



COALPAC CONSOLIDATION PROJECT

PRELIMINARY ENVIRONMENTAL ASSESSMENT

for

Coalpac Pty Limited

October 2010

Hansen Bailey

ENVIRONMENTAL CONSULTANTS

COALPAC CONSOLIDATION PROJECT

PRELIMINARY ENVIRONMENTAL ASSESSMENT

Prepared by:

HANSEN BAILEY
PO Box 473
SINGLETON NSW 2330

21 October 2010

for:

COALPAC PTY LIMITED
Castlereagh Highway
CULLEN BULLEN NSW 2790

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

COALPAC CONSOLIDATION PROJECT
PRELIMINARY ENVIRONMENTAL ASSESSMENT

for
Coalpac Pty Limited

1 INTRODUCTION

1.1 BACKGROUND

Coalpac Pty Ltd (Coalpac) seeks a Project Approval under Part 3A of the *Environmental Planning & Assessment Act 1979* (EP&A Act) to consolidate the operations and management of the Cullen Valley Mine and Invincible Colliery sites under a single, contemporary planning approval to allow coal mining operations within its current mining tenements to continue for a further period of 21 years (Project). The Project Application Boundary (EA Boundary) is shown on **Figure 1**.

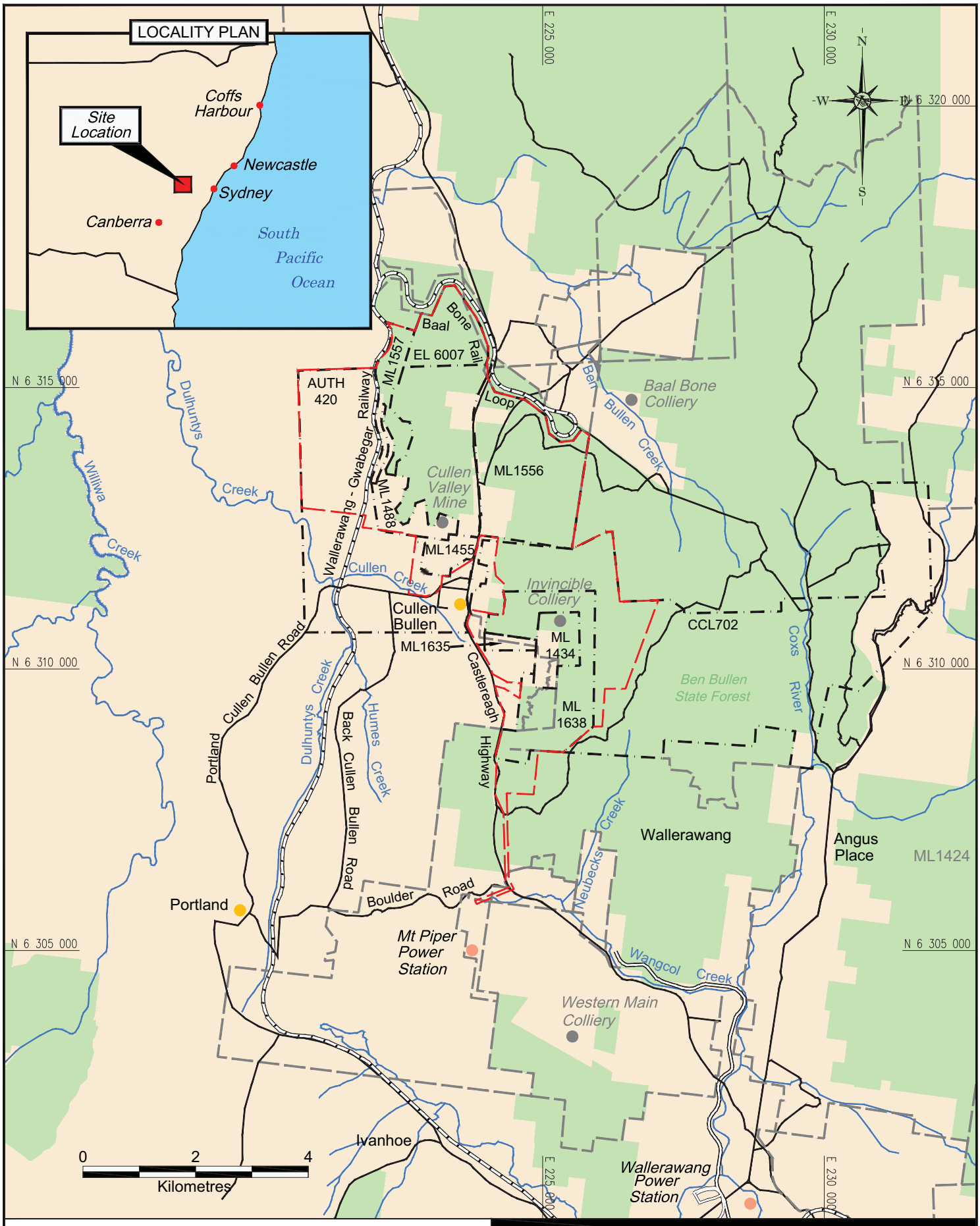
1.2 PROPONENT

Coalpac was established in 1989 and has successfully owned and operated coal mines in the Lithgow district for over 20 years. Coalpac has operated Invincible Colliery using various mining methods since that time, including underground continuous miner, longwall, open cut excavator and truck, and highwall mining operations.

