



Integra Coal Operations Pty Ltd

ABN: 96 118 030 998

## Environmental Assessment

### Glennies Creek Open Cut Coal Mine

Prepared by:



**R.W. CORKERY & CO. PTY. LIMITED**

October 2007



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ABN: 96 118 030 998

## Environmental Assessment

# Glennies Creek Open Cut Coal Mine

**Prepared by:**

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October 2007

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## Author's Certification

for the submission of an Environmental Assessment prepared in accordance with the  
*Environmental Planning and Assessment Act 1979 (Part 3A – Section 75).*

**(a) EA prepared by:**

name: Robert W. Corkery  
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ORANGE NSW 2800

**(b) Planning Approval application by:**

applicant name: Integra Coal Operations Pty Ltd  
PMB 7  
SINGLETON NSW 2330

**(c) Application Number:** 06\_0073

**(d) Address/land details**

properties to be developed

**Land Description:**

The Project Site is located 12km north of Singleton and covers an area of approximately 376ha.

**Open Cut Area:**

**Parish of Auckland, County of Durham,**  
Lot 792/DP586255, Part Lot 791/DP580967,  
Part Lot 710/DP624852, Part Lot 4/DP606344,  
Part Lot 93/DP752442, Part Lot 1/DP783398,  
Part Lot 1 and 2/DP1083482, Part Lot 100/DP633743,  
**Parish of Broughton, County of Durham,**  
Part Lot 1, 2 and 10/DP752450.

**Coal Haul Route D Corridor:**

**Parish of Auckland, County of Durham,**  
Part Lot 1/DP752450, Part Lot 11/DP1013180,  
Part Lot 92/DP752442, Part Lot 3/DP752455,  
Former Railway Line Easement within Lot 3/DP752455.

**Coal Haul Route E:**

**Parish of Auckland, County of Durham,**  
Part Lot 1 and 2/DP1083482, Part Lot 1/DP810309,  
Part Lot 1/DP246434, Part Lot 1/DP212284,  
Part Lot 22/DP752442,  
**Parish of Darlington, County of Durham,**  
Part Lot 3/DP752455.

**Coal Handling and Preparation Plant:**

**Parish of Darlington, County of Durham,**  
Part Lot 3/DP752455, Former Railway Line Easement  
within Lot 3/DP752455.

**(e) Project Outline:**

The development and operation of an open cut coal mine involving:

- open cut mining and associated activities including placement of waste rock and transportation of run-of-mine coal.
- beneficiation of run-of-mine coal within the existing Camberwell Coal Handling and Preparation Plant; and
- progressive and final rehabilitation of areas of surface disturbance.



**(f) Assessment of**

**Environmental Impact:** The assessment of environmental impacts of this project includes the matters referred to in Director-General's Requirements provided to the Proponent on 25 January 2007 under Section 75F of the *Environmental Planning and Assessment Act 1979*.

**(g) Declaration:**

I, Robert William Corkery, hereby declare that I have overseen the preparation of the contents of this assessment and to the best of my knowledge:

- it has addressed the Director-General's Requirements as provided by the Department on 25 January 2007;
- the assessment contains all available information that is relevant to the environmental assessment of the project; and
- the information contained in the statement is neither false nor misleading.

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_



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# Executive Summary

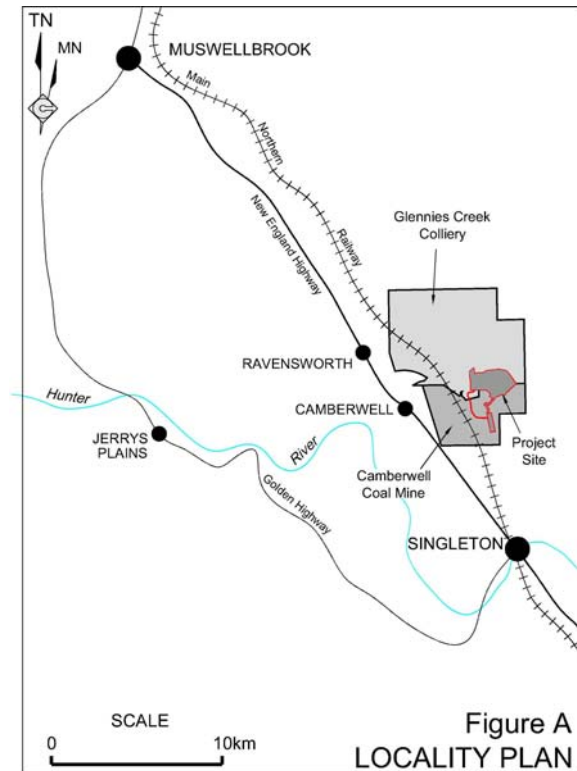
## INTRODUCTION

This *Environmental Assessment* has been prepared by R.W. Corkery & Co. Pty. Limited to accompany an application for project approval by Integra Coal Operations Pty Ltd (“the Proponent”), for and on behalf of its joint venture partners, for an open cut coal mine to be known as the Glennies Creek Open Cut Coal Mine (“the Project”). The Project includes the following mining and mining-related activities.

- Extraction of coal, overburden and interburden material, as well as the construction of a waste rock emplacement within and adjacent to the proposed open cut.
- Transportation of Run-of-Mine (ROM) coal to the Camberwell Coal Handling and Preparation Plant (CHPP) either directly or via intermediate stockpiles.
- Processing and despatch of coal within and from the existing Camberwell CHPP.

As illustrated in **Figure A**, the Project Site is located approximately 12km north of Singleton in the Hunter Valley, within the Glennies Creek Colliery and adjacent to the Camberwell Coal Mine.

The application for project approval relates to extraction of 7.7 million tonnes of ROM coal by open cut mining methods and associated activities. A further 1.3 million tonnes of ROM coal may potentially be amenable to future open cut mining. However, recovery of this resource does not form part of this application.



## PLANNING CONTEXT

The Project Site lies wholly within land zoned Rural 1(a) under the *Singleton Local Environment Plan 1996*. The Plan states that ‘coal mining’ is a permissible land use within this zone.

The Project is classified as a Major Project under Schedule 1 of the *State Environmental Planning Policy (Major Projects) 2005* and hence the application for project approval (Major Projects No. 06-0073) is to be assessed under Part 3A of the *Environmental Planning and Assessment Act 1979*. The Act requires that an *Environmental Assessment* accompany the application for project approval.





## THE PROPONENT

The Proponent, Integra Coal Operations Pty Ltd, is the management company responsible for the operation of the Glennies Creek Colliery and Camberwell Coal Mine and is wholly owned by the parties to the Integra Coal Joint Venture. The parties to the joint venture are as follows.

