operations, ie. 35dB(A);
- an $L_{Aeq(15min)}$ of 35dB(A) for noise generated during the site establishment phase of the project, as this would take in excess of 26 weeks;
- an L_{Amax} of 15dB(A) above the assumed 30dB(A) background level for night-time sleep disturbance, ie. 45dB(A);
- an $L_{Aeq(1hr)}$ of 60dB(A) and 55dB(A) for daytime and evening road traffic noise respectively; and
- a maximum $L_{Aeq(24hr)}$ of 60dB(A) and L_{Amax} of 85dB(A) for rail traffic.

Assuming the adoption of the identified noise controls, minor exceedances of noise criteria (by 1 to 2dB(A)) would occur at two residences during site establishment activities. No exceedances of noise criteria were predicted for mine operations or sleep disturbance. The project would also easily comply with the criteria for road and rail traffic at the closest residences to the proposed road and rail traffic routes.

The Proponent would monitor noise levels at several of the potentially most affected surrounding residences and maintain dialogue with these residents to ensure that the impacts of noise generated by the project are minimised.

Socio-economic Setting

A socio-economic assessment for the project was undertaken in phases.

Phase 1 involved an analysis of previous social and economic assessments in the region in order to obtain a general understanding of the local setting, social issues of greatest concern and community views/opinions on mining.

Phase 2 involved more detailed qualitative research of those social issues identified to be of greatest significance to local stakeholders, namely:

- housing;
- education;
- industry diversification;
- employment opportunities; and
- community services and facilities.

Based on the identification of these key themes, the qualitative research component of the assessment focussed on:

(i) consideration of the existing services, facilities and opportunities within the Narrabri and Gunnedah Shires;

(ii) assessing the likely increase in demand for local services as a consequence of the predicted local population increase; and

(iii) consultation with professionals working in the key area identified by Phase 1 of the assessment.

In light of the range of available services in Narrabri and Gunnedah, and particularly the courses and expertise offered by the local TAFE colleges, combined with the positive attitude of the local Councils, it has been assessed that the region currently has, or would quickly develop, capacity in the three key areas of education/training, housing capacity and economic development to meet the demands of a growing population of mine workers and related trades. Based on several assumptions over the probable workforce, ie. two thirds of the initial mine workforce would be sourced from outside the local area, 80% of these would choose to live in Narrabri and these employees would have family structures approximating the NSW average, the increased demand on education, health and other 'soft' infrastructure would be minor and manageable. In actual fact, an increased economic vibrancy within the region may encourage the immigration of the additional health professionals, of which there is a shortfall throughout rural NSW.

The social assessment also concluded that the project would result in largely positive social impacts, including but not limited to:

(i) reduction of social stress through provision of local jobs and enhanced economic well being;

(ii) training opportunities for local people, including young people and indigenous people, in a growth industry (mining);

(iii) contribution to the diversity of the economic base in Narrabri and Gunnedah Shires; and

(iv) increased population to participate in locals clubs, sporting groups, cultural activities, and organisations.

Land Use

The Project Site is located within an area used predominantly for mixed grazing and cropping. During the life of the project, there would be a change in the land use in the Pit Top Area and Ventilation Shaft Area. However, the project would not influence the use of the land on surrounding landholdings.

PROJECT EVALUATION AND JUSTIFICATION

The Narrabri Coal Project has been evaluated and justified principally through consideration of its potential impacts on the environment and potential benefits to the local and wider community.

An evaluation of the project has been undertaken by firstly reassessing the risks posed to the local environment by project-related activities following the implementation of all operational controls, safeguards and/or mitigation measures, and secondly through consideration of the principles of ecologically sustainable development. This evaluation has found that with the implementation of the proposed operational controls, safeguards and/or mitigation measures, the residual risk posed by each possible environmental incident or impact was reduced from its original level and with limited exception classified as either moderate or low, and therefore acceptable. Further, the design of the project has addressed each of the sustainable development principles, and on balance, it is concluded that the Narrabri Coal Project achieves a sustainable outcome for the local and wider environment.

The Narrabri Coal Project and associated activities have been assessed in terms of a wide range of biophysical, social and economic issues. These impacts can be justified in terms of the positive economic and social benefits to Narrabri, the local government area, Narrabri Shire and NSW and Australia, the market opportunities for export quality coal and the principles of ecologically sustainable development.

CONCLUSION

The Narrabri Coal Project has, to the extent feasible, been designed to address all issues raised by the local community and all levels of government as well as the principles of ecologically sustainable development. The project provides for the mining, production, sale and despatch of a high quality coal product which would be significant in generating employment opportunities and boosting the local economies of Narrabri and surrounding communities. The post-mining landform would provide for the substantial re-establishment of agricultural land.

In light of the conclusions included throughout the *Environmental Assessment*, it is assessed that the proposed Narrabri Coal Project could be constructed and operated in a manner that would satisfy all relevant statutory goals and criteria, environmental objectives and reasonable community expectations.

The *Environmental Assessment* supported by the range of specialist consultant studies has established that if the Narrabri Coal Project proceeds, it would:

(i) contribute to satisfying the demand for export quality coal;

(ii) satisfy sustainable development principles;

(iii) have a minimal and manageable impact on the biophysical environment;

(iv) address the perceived social impacts; and

(v) contribute to the continued economic activity of Narrabri and Narrabri Shire.