In November 2006, CET Resources purchased a controlling interest in Coalpac, with the aim of fully realising the potential of the available coal reserves at Invincible Colliery through innovative mining techniques and increased efficiencies. In February 2008, Coalpac purchased the Cullen Valley Mine and with Invincible Colliery, has operated the two mines in unison since that time. It is the intention to utilise these mines as a base from which to grow Coalpac's operations in the Western Coalfields of NSW. The contact details for Coalpac are:

Coalpac Pty Ltd
Cullen Valley Mine and Invincible Colliery
Castlereagh Highway
CULLEN BULLEN NSW 2790
Phone: (02) 6359 0600
Fax: (02) 6359 0608

As shown on **Figure 1**, the Cullen Valley Mine and Invincible Colliery operations are located adjacent to the Castlereagh Highway, approximately 25 km north-west of Lithgow, NSW. Both operations are located on lands surrounding the township of Cullen Bullen, with Invincible Colliery and Cullen Valley Mine located approximately 1 km to the south-east and north-west, respectively. All of Coalpac's mining activities occur within the Lithgow City Council Local Government Area (LGA).



EA Boundary
Coalpac Mining Tenements
Other Tenements
Wallerawang-Gwabegar Railway
Roads
Creeks

Hansen Bailey

Coalpac Pty Ltd
Cullen Valley Mine

Coordinate System: MGA Zone 56

COALPAC CONSOLIDATION PROJECT

Regional Locality

Cad File: 06221H.dwg	Date: 29.09.10	Drawn: TB	Figure 1

Coalpac currently has approval to produce up to 1.9 Million tonnes per annum (Mtpa) product coal by open cut and highwall mining methods for domestic supply. The combined volume of product coal from both operations, up to 1.0 Mtpa and 0.9 Mtpa is allowed under the respective approvals for Cullen Valley Mine and Invincible Colliery.

1.4 PROJECT OVERVIEW

Project Approval is sought for the following Project:

- Consolidation and expansion of the existing Cullen Valley Mine and Invincible Colliery operations to produce up to a total of 3.5 Mtpa product coal, including:
    - The continuation of mining operations at Cullen Valley Mine (the area west of the Castlereagh Highway via both open cut and highwall mining methods to access an additional resource of approximately 35 Mt ROM; and
    - The continuation of mining operations at Invincible Colliery and an extension north into the East Tyldesley area via open cut and highwall mining methods to access an additional resource of approximately 48 Mt ROM;
- Continuation of coal supply to the local Mount Piper Power Station (MPPS) and (emergency supply to) Wallerawang Power Station, with flexibility for supply to additional domestic destinations and Port Kembla for export;
- Upgrades to existing administration, transport and other infrastructure;
- Construction of the previously approved Coal De-shaling preparation Plant (CDP) at the Cullen Valley Mine;
- Construction of a bridge over the Castlereagh Highway to link operations east and west of the highway and the development of required access roads to the East Tyldesley area;
- Construction of a bridge and haul road across the Wallerawang - Gwabegar Railway line to permit access to mine the previously approved Hillcroft resource;
- The extraction of the Marangaroo Sandstone horizon from immediately below the Lithgow Coal Seam in the northern coal mining area of Cullen Valley Mine. This material is to be trucked for crushing on site prior to sale into the Sydney industrial sand market;
- Construction of a rail loop or rail siding with loading infrastructure to permit transport of product coal and sand products;
- Integration of the water management of both sites into a single closed system; and
- Integration of the management of mine rehabilitation and conceptual final landform outcomes for Cullen Valley Mine and Invincible Colliery.

1.5 DOCUMENT PURPOSE AND STRUCTURE

This Preliminary Environmental Assessment (PEA) has been prepared by Hansen Bailey Environmental Consultants (Hansen Bailey) on behalf of Coalpac to support a Project Application under Section 75E of the EP&A Act. This document describes the key social and environmental issues associated with the Project and the proposed assessment methodologies for the consideration of the Department of Planning (DoP), other relevant NSW government regulators and community interest groups.

The Environmental Assessment Requirements (EARs) for the Project will be sought following consultation with DoP, the community and discussions with other key government agencies.

The PEA is generally structured as follows:

- **Section 2** provides an overview of the existing mining operations of Cullen Valley Mine and Invincible Colliery and a description of the surrounding environment;
- **Section 3** provides a detailed description of the Project;
- **Section 4** summarises the legislation relevant to the Project;
- **Section 5** describes the stakeholder engagement program to be undertaken to ensure all interested parties are consulted over the Project;
- **Section 6** provides an overview of the preliminary environmental risk assessment completed for the Project;
- **Section 7** describes the potential impacts and proposed assessment methodology for all key environmental issues identified in the preliminary environmental risk assessment for the Project;
- **Section 8** provides a preliminary justification for the Project; and
- **Section 9** lists reference documents relevant to this PEA.

2 BACKGROUND

This section provides a discussion of the existing and approved operations at Cullen Valley Mine and Invincible Colliery and a description of the current environmental management and monitoring programs Coalpac has established for the two sites. It also discusses relevant components of the existing environment including climate, topography, geology and land ownership.

2.1 EXISTING OPERATIONS

2.1.1 History

Cullen Valley Mine

The Cullen Valley Mine site contains the former operational areas of the Tyldesley and Beaumaris Collieries, where coal mining via underground methods commenced in the late 1800's. A range of open cut and underground mining operations have been undertaken at the site since this time, with activities suspended at various times in the intervening period.