- CVRD Australia Pty Ltd (CVRD) (61.2%) - through its subsidiary companies CVRD Australia (GC) Pty Ltd (36%) and Maitland Main Collieries (MMC) (25.2%).
- NS Glennies Creek Pty Limited (3.6%).
- POS-GC Pty Ltd (3.6%).
- JS Glennies Creek Pty Ltd (1.8%).
- JFE Steel Australia (GC) Pty Ltd (1.8%).
- Toyota Tsusho Mining (Australia) Pty Ltd (11.2%).
- Navidale Pty Ltd (14%).
- Toyota Tsusho Corporation (Australia) Pty Ltd (2.8%).

## PROJECT SITE

The Project Site covers an area of approximately 376 hectares of which 207 hectares (55%) is presently disturbed. All land within the Project Site is owned by companies associated with the Proponent.

The Project Site incorporates the following components, presented on **Figure B**, namely:

- the Open Cut Area;
- Haul Route Corridor D;

- Haul Route E (the existing RL 100 Haul Route); and
- the Camberwell CHPP and coal loading facility.

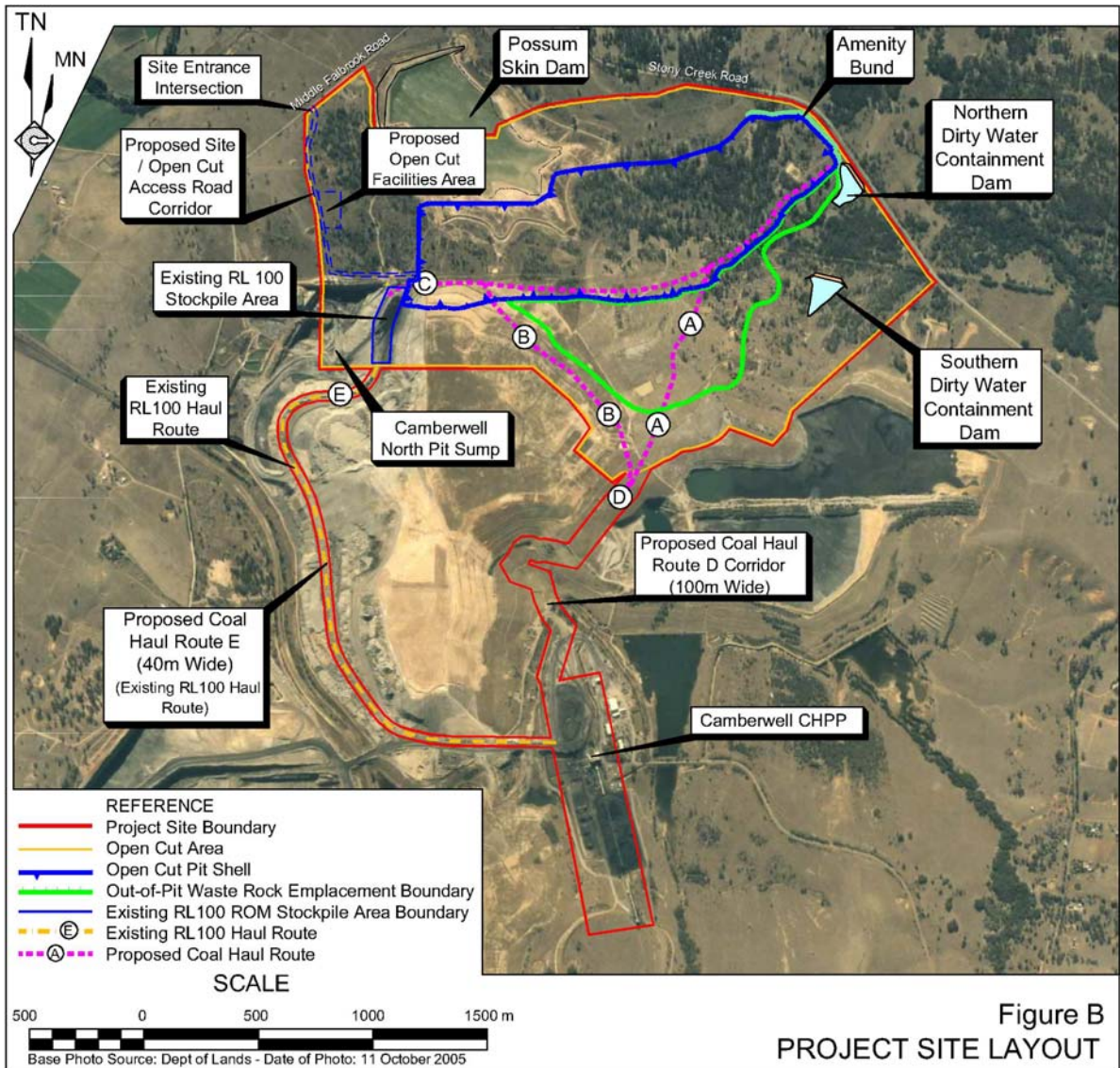
## PROJECT DESCRIPTION

### Overview

The Project would involve the following activities, the locations of which are displayed on **Figure B**.

- Construction of the site and open cut access road and open cut facilities area.
- Extraction of coal by open cut mining methods at a rate of up to 1.5 million tonnes/year for a period of approximately 6 to 8 years and within an area covering approximately 90 hectares.
- Highwall or auger mining may be undertaken, where practicable.
- Stockpiling of coal at temporary stockpile locations within the open cut mine or at the existing RL100 Stockpile Area, when required.
- Transportation of coal to the Camberwell CHPP via a network of internal haul roads.
- Processing of coal at the existing Camberwell CHPP and loading / despatch of product coal by rail.
- Programmed placement of waste rock materials initially to an out-of-pit waste rock emplacement, with subsequent placement both out-of-pit and in-pit.
- Progressive reshaping and rehabilitation of all areas of mining-related disturbance.
- Establishment and management of a number of biodiversity offset areas.





It is noted that the Camberwell CHPP and Haul Route E are the subject of existing approvals. However, as those existing approvals do not contemplate the use of coal sourced from the proposed open cut, this application contains further assessment of those activities. The Camberwell CHPP will be the subject of a future application to extend the life of that facility.

### Site Preparation

Where present within the areas to be disturbed, larger vegetation, ie. trees and shrubs, would be cleared and suitable

vegetation either immediately used in the rehabilitation of completed areas of the final landform or stored for subsequent use in this manner. Topsoil and subsoil would be stripped separately and preferentially placed in areas undergoing progressive rehabilitation, or stockpiled.

### Mining Operations

Mining operations would involve conventional open cut methods with waste rock (overburden and interburden) removed and placed initially within an out-of-pit waste rock emplacement. As sections of

the open cut are completed, waste rock would be placed within both in-pit and out-of-pit waste rock emplacements (**Figure B**).

Mining would commence within a box cut at the northeastern end of the proposed open cut and would move progressively to the west. Blasting would occur below the weathered zone, from approximately 2m to 10m below surface.

Blasts would typically fragment up to 150 000m<sup>3</sup> of rock and would occur between 9.00am and 5.00pm on weekdays, unless required for safety or misfire reasons. Up to five blasts would be initiated each week. Blast designs would be modified to ensure all blast impact assessment criteria are satisfied at all surrounding residences. No explosives would be stored on site.

Coal would be preferentially transported directly to the Camberwell CHPP. However, when stockpiling is required, coal would be stockpiled at the existing RL100 Stockpile Area, or at temporary stockpiles at the top of the active open cut ramp within the Open Cut Pit Shell. Coal would be transported to the Camberwell CHPP from the proposed open cut or ramp top stockpiles via the following haul routes (see **Figure B**).

- Haul Routes A and D.
- Haul Routes B and D.
- Haul Routes C and E.

Haul Routes A and D would be used when mining is underway in the eastern section of the proposed open cut. Haul Routes B and D would be used when mining is underway in the western section of the open cut. Haul Routes A and B would not be used concurrently.

Haul Routes C and E would principally, but not exclusively, be used when coal is being stockpiled within the RL100 Stockpile Area.

All processing of ROM coal, stockpiling and despatch of product coal, and coarse reject and fine tailings management would be undertaken within the existing Camberwell CHPP in accordance with the present approval for this facility. The approved tailings storage facility has sufficient capacity to store fine tailings from the Glennies Creek Colliery, Camberwell Open Cut and the proposed open cut.

The proposed open cut would be progressively backfilled with waste rock. The final void at the end of mining would be backfilled to the surface using reject material from the Camberwell CHPP or breaker stone from the pre-treatment plant at the Glennies Creek Colliery. However, prior to commencing to backfill the final void, the Proponent would review the potential for the void to be used as an entry for underground mining to access the Barrett or Hebden coal seams and, if feasible, would seek approval for an alternative land use in a subsequent application for project approval.

### **Production Rate and Project Life**

The maximum ROM coal production rate would be 1.5 million tonnes/year over an anticipated mine life of approximately 6 to 8 years.

### **Hours of Operation**

Site preparation activities, open cut mining activities, transportation of coal via Haul Routes A to D and rehabilitation-related activities would be undertaken between 7.00am and 10.00pm, 7 days per week. Transportation of coal via Haul Route E and



coal processing related activities would be undertaken 24 hours per day, 7 days per week. Highwall or auger mining would be undertaken on a campaign basis 24 hours per day, 7 days per week.

### **Employment**

The Project would directly generate approximately 45 full time equivalent positions, with an estimated additional 65 full time equivalent indirect positions created within the Hunter Valley and a further 68 full time equivalent indirect positions throughout NSW.

### **Traffic and Transportation**

The Project would generate an estimated maximum of 130 light vehicle movements per day on Middle Falbrook and Stony Creek Roads, with most of these vehicle movements likely to occur before and after shift change-overs. In addition, up to 10 Project-related heavy vehicle movements are anticipated on these roads daily. All product coal would be transported from the Camberwell CHPP by rail.

### **Facilities and Services**

An open cut facilities area would be established as part of the Project (**Figure B**). This area would include a site office, cribroom, storage and ablutions facilities, car park and muster area, as well as maintenance buildings, bunded fuel storage and a hardstand area.

The existing 66kV transmission line that supplies the Glennies Creek Colliery would be relocated. Mains power to the buildings within the open cut facilities area would be supplied by an extension of the existing power supply to the Glennies Creek Colliery.

Diesel fuel would be stored in two tanks in a bunded fuel bay, each with a capacity of 50 000L. Other bulk hydrocarbons would also be stored in appropriate containers within an appropriately bunded area. Alternatively, the tanks may be self bunded. A sealed refuelling bay would be constructed, with surface water runoff from this area, and from the area around the maintenance building, directed through an oil/water separator.

Potable water would be supplied in bulk and stored in tanks within the open cut facilities area. Water for operational purposes would be sourced from groundwater inflows and rainfall collected in the open cut, or from the Camberwell North Pit sump or Possum Skin Dam (**Figure B**).

Sewage from the ablutions building would be treated through a biocycle (or equivalent) sewage treatment system.

### **Safety**

The Proponent would ensure that the Project Site is securely fenced to prevent unauthorised access. In addition, the Proponent would develop a Safety Management System, including appropriate recruitment criteria, employee and contractor inductions and appropriate procedures to ensure compliance with all statutory and conditional requirements.

### **Rehabilitation**

The Proponent would undertake progressive rehabilitation throughout the life of the Project. The short-term objectives of this program would be as follows.

- Stabilise all disturbed areas no longer required for mining-related activities through progressive reshaping, spreading of topsoil and revegetation.



- Reduce the visual impact of the Project upon surrounding residents by early establishment of tree screens and progressive rehabilitation.
- Establish, enhance and maintain the biodiversity offset areas and undisturbed areas within the Open Cut Area.

The long-term objectives of the rehabilitation program would be as follows.

- Provide a low maintenance, geotechnically stable and safe landform which blends with surrounding landforms and provides a landform suitable for nature conservation as the final land use.
- Manage the biodiversity offset areas to ensure:
  - the long term enhancement of the biodiversity value of the areas for native species;
  - an increase in the area of high quality, native vegetation; and
  - provision of biodiversity linkages with the rehabilitated and protected areas in accordance with the *Synoptic Plan: Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley* and the *Glennies Creek Catchment – Total Catchment Management Study – Management Strategy*.

Progressive rehabilitation would include the following activities.

- Progressive shaping of the waste rock emplacements to enable the emplacements to blend with the existing natural and man-made landform.
- Contour banks and flumes would be progressively installed on the rehabilitated landform, as required.

- Where practicable, weathered to partly weathered overburden would be placed on the shaped landform.
- Subsoil and then topsoil would be placed on the shaped landform with the materials being preferentially sourced from active stripping areas.
- Selected vegetation would be placed over the areas to be rehabilitated following soil placement.
- The topsoiled surfaces would be initially stabilised with a non-persistent cover crop. A selection of locally occurring tree and shrub species would then be planted as tubestock or direct seeded.