On 24 December 1997, the Lithgow Coal Company (previous owners of the Cullen Valley Mine) was granted DA 200-5-2003 by the Minister for Planning for the operations described in the *Feldmast Coal Project Environmental Impact Statement 1997* (Feldmast EIS) (IEC, 1997). The Feldmast EIS described and assessed open cut, underground and highwall mining activities at Cullen Valley Mine. Open cut mining consistent with the Feldmast EIS commenced in May 2000.

Following the identification of additional open cut coal reserves, the *Cullen Valley Mine Open Cut Extension EIS* (Cullen Valley Mine EIS) (IEC, 2004) was lodged in April 2004. This modification to DA 200-5-2003 was granted by the Department of Infrastructure, Planning and Natural Resources on 19 August 2004. This approves open cut mining activities on the western side of Tyldesley Hill and continued activities under the Feldmast EIS.

Product coal from Cullen Valley Mine has historically been supplied under contract to MPPS. However, with the failure of the mine to renew a supply contract, the operation was placed on a Care and Maintenance program in June 2007.

In February 2008, when Coalpac acquired Cullen Valley Mine from Lithgow Coal Company, the mine was taken off Care and Maintenance. The open cut mining operations approved under DA 200-5-2003 re-commenced at that time.

A summary of current operations, approvals and the environmental management of Cullen Valley Mine is provided below in **Section 2.1.2** to **Section 2.1.5**.

Invincible Colliery

Coal mining at Invincible Colliery commenced in 1901, with the establishment of an underground mining operation located on the eastern side of the township of Cullen Bullen. This operation continued into the mid 1950's, until the mine was relocated approximately 4 km to the south to commence another underground operation which remained active until 1998, when operations were suspended due to low coal prices.

Limited open cut mining at Invincible Colliery recommenced in 1998 and continued until 2001, when the site was placed on Care and Maintenance.

In May 2005, Coalpac secured a contract from Delta Electricity to supply coal to the MPPS over a three year period. An application for Project Approval under the EP&A Act, supported by the *Environmental Assessment for Proposed Extension of Invincible Open Cut Mine and Rehabilitation Activities* (Craven Elliston Hayes, 2006), was submitted to DoP for an extension to the open cut operations at Invincible Colliery to allow this contract to be met. Project Approval (PA 05_0065) was subsequently granted on 7 September 2006 for the mine extension and the Invincible Colliery was taken off Care and Maintenance.

Following the recommencement of open cut mining at the Invincible Colliery being approved, two further successful applications were made for the modification of PA 05_0065. These modifications gained approval to recommence coal washing at the Invincible Colliery Preparation Plant (ICPP) and introduce highwall mining within the open cut mine area.

Invincible Colliery operates under PA 07_0217 which was granted by DoP on 4 December 2008, which also required the surrender of PA 05_0065. PA 07_0127 primarily enables an increase in the volume of ROM coal production at Invincible Colliery to 1.2 Mtpa in order to secure supply of product to local power stations. This application was supported by the *Environmental Assessment of the Proposed Extension to the Invincible Colliery Open Cut Mine and Production Increase 2008* (Invincible Colliery EA) (R.W. Corkery 2008).

Three modifications have been granted for PA 07_0127 and include:

- MOD 1 granted 12 January 2009 to amend a discrepancy in the schedule of land provided in the original EA;
- MOD 2 granted 12 August 2009 which granted for changes to the Project site boundary to allow consistency between this area and the mining tenements held by Coalpac for Invincible Colliery. This modification also approved the amendment of the layout of the open cut pit areas for the site, although the total open cut pit disturbance area did not change; and
- MOD 3 granted 8 October 2010 to allow the transportation of up to an additional 300,000 tonnes per annum (tpa) of product coal by public roads to the currently approved destination of MPPS (a maximum volume of 1.2 Mtpa).

A summary of current operations, approvals and the environmental management of Invincible Colliery is provided below in **Section 2.1.2** to **Section 2.1.5**.