Areas undergoing rehabilitation or enhancement would be regularly inspected and assessed against the short- and long-term rehabilitation objectives and remedial action undertaken, where appropriate.

### Biodiversity Offsets

The Proponent intends to compensate for the removal of approximately 75 hectares of native vegetation by protecting and enhancing approximately 254 hectares of Project-related land, namely the Northern, Southern and Western Biodiversity Offset Areas. In addition, the Proponent would seek to protect and enhance an additional 33 hectares of non-Project-related land, namely the Supplementary Biodiversity Offset Area, subject to a suitable arrangement being negotiated with the owners of that land (**Figure C**).

The Proponent would secure the biodiversity offset areas through an enduring covenant or restriction on the use of the land to the satisfaction of the relevant government agencies. The Proponent would undertake to manage the biodiversity offset areas for the purpose of native vegetation conservation while ever it retains ownership of the biodiversity offset areas.



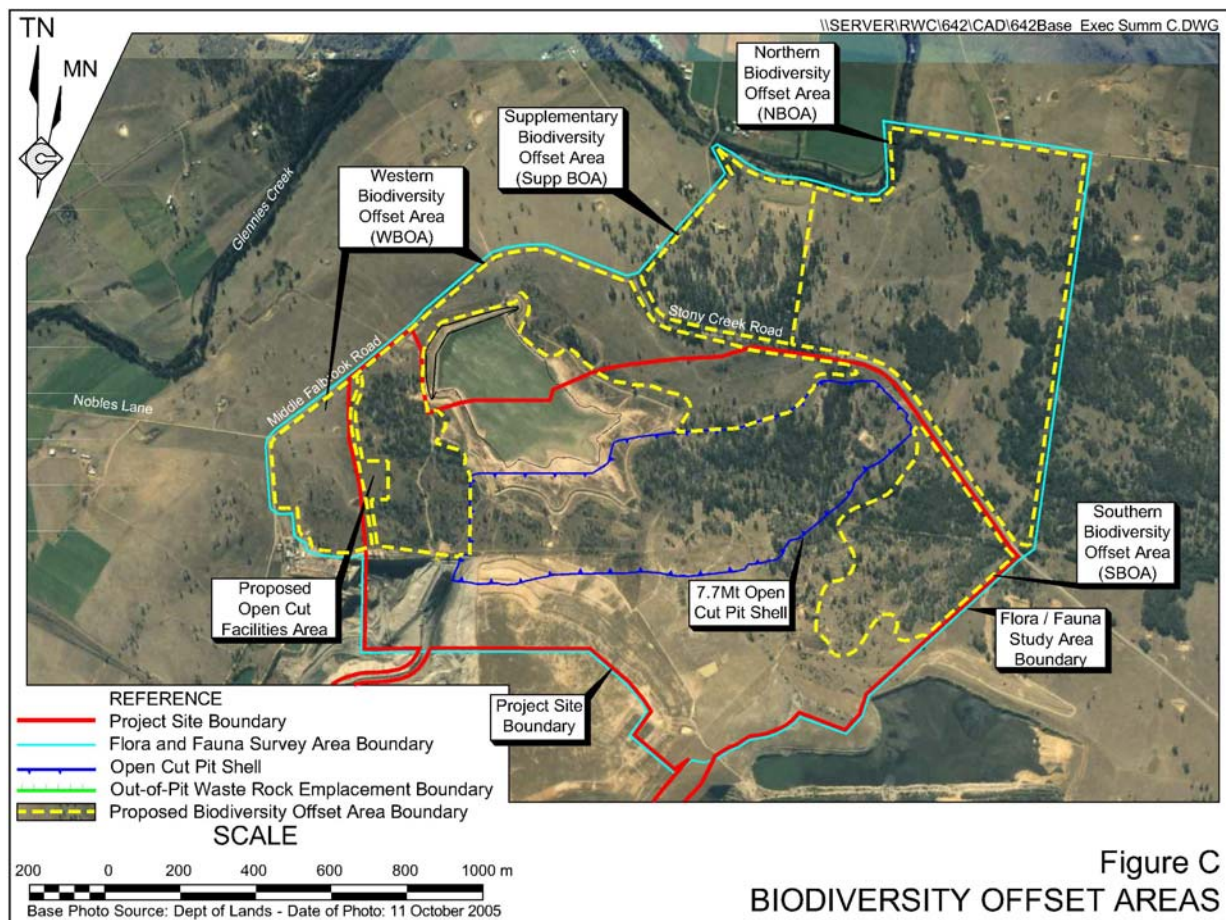


Figure C  
BIODIVERSITY OFFSET AREAS

Specific actions that would be undertaken within these areas include:

- continued exclusion of stock;
- erection of fences where necessary to prevent stock from surrounding properties entering the biodiversity offset areas;
- ongoing implementation of pest and weed control programs;
- planting of approximately 10 hectares of seedlings of River Oak, Swamp Oak, Forest Red Gum, Grey Box and species representative of the Narrow-Leaved Ironbark – Spotted Gum – Forest Red Gum Community adjacent to Glennies Creek; and
- erection of nesting boxes for Brush-tailed Phascogale and roosting tubes for microbats within the biodiversity offset areas.

### Remediation of the Glennies Creek Riparian Zone

The Proponent would, subject to obtaining the appropriate approvals, undertake the following remediation work within land owned or controlled by companies associated with the Proponent, adjacent to and within the banks of Glennies Creek.

- Weed control programs.
- Revegetation with appropriate species.
- Fencing of the revegetated area to exclude stock or provision of individual tree guards.
- Ongoing maintenance of remediated areas.

In addition, the Proponent would view favourably any request by surrounding land owners for assistance in remediating other sections of the riparian zone of Glennies Creek in the vicinity of the Project Site.

## ISSUE IDENTIFICATION AND PRIORITISATION

In order to undertake a comprehensive environmental assessment of the Project, the Proponent undertook the following steps to identify and prioritise potential environmental impacts associated with the Project.

### Issue Identification

Community consultation was undertaken via a newsletter, community forums and information sessions, targeted interviews and discussions with individual landholders. In addition, feedback was sought from:

- the Glennies Creek Community Consultative Committee;
- government agencies through a Planning Focus Meeting; and
- relevant State Environmental Planning Policies.

This process identified 12 potential environmental issues as follows.