2.1.2 Approved Operations

Cullen Valley Mine

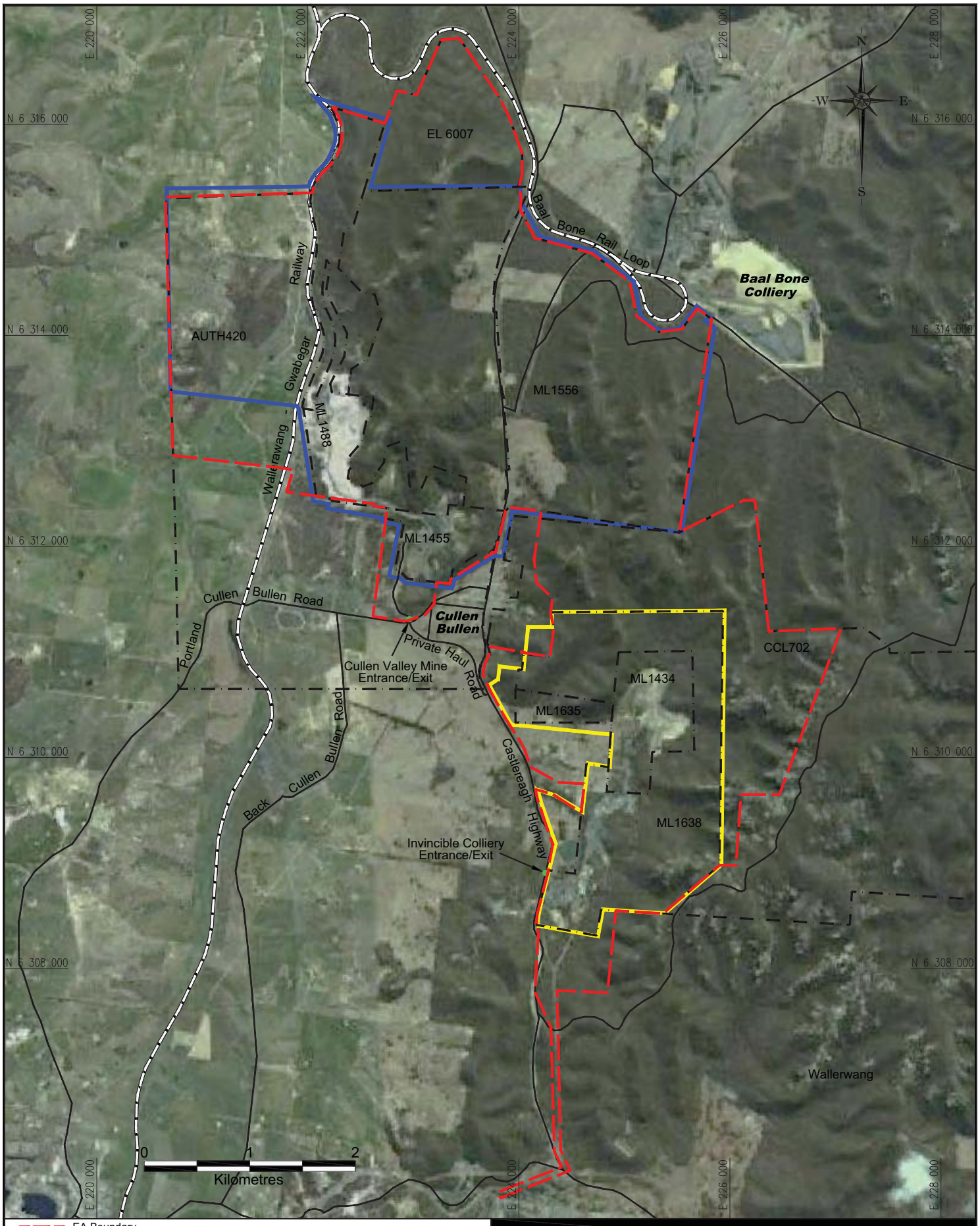
Figure 2 illustrates the key features of Cullen Valley Mine, as approved under DA 200-5-2003. An overview of the key elements of the approved mine is provided below.

Mine Plan

- The Feldmast EIS and Cullen Valley Mine EIS identified proposed operational limits within which open cut, highwall and underground mining would take place;
- Currently, open cut mining is undertaken as approved under the Cullen Valley Mine EIS up to the product coal limit of 1 Mtpa. Of this volume, no more than 250,000 tonnes (t) may be transported to destinations other than MPPS;
- Open cut mining operations involve the extraction of coal from the combined Katoomba / Middle River / Moolarben; Upper Irondale; Irondale; and the coalesced Lidsdale / Lithgow Seams within the Illawarra Coal Measures; and
- Underground operations described in the Feldmast EIS (but not yet developed) proposed to access the Lithgow and Irondale Seams within the Illawarra Coal Measures.

Equipment and Employment

- Manning of up to 26 full time personnel, plus additional contractors;
- Mining operations may occur 24 hours per day, 7 days a week with blasting approved between 9:00 am and 3:00 pm Monday to Friday, inclusive. All haulage of product coal by road is approved to occur between 7:00 am and 5:30 pm, Monday to Friday, and 7:00 am to 5:00 pm on no more that 30 Saturdays annually, in accordance with the requirements of Department of Environment Climate Change and Water (DECCW) and Lithgow City Council; and
- The utilisation of a combination of a truck / shovel open cut, highwall and continuous miner underground operations. The Feldmast EIS includes a description of the conceptual layout, equipment requirements and operational areas for the underground operation, which has not yet been developed.



EA Boundary
Approved Invincible Colliery Project Site Boundary
Approved Cullen Valley Mine DA Boundary
Coalpac Mining Tenements
Roads

Hansen Bailey

Coalpac Pty Ltd
Cullen Valley Mine

Coordinate System: MGA Zone 56

COALPAC CONSOLIDATION PROJECT

Site Layout

Cad File: 06222G.dwg	Date: 29.09.10	Drawn: TB	Figure 2

Infrastructure

- Mine infrastructure (including site offices, workshop, car park and bathhouse facilities), access roads, mine water storage, a 100,000 t coal stockpile and infrastructure housing two bunded 50,000 litre fuel storage tanks;
- Coal handling systems:
    - Coal crushing and sizing plant, which conveys to the product stockpile prior to loading into coal haulage trucks for transportation to approved domestic destinations; and
    - Flexibility also exists under the Cullen Valley Mine EIS for the construction of a CDP. Construction of this facility has not yet been required; however approval to develop the infrastructure will be retained. A current implementation plan for construction of this plant is being finalised for an anticipated construction completion date of January 2011.

Product Coal Transport

- Product coal is transported by road from the product stockpile using semi-trailers along the main mine access road to its intersection with the Portland Cullen Bullen Road. At this intersection, the trucks cross the Portland Cullen Bullen Road onto a 1.3 km private haul road in order that Cullen Valley Mine traffic can bypass to the south of the Cullen Bullen village; and
- Product coal trucks exit the private haul road onto the Castlereagh Highway heading south to travel to the MPPS, located approximately 5 km away.

Invincible Colliery

Figure 2 illustrates the key features of Invincible Colliery, as currently approved under PA 07_0127. An overview of the key elements of the approved mine is provided below.

Mine Plan

- The Invincible Colliery EA identified a number of mining areas to be accessed by a combination of open cut and highwall mining methods, for the recovery of coal at a rate of up to 1.2 Mtpa ROM to the year 2016;
- Open cut mining operations at Invincible Colliery extract coal from the coalesced Lithgow / Lidsdale Seam and Irondale Seam. Highwall mining extracts coal primarily from the Irondale Seam, with limited mining of the Lithgow Seam identified in the Invincible Colliery EA for some areas in the west of the open cut; and
- ROM coal is transported to either the centralised coal crushing and screening area or the ROM Pad adjacent to the Invincible Colliery site access road for washing at the ICPP.

Equipment and Employment

- Employment for up to 20 full time personnel, plus additional contractors;
- Generally, mining operations may occur between 7:00 am and 10:00 pm, Monday to Saturday inclusive, with the exception of public holidays. Those open cut pits nominated in the Invincible Colliery EA as the West, Renown (Central) and South pits are not permitted to be mined between the hours of 6:00 pm and 10:00 pm, however maintenance activities and safety procedures may be undertaken at any time, with the approval of Industry & Investment NSW (I&I NSW); and
- The utilisation of a combination of a truck / shovel open cut and highwall mining operations. The Invincible Colliery EA identifies the conceptual layout, equipment requirements and operational areas for the approved open cut and highwall mining operations.

Infrastructure

- Utilisation of existing mine infrastructure (including site offices, car park, workshop and bathhouse), ICPP, Coal Crushing and Screening Area, site access and haul roads, fine rejects storage and water management system;
- Coal handling systems:
    - Centralised Coal Crushing and Screening Area for sizing and screening of ROM coal, with stockpiling capacity of 15,000 t of ROM coal and 10,000 t of product coal. Separate ROM and product stockpiles are maintained for the screening plant and crusher, with a further product stockpile maintained for the loading of road trucks for the transportation of product coal;
    - Operation of the ICPP. At this facility, ROM coal is fed to a Klockner primary breaker for size reduction prior to being transported by conveyor to the Bradford Breaker for sizing and separation from coarse rejects. Sized coal <100 mm from the Bradford Breaker can be fed to a double Jig Washer via a small surge bin at a maximum rate of 350 tonnes per hour (tph), which further separates coal into either of the four local product bins or the 5,000 t capacity conical stockpile. Excess coal from the conical stockpile can be pushed to an adjacent 80,000 t stockpile area, as required;
    - Coarse rejects are conveyed from the Jig Washer to a reject bin for truck loading. Up to 75% of coarse rejects are re-washed and combined with coal provided to MPPS, with the remainder loaded onto empty trucks returning to the open cut for emplacement in these areas, which generally have a capacity of 100,000 tpa; and
    - Fine rejects from processing are pumped to the storages shown on **Figure 2**, which have a combined capacity of approximately 30,000 m^3. Consolidated fines in these areas are regularly excavated for coal blending purposes, which allows for new material to be stored as additional space is created.

Product Coal Transport

- Product coal is approved for transportation by road-registered highway trucks of varying configurations up to a maximum haulage capacity of 40 t to domestic destinations at a rate of 0.9 Mtpa. All product coal leaves the site via the access road onto the Castlereagh Highway;
- Product from the coal crushing and screening area is loaded onto trucks via front end loader. Washed coal from the ICPP is loaded onto the haul trucks from an overhead bin located near the site access road to the Castlereagh Highway;
- Product coal is predominantly transported to the MPPS, with approval also in place to supply the Wallerawang Power Station on a limited campaign basis for up to two weeks in any three month period, following notification of relevant landholders or specific approval from DoP; and
- Up to 200,000 tpa of product coal may also be transported to domestic destinations other than MPPS or Wallerawang Power Station.

2.1.3 Existing Licences and Approvals

Table 1 and **Table 2** outline the status of the respective licences, leases and other mining approvals currently held by Coalpac for Cullen Valley Mine and Invincible Colliery respectively.

Table 1
Cullen Valley Mine Licences & Approvals

Ref	Approval No	Description	Approval Term	Authority
1	DA-200-5-2003	Cullen Valley Mine Development Consent	19/08/04 - 19/08/25	DoP
2	Cullen Valley Mine EIS	Cullen Valley Mine Open Cut Extension. 7 Mt to be removed within 10 years with a maximum of 1 Mtpa production	20/05/04 - 20/05/25	N/A
3	Feldmast EIS	Feldmast Project open cut, highwall mining and underground mine producing up to 1 Mtpa product coal	24/12/97 - 24/12/18	N/A
4	Mining Lease (ML) 1455	Mining Lease (open cut)	19/08/99 - 19/09/20	I&I NSW
5	ML 1488	Lease extension granted (open cut / highwall mining)	21/06/01 - 21/06/22	I&I NSW
6	ML 1556	Mining Lease (underground / highwall)	20/09/04 - 20/09/25	I&I NSW
7	ML 1557	Mining Lease (open cut / highwall)	20/09/04 - 20/09/25	I&I NSW
8	AUTH (Authorisation) 324	Authorisation for area to east of the Castlereagh Highway	25/08/83 - 09/04/12	I&I NSW
9	AUTH 420	Authorisation for area to west of the railway	12/01/90 – 9/04/12	I&I NSW
10	EL (Exploration Lease) 5712	Exploration Lease for area to the west of railway	10/04/00 – 09/04/12	I&I NSW
11	EL 6007	Exploration Lease for area to the north-east of Cullen Valley Mine	08/10/02 – 07/10/12	I&I NSW