- Air Quality.
- Noise and Blasting.
- Fauna.
- Flora.
- Aboriginal Heritage.
- Soils and Land Capability.
- Visual Amenity.
- Surface Water.
- Ground Water.
- Traffic and Transportation.
- European Heritage.
- Socio-economic Environment.

### Issue Prioritisation

An environmental risk analysis based on the likelihood and consequence of potential environmental issues identified was completed. The results of this analysis were used to determine the appropriate level of environmental assessment to be undertaken, together with the order that the issues are presented in this summary and throughout the *Environmental Assessment*.

## ENVIRONMENTAL SAFEGUARDS AND RESIDUAL 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 the environment. A brief overview of the main components of the surrounding environment, the proposed safeguards and the residual impacts are set out below.

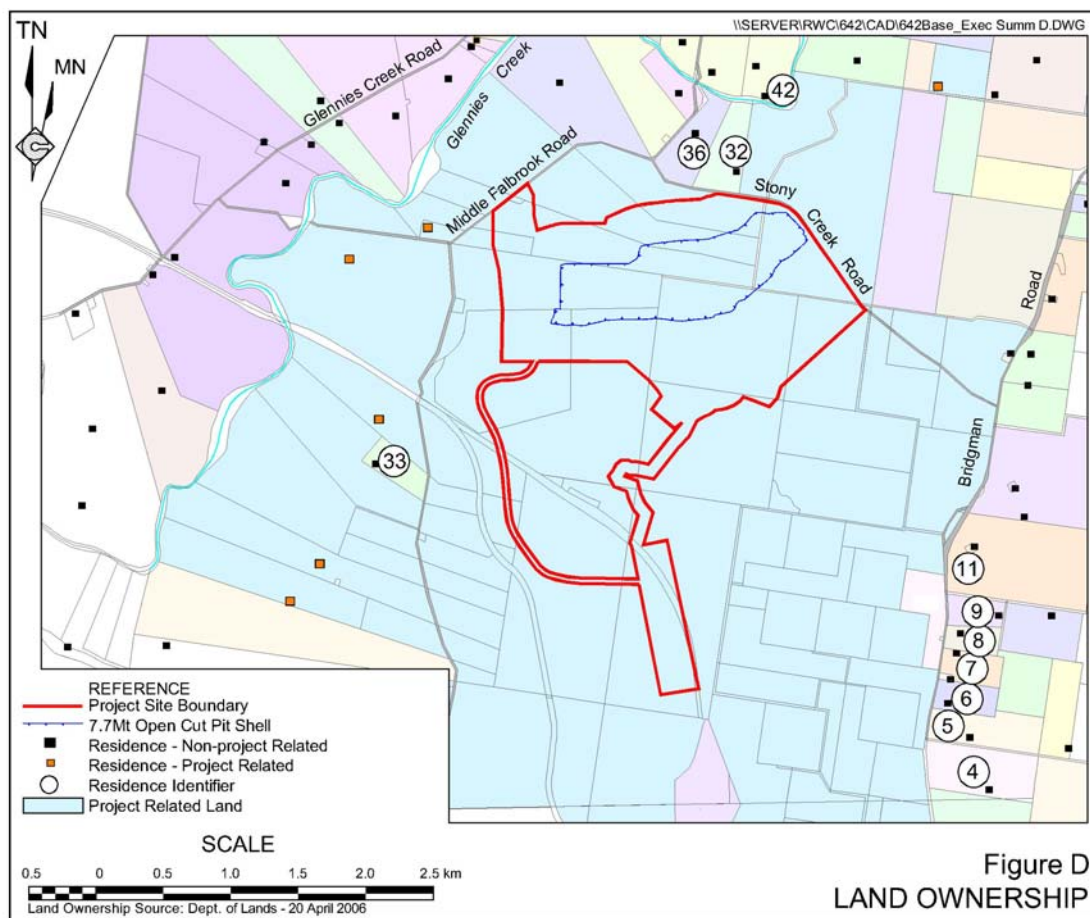
### Air Quality

Air quality impacts primarily include the dispersion of particulate material in the atmosphere and greenhouse gas emissions. In order to reduce the generation of airborne dust, the Proponent would:

- minimise areas to be cleared;
- progressively revegetate and/or rehabilitate cleared areas;
- use water sprays, where required, to prevent lift-off of dust;
- adopt dust control measures during drilling operations; and
- adequately stem all blast holes.

Notwithstanding the incorporation of the above safeguards, dust dispersion modelling predicted that Residences 32, 33, 36 and 42 (**Figure D**) would be likely to receive dust levels in excess of the Department of Environment and Climate Change (DECC) assessment criteria.





The greenhouse gas assessment concluded that Project extraction, processing and transportation-related activities, together with the combustion of the product coal, would contribute an estimated 0.008% of global annual greenhouse gas emissions and account for an estimated 0.00001°C of global warming.

### Noise and Blasting

The sources of noise around the Project Site are typical of a rural environment within the Hunter Valley, with contributions from farming activities, existing mining operations, insect noise, livestock, wind through vegetation and vehicles on local roads. Rating background noise levels were calculated for eight representative locations surrounding the Project Site and Project specific noise

assessment criteria for eight noise assessment groups were established in accordance with the Industrial Noise Policy. A rating background level established during a previous noise assessment was used for a ninth noise assessment group.

The Proponent would adopt the following safeguards with regards to noise and blasting issues.

- Hours of operation would be limited to between 7.00am and 10.00pm, with the exception of coal transportation via Haul Route E, coal processing and despatch activities and, intermittently, highwall or auger mining which would occur 24-hours per day, 7 days per week.
- Noise-mitigated equipment would be used.





- Acoustic bunds would be constructed where practicable adjacent to the active haul route and at the margins of the waste rock emplacement.
- Mining-related activities would be scheduled such that evening operations (between 6:00pm and 10:00pm) would occur in the deepest areas of the proposed open cut or behind acoustic bunds.
- Each blast would be designed by a suitably qualified Drill & Blast Engineer to achieve the Australian and New Zealand Environment and Conservation Council (ANZECC) recommended guidelines for ground vibration and airblast at all residences surrounding the Project Site.
- All blasts would, where appropriate be monitored on site and off site. Blast designs would be modified where necessary.

Noise modelling incorporating the proposed safeguards and simulating calm conditions predicts that the Project-specific intrusive noise assessment criteria would likely be exceeded at Residences 32 and 36 during the day and evening, as a result of the proposed mining-related activities. In addition, noise attributable to the Camberwell CHPP received at seven residences (Residences 4, 5, 6, 7, 8, 9 and 11) is predicted to exceed the Project-specific noise assessment criteria during the night under adverse weather conditions, ie. temperature inversions (**Figure D**).