Ref	Approval No	Description	Approval Term	Authority
12	Mining Operations Plan (MOP)	Covering Lease Extension Area	30/09/04 – 30/09/11	I&I NSW
13	Environmental Protection Licence (EPL) 10341	Cullen Valley Environment Protection Licence	10 December (Anniversary)	DECCW

Table 2
Invincible Colliery Licences & Approvals

Ref	Approval No	Description	Approval Term	Authority
1	PA 07_0127	Invincible Colliery Project Approval	04/12/08 - 04/12/16	DoP
2	Invincible Colliery EA	Invincible Colliery open cut extension from 500,000 tpa to 1.2 Mtpa (ROM) and 900,000 tpa product coal	04/12/08 - 04/12/16	As above
3	Invincible Colliery EA (MOD 1)	Amendment to schedule of land provided for PA 07_0127	As above	As above
4	Invincible Colliery EA (MOD 2)	Modification of the Project site boundary for consistency between this area and the mining tenements held by Coalpac for Invincible Colliery	As above	As above
5	Invincible Colliery EA (MOD 3)	Modification to allow the transport of up to an additional 300,000 tpa of product coal by public roads to MPPS (up to 1.2 Mtpa).	As above	As above
6	ML1635	Surface Mining Lease (22.99 Ha)	10/09/09 - 10/09/30	I&I NSW
7	ML1638	Surface Mining Lease (404.80 Ha)	6/11/09 - 6/11/30	I&I NSW
8	MOP	Covering Lease Extension Area	30/09/04 - 30/09/11	I&I NSW
9	EPL 1095	Invincible Colliery Environment Protection Licence	27 February (Anniversary)	DECCW
10	Groundwater discharge licence	Long Swamp Bore discharging underground workings water	Covered under EPL 1095	DECCW

2.1.4 Environmental Management

Coalpac has developed and implemented a number of environmental management systems and plans to ensure that potential impacts from its mining operations are appropriately identified and minimised. Environmental management documents have been put in place for all key issues with the potential to impact on the environment and local communities and include mitigation measures required for the appropriate control of each aspect of operations.

2.1.5 Environmental Monitoring Program

Coalpac has established an Environmental Monitoring Program for both Cullen Valley Mine and Invincible Colliery to assist in the management and measurement of the environmental performance of each operation. This program includes a network of monitors at the locations illustrated in **Figure 3**.

The combined environmental monitoring network incorporates:

- Two meteorological monitoring stations;
- 11 dust depositional dust gauges (six at Invincible Colliery, five at Cullen Valley Mine);
- Two High Volume Air Sampler (HVAS) monitoring Particulate Matter less than 10 microns in diameter (PM_{10}) (one in place for each operation);
- 10 noise monitoring locations (five at Invincible Colliery, five at Cullen Valley Mine);
- Monitoring of the standing water levels in the old Tyldesley Colliery workings underlying Cullen Valley Mine; and
- Four surface water monitoring locations (two for Invincible Colliery, two for Cullen Valley Mine).

This existing network and associated management documents will be reviewed and updated as required to ensure that the consolidated network will remain effective in monitoring any potential impacts associated with the Project.

2.2 EXISTING ENVIRONMENT

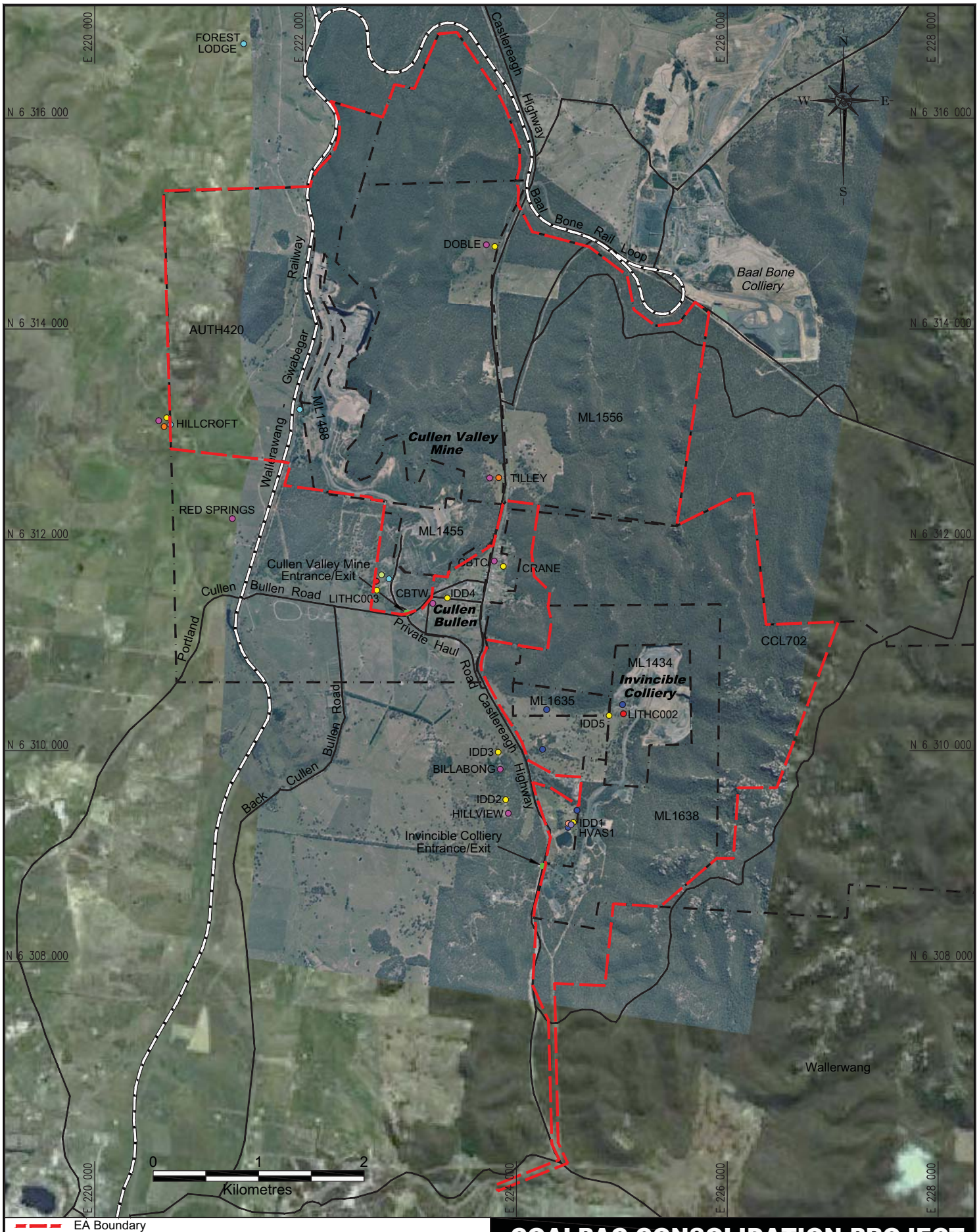
2.2.1 Regional Setting

Cullen Valley Mine and Invincible Colliery are located on the western slopes of the Great Dividing Range adjacent to the township of Cullen Bullen, which has a population of approximately 300 people. The closest urban area is the regional centre of Lithgow, situated approximately 25 km to the south-east along the Castlereagh Highway.

The Project is bounded to the north, east and south by the Ben Bullen State Forest and the lower lands of Cullen Valley to the west. There are several other State Forestry areas and National Parks located in the regions adjacent to the Ben Bullen State Forest, including the Gardens of Stone National Park approximately 10 km north of the Project, the Wolgan State Forest approximately 8 km to the north-east of the Project and the Newnes State Forest, located approximately 12 km to the south-east.

The Project area is located in the upper Turon River catchment, approximately 500 m east of the divide from the Cox's River catchment that is created by the steep terrain in the Ben Bullen State Forest associated with the Great Dividing Range.

As can be seen in **Figure 1**, there are a number of minor drainage lines in the vicinity of the Project area, with local catchments consisting of a number of creeks and ephemeral watercourses that generally flow into the upper Turon River system.



EA Boundary
Coalpac Mining Tenements
Wallerawang-Gwabegar Railway
Roads
Meteorological Station
Water Monitoring Location
Surface Water Monitor
High Volume Air Sampler
Blast Monitor
Depositional Dust Monitor
PM10 Monitor
Existing Licensed Discharge Point
Noise Monitor

Hansen Bailey

Coalpac Pty Ltd
Cullen Valley Mine

Coordinate System: MGA Zone 56

COALPAC CONSOLIDATION PROJECT

Environmental Monitoring System

Cad File: 06223H.dwg	Date: 29.09.10	Drawn: TB	Figure 3

2.2.3 Climate

The climate of the region is defined by its latitude, inland location, and the steep ridge and valley escarpments typical to the western slopes of the Great Dividing Range. Generally, the climate is cool-temperate, characterised by relatively mild summers and cold winters. Rainfall patterns are summer dominant. Fog and frost are common in cooler months, although a range of factors including the ridge and valley topography, altitude, aspect and exposure result in some localised temperature variations across the Project area. Temperature inversions are common in winter months, tending to occur on frosty mornings and on days when fogs are present.

2.2.4 Topography

The Project is located on the western slopes of the Great Dividing Range at elevations between 900 – 940 m AHD, with several steep sandstone escarpments dividing the site topographically as shown on **Figure 2**. With the exception of the steeply rising lands associated with the remnant sandstone escarpment features, the area is typified by moderately undulating terrain. To the west of the Project area, the topography gently slopes downward toward Cullen Valley, to an elevation of approximately 840 m AHD.

2.2.5 Geology

The Project is located within the Western Coalfields of NSW, which is geologically located on the western edge of the Sydney Basin. The Sydney Basin consists of a series of gently dipping sedimentary beds of shale and sandstone of Permo-Carboniferous age capped by massive sandstones of Triassic Age. Directly beneath the Triassic sandstone, these beds contain coal seams and form the Upper Coal Measures. The measures extend from the western boundary of the Western Coalfields in an easterly direction, dipping gently at an angle of 1 - 3° to the north-east, towards the coast, and extending out to sea.

The Western Coalfields are characterised by the prominent cliffs and eroding plateaus of the Triassic age sandstone and shale, the Narrabeen Group which overlies the shale, sandstone, conglomerate and coal of the Permian aged Illawarra Coal Measures, which form the eroded slopes that fall away from the sandstone and shale cliffs.