The cumulative or amenity noise impacts are predicted to exceed the assessment criteria at Residences 32 and 36 (**Figure D**).

Off-site road transportation noise impacts are predicted to be within the DECC assessment criteria at distances of greater than 25m from Middle Falbrook and Stony Creek Roads.

The number of trains transporting coal from the Camberwell CHPP would be unchanged from the existing number of trains. The noise assessment indicates that the assessment criteria would be achieved at distances greater than 36m and 150m from the track during the daytime and night-time respectively.

The blasting assessment indicates that no residence would experience blasting-related impacts in excess of the ANZECC recommended “acceptable” impact assessment criteria.

### Fauna

A total of 106 fauna species were identified within the Fauna Survey Area (**Figure C**). Of these, five are listed as threatened under the *Threatened Species Conservation Act 1995* (TSC Act). A further 63 species listed under the schedules of the TSC Act and/or the *Environment Protection and Biodiversity Conservation Act 1999* have been observed or are considered likely to occur within the Singleton Local Government Area.

Six fauna habitat areas were identified within the Fauna Survey Area, namely:

- Open Pastures Habitat;
- Open Woodland Habitat;
- Woodland Habitat;
- Riparian Oaks Habitat;
- Wetland/Dams Habitat; and
- Existing Mine Disturbance.

The following safeguards have been or would be implemented by the Proponent to minimise Project-related impacts on fauna.

- The out-of-pit waste rock emplacement, site access road, facilities area and dirty water containment dams were designed to avoid areas of native vegetation and fauna habitat.



- Removal of vegetation would be undertaken progressively and would be limited to those areas required for operational purposes during the subsequent 12 months.
- Large trees would be removed in late spring or early autumn and would be inspected for nesting fauna prior to removal.
- Where practicable, cleared vegetation would be relocated to areas undergoing rehabilitation or areas that would not be disturbed.
- Three biodiversity offset areas comprising approximately 254 hectares of Project-related land and a further area covering approximately 33 hectares of non-Project-related land (subject to a suitable arrangement with the landholders being negotiated) would be created to offset the loss of vegetation communities and fauna habitat as a result of the Project (**Figure C**).
- Stock has been and would continue to be excluded from the Open Cut Area and biodiversity offset areas.
- Nesting boxes suitable for Brush-tailed Phascogale and roosting tubes suitable for microbats would be erected in trees within the biodiversity offset areas.
- Weed control and habitat enhancement programs, including establishment of native vegetation in an area of approximately 10 hectares adjacent to Glennies Creek within the Northern and Supplementary Biodiversity Offset Areas, would be undertaken.
- A 20m wide section of Project-related land adjacent to and south of Stony Creek Road would be revegetated to enhance the roadside vegetation corridor.

- Species Management Plans would be prepared for the Brush-tailed Phascogale and Grey-crowned Babbler prior to commencement of mining activities.

The fauna assessment concluded that the Brush-tailed Phascogale and the Grey-crowned Babbler may be significantly impacted by the Project. However, the proposed ameliorative and management measures and Biodiversity Offset Strategy would mitigate the Project-related impacts on these species.

In addition, the fauna assessment concluded that the Project would not significantly impact on any other threatened or listed species.

#### Flora

Six vegetation communities were identified within the Flora Survey Area (**Figure C**), namely:

- Tussock Grassland Community;
- Regenerating Native Woodland / Shrubland Community;
- Narrow-leaf Ironbark – Spotted Gum – Forest Red Gum Community;
- Bull Oak Community;
- Swamp Oak Community; and
- River Oak Community.

A further two disturbed vegetation communities were identified, namely:

- Rehabilitated Disturbed Land; and
- Disturbed Land.

In addition to the safeguards described previously, the Proponent would adopt the following safeguards to minimise flora-related impacts associated with the Project.

- Areas to be cleared would be clearly defined and marked and would be sprayed for weeds prior to stripping the topsoil.



- Clearing of vegetation would be undertaken with a bulldozer with the blade positioned just above the ground. The remaining vegetation would be removed with the topsoil.
- Topsoil would be retained on site to limit the spread of ‘onion grass.’
- Weed and pest control programs would be maintained and expanded.

The flora assessment found that no threatened flora species, endangered ecological communities or flora populations occur, or are likely to occur, within the Open Cut Area.

The Western Golden Wattle is listed as threatened in the *Hunter Bushland Resource Kit* (HCMT, 2003). This species was identified within the Flora Survey Area. The impact of the Project on this species, together with the impacts associated with the clearing of approximately 75 hectares of native vegetation, would be mitigated by the preservation and enhancement of the biodiversity offset areas (**Figure C**). The mitigated flora-related impacts are not considered to be significant.

### Biodiversity Offset Strategy

The areas of each vegetation community and fauna habitat that would be preserved within the biodiversity offset areas or would be disturbed as a result of the Project are presented with the “Key Statistics” at the end of this Executive Summary.

In assessing the Biodiversity Offset Strategy, the fauna assessment concluded the following.

- All mammal and amphibian species observed or likely to occur within the areas to be disturbed would also occur or would be likely to occur within the biodiversity offset areas.

- There is a greater abundance of insectivorous birds and a lower abundance of grassland, blossom-feeding and waterbird species within the Northern Biodiversity Offset Area than others areas within the Fauna Survey Area.
- The threatened Grey-crowned Babbler was only observed within the areas to be disturbed, however, this species is also expected to utilise resources within the biodiversity offset areas.
- Reptiles are more likely to be found within the Northern and Supplementary Biodiversity Offset Areas than other areas within the Fauna Survey Area.
- The Biodiversity Offset Strategy would be likely to result in short-term benefits for 18 listed species and long-term benefits for 38 listed species.

Similarly, in assessing the Biodiversity Offset Strategy, the flora assessment concluded the following.

- The Tussock Grassland, Regenerating Native Woodland / Shrubland and Narrow-leaf Ironbark – Spotted Gum – Forest Red Gum Communities have similar biodiversity value in both the areas to be disturbed and the biodiversity offset areas.
- Native tree and shrub species are rapidly regenerating within the Tussock Grassland and Regenerating Native Woodland / Shrubland Communities and sections of these communities may be expected to develop into Narrow-leaf Ironbark – Spotted Gum – Forest Red Gum or Bull Oak Community with time.



- The Bull Oak and Swamp Oak Communities, which would not be disturbed by the Project, add to the biodiversity value of the biodiversity offset areas.
- The biodiversity value of the River Oak Community would be increased by the proposed remediation and revegetation activities.

Finally, an assessment of the Biodiversity Offset Strategy against the requirements of the *Principles for the use of Biodiversity Offsets in NSW* indicates that the Biodiversity Offset Strategy complies with each of the guidelines' component principles.

### Aboriginal Heritage

A total of 19 sites containing isolated or scattered Aboriginal artefacts were identified within the Open Cut Area. The artefacts are predominantly flakes interpreted to be by-products of the tool making process and are unlikely to have been used. The remainder of the area surveyed is considered to have a low archaeological sensitivity.

The Proponent would develop a Management Protocol in consultation with the Aboriginal community to recover the identified objects.

### Soils and Land Capability

Two soil types were identified within the Open Cut Area. Soils of Soil Mapping Unit 1 (SMU 1) are largely associated with elevated ridgelines, while soils of SMU 2 are generally found on mid-to lower-slopes and drainage depressions.

Soils of both SMUs have variable dispersibility ratings, are non-saline to moderately saline and have a pH that is mostly between 6.0 and 6.5. The topsoil

and subsoil of both SMUs are suitable for stripping and stockpiling with soils of the same SMU and soil class.

The land capability of the Open Cut Area is predominantly Class V, with disturbed areas being Class M. The agricultural suitability of the Open Cut Area is predominantly Classes 3 and 4. The areas to be disturbed by open cut mining and related activities would be likely to have a final land capability of Class V and VII, and an agricultural suitability of Class 5, with limited areas of Class 3 and 4.

### Visual Amenity

The existing outlook from most residences surrounding the Project Site includes land used for agricultural, nature conservation and/or mining purposes. While the Proponent's activities would be visible from a number of residences, intervening topography and vegetation completely or partially screens the Project Site from many residences. Notwithstanding this, the Proponent would undertake the following measures to mitigate the visual impact of the Project.

- Construction of a visual amenity bund adjacent to Stony Creek Road (**Figure B**).
- Waste rock emplacements would be progressively reshaped and revegetated.
- Consideration of any request by an affected resident for assistance to create a visual screen between a residence and the Open Cut Area.
- Where lighting is required within the Open Cut Area, lighting plants would preferentially be placed in the deeper portions of the open cut or would be directed towards the existing mining infrastructure and not towards residences surrounding the Project Site.



## Surface Water

The Open Cut Area is located within the Glennies Creek catchment. Three small sub-catchments draining into Reedy Creek (a tributary of Glennies Creek) or directly into Glennies Creek occur within the Open Cut Area.

The surface water management system for the proposed open cut would be integrated with the existing Glennies Creek / Camberwell water management system. This system includes, or would include, the following safeguards.

- Diversion of all clean water to Reedy or Glennies Creek.
- Construction of two dirty water containment dams to the east of the out-of-pit waste rock emplacement as well as associated catch drains and diversion structures (**Figure B**).
- Containment of all dirty water in the existing and proposed dirty water containment dams, Possum Skin Dam or the Camberwell North Pit sump.
- Use of dirty water within the Camberwell CHPP, as well as for other mining-related activities.
- Export of dirty water to nearby Collieries for mining-related purposes.

The surface water assessment concludes that the integrated surface water management system, including the proposed open cut mine, would, taking into consideration long-term rainfall and estimated groundwater inflows, have an average surplus of approximately 850m<sup>3</sup>/day. However, taking into account existing agreements to export between 1 400m<sup>3</sup>/day and 3 900m<sup>3</sup>/day, the integrated surface water management system would be readily maintained in balance, with a potential to export an additional 550m<sup>3</sup>/day to 3 050m<sup>3</sup>/day if

excess water should be available. As a result, no off-site dirty water discharge would be required, and total on-site containment of all dirty water would be achievable.

## Groundwater

Two aquifers were identified within the vicinity of the Open Cut Area, namely:

- alluvial aquifers associated with surface drainage; and
- Permian-aged aquifers associated with coal seams.

The groundwater within the alluvial aquifers is of high quality, while the groundwater within the Permian-aged aquifers is comparatively saline. The groundwater assessment concludes that connectivity between these aquifers is low. No groundwater dependent ecosystems or agricultural users of water from the Permian-aged aquifers were identified.

The Project would impact on the Permian-aged aquifers only. Groundwater modelling indicates inflows to the proposed open cut of between 44m<sup>3</sup>/day and 261m<sup>3</sup>/day. This water would be incorporated into the integrated Glennies Creek and Camberwell surface water management system. Groundwater modelling indicates the zone of groundwater depression associated with the Project would extend approximately 1km east of the proposed open cut, but that the extent of drawdown attributed to the surrounding coal mines would be significantly greater than that associated with the Project.

## Traffic and Transportation

Access to the Project Site would typically be via Stony Creek Road and Middle Falbrook Road. Both these roads comprise a sealed pavement between 6.5m and 7.0m



wide with unsealed 2.0m wide shoulders on both sides in good condition. Traffic monitoring data indicates existing average daily total vehicle movements of approximately 550 and 410 on Stony Creek and Middle Falbrook Roads respectively.

The Project would be likely to generate a maximum of approximately 130 light vehicle and 10 heavy vehicle movements per day, resulting in maximum average daily vehicle movements of 690 and 550 on Stony Creek and Middle Falbrook Roads respectively. These anticipated traffic volumes are well within the RTA design criteria for roads of the standard of Stony Creek and Middle Falbrook Roads.

### **European Heritage**

The Middle Falbrook Road Bridge over Glennies Creek is the only item of European heritage significance identified from a search of National, State and local heritage registers in the vicinity of the Project Site. The Project would have no impact on this structure.

### **Socio-economic Environment**

The Project is located within the Singleton Local Government Area (LGA). The mining industry is the largest employer within the Singleton LGA, with other significant industries including retail, manufacturing and health and community services.

The Project is predicted to have the following social and economic benefits.

- Generation of approximately 110 full-time equivalent jobs within the Hunter Valley.
- Generation of an additional approximately 68 indirect fulltime equivalent jobs within the rest of NSW.

- An estimated increase in household expenditure in the Hunter Valley of approximately \$253.9 million.
- Additional royalty and tax payments to State and Commonwealth governments.

Potential community-wide socio-economic costs or impacts include the following.

- Minor and temporary reductions in property values as a result of noise impacts.
- Costs associated with Project-related greenhouse gas emissions.
- Costs associated with reduced surface water flows into Glennies Creek.

Other community-wide adverse socio-economic impacts associated with the Project were considered to be insignificant. It is acknowledged, however, socio-economic impacts on individual members of the community may be greater than the community-wide impact depending on the individual's susceptibility to a particular impact.

### **JUSTIFICATION AND EVALUATION**

The proposed Glennies Creek Open Cut Coal Mine 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 was 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 found that with the implementation of the proposed operational safeguards and mitigation measures, the residual risk posed by most potential environmental issues or impacts was reduced from the original risk level. The majority of identified residual environmental risks or potential impacts, taking into account the proposed safeguards, were assessed to have a low to moderate risk of occurrence, and are therefore considered to be acceptable.

In addition, the design of the Project has addressed each of the ecological sustainable development principles, and on balance, it is concluded that the Project achieves a sustainable outcome for the local and wider environment.

The 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 the Glennies Creek community and the Singleton LGA, as well as the communities and economies of the Hunter Valley, NSW and Australia. The Project is also consistent with the principles of ecologically sustainable development.

## **CONCLUSION**

The proposed Glennies Creek Open Cut Coal Mine has, to the extent feasible, been designed to address the various 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, processing and despatch of a high quality coal product and would generate significant employment opportunities, boosting the economies of local communities surrounding the Project Site.

The post-mining landform would be used for nature conservation, and together with the proposed biodiversity offset areas, would be consistent with the *Glennies Creek Total Catchment Management Strategy* and the *Synoptic Plan: Integrated Landscapes for Coal Mine Rehabilitation in the Hunter Valley*.

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

- contribute to satisfying the demand for high quality coal;
- satisfy ecological sustainable development principles;
- have a minimal and manageable impact on the biophysical environment;
- address the perceived social impacts; and
- contribute to the continued economic activity of Singleton Local Government Area and surrounding communities.



# Key Statistics

Areas		Approximate Area		
Project Site		Currently Disturbed	Currently Undisturbed	Total
Project Site		207ha	169ha	376ha
Open Cut Area		151ha	169ha	320ha
Haul Route Corridor D		14ha	-	14ha
Haul Route Corridor E		11ha	-	11ha
Camberwell CHPP		31ha	-	31ha
Biodiversity Offset Areas				Total
Northern Biodiversity Offset Area				121ha
Southern Biodiversity Offset Area				39ha
Western Biodiversity Offset Area				94ha
Supplementary Biodiversity Offset Area				33ha
Areas to be Disturbed		Currently Disturbed	Currently Undisturbed	Total
Open Cut		24.7ha	65.3ha	90ha
Out-of-pit Waste Rock Emplacement		31.8ha	11.2ha	43ha
Open Cut Facilities Area		-	1.5ha	1.5ha
Site / Open Cut Access Road		-	1.0ha	1.0ha
Haul Routes A, B and C		12.5ha	3.2ha	15.7ha
Stony Creek Road Amenity Bund		-	1.0ha	1.0ha
Northern Dirty Water Containment Dam		-	1.4ha	1.4ha
Southern Dirty Water Containment Dam		-	1.7ha	1.7ha
Vegetation Communities	Area proposed to be disturbed	Biodiversity Offset Areas		
		Northern, Southern and Western	Supplementary	Total
Tussock Grassland	6.1ha	38.6ha	5.8ha	44.4ha
Regenerating Native Woodland / Shrubland	0.7ha	74.0ha	-	74.6ha
Narrow-leaf Ironbark – Spotted Gum – Forest Red Gum	68.3ha	85.5ha	27.6ha	113.1ha
Bull Oak	-	20.9ha	-	20.9ha
Swamp Oak	-	33.4ha	-	33.4ha
River Oak	-	1.5ha	-	1.5ha
Rehabilitated Disturbed Land	47.6ha	-	-	-
Disturbed land	12.3ha	0.4ha	-	0.4ha
Fauna Habitat Areas	Area proposed to be disturbed	Biodiversity Offset Areas		
		Northern, Southern and Western	Supplementary	Total
Open Pastures	3.8ha	123.4ha	12.2ha	135.6ha
Open Woodland	34.3ha	60.9ha	-	60.9ha
Woodland	42.4ha	25.5ha	21.5ha	47.0ha
Riparian Oaks	-	41.5ha	-	41.5ha
Wetland / Dams	8.7ha	1.1ha	-	1.1ha
Existing Mine Disturbance	45.8ha	-	-	-





## Key Statistics (Cont'd)

<b>Volumes</b>		
ROM coal to be extracted	7.7 million tonnes	
Waste Rock to be extracted	43.9 million bcm	
<b>Topography and Residences</b>		
Maximum elevation of proposed waste rock emplacement	135mAHD	
Maximum elevation of existing waste rock emplacement	140mAHD (20m- 35m above the natural landform).	
Slope of natural landforms within the Project Site	Max 1:5 (V:H) Average 1:28 (V:H)	
Slope of the proposed waste rock emplacement	Max 1:5 (V:H) Average 1:20 (V:H)	
Number of Residences within 1km and 2.5km of the Open Cut Pit Shell	1km	3
	2.5km	40
<b>Mining</b>		
Proposed Project Life	Approximately 6 to 8 years	
Coal Reserve	7.7 million tonnes ROM coal	
Proposed Extraction Rate	Up to 1.5 million tonnes / year	
Coal Seams to be extracted	Liddell Seam (4.0m thick) Upper Barrett Seam (3.8m thick) Hebden Seam (1.7m thick)	
Cumulative thickness of coal to be extracted	Approximately 9.5m	
Mining Methods	Conventional Open cut Terrace Open cut Highwall or Auger Mining	
Frequency of Blasting	Up to 5 times per week	
Maximum internal truck movements per hour	60 (30 loads) (Cat 785 trucks) 44 (22 loads) (Cat 789 trucks)	
<b>Hours of Operation</b>		
Site preparation	7.00am – 10.00pm; 7 days / week	
Open cut mining	7.00am – 10.00pm; 7 days / week	
Blasting	9.00am – 5.00pm; up to 5 days per week	
Highwall or auger mining (intermittent activity)	24 hours, 7 days per week	
Coal transportation (Haul Routes A to D)	7.00am – 10.00pm; 7 days / week	
Coal transportation (Haul Route E)	24 hours, 7 days per week	
Coal Handling and Preparation	24 hours, 7 days per week	
Site rehabilitation	7.00am – 10.00pm; 7 days / week	
<b>Economic Contribution</b>		
Employment (in the Hunter Region)	Up to 110 additional full time equivalent positions	
Net Revenue	\$58.1 million	
Additional household expenditure	\$253.9 million	
Increase in the Gross Regional Product	0.11% to 0.13%	
Increase in rate of full time employment	0.05% to 0.07%	