The Western Coalfield extends from the south of Lithgow to north of Ulan and is bounded to the west by outcroppings of the Lithgow Seam, the deepest coal seam of the measures. There is no defined eastern boundary, given the dipping of the coal measures to the north-east below the Hawkesbury Sandstone of the Blue Mountains.

2.2.6 Coal Resource

The Illawarra Coal Measures are those targeted by the existing operations of Cullen Valley Mine and Invincible Colliery and this is anticipated to continue for the Project. There are seven identified coal seams in the Illawarra Coal Measures, which occur as follows (in descending stratigraphic order):

- Katoomba Seam;
- Middle River Seam;

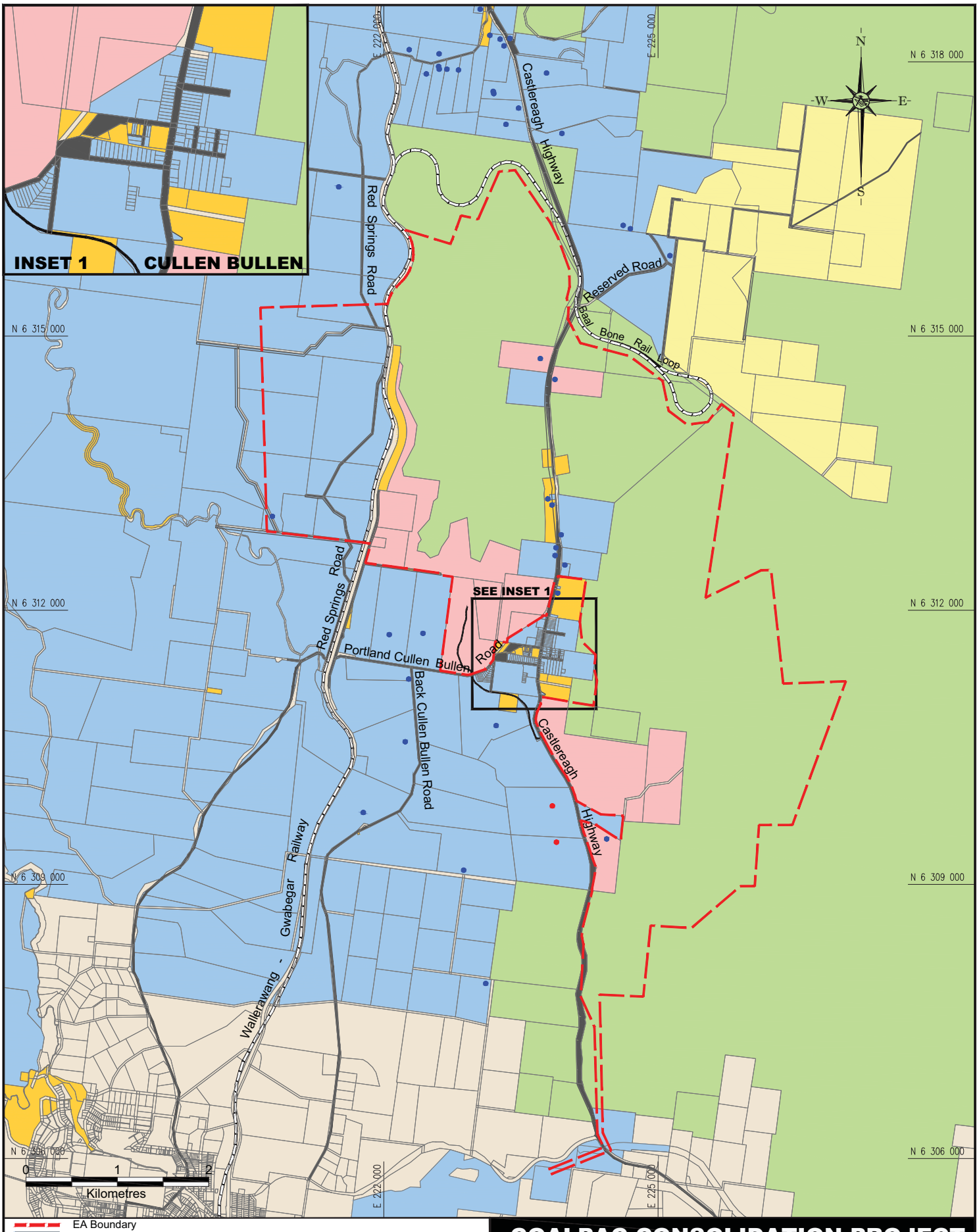
- Moolarben Seam;
- Upper Irondale Seam;
- Irondale Seam;
- Lidsdale Seam; and
- Lithgow Seam.

2.3 LAND USE

Predominantly, activities within the EA Boundary are associated with the existing operations of Cullen Valley Mine and Invincible Colliery, rural land uses and recreational activities within the Ben Bullen State Forest. Land use in the wider region also includes other mining operations and agricultural and forestry activities. The township of Cullen Bullen is located on the Castlereagh Highway to the south-west of Cullen Valley Mine and the north-west of Invincible Colliery.

2.4 LAND OWNERSHIP

An overview of land ownership surrounding the Project is shown on **Figure 4**. As stated above, land ownership in the vicinity of the Project includes Cullen Bullen, which has a population of approximately 300 people, and a number of rural properties in private ownership located in surrounding areas. Large portions of land in the east and north of the EA Boundary are also held by the Crown and dedicated as the Ben Bullen State Forest. Lands held for the Ben Bullen State Forest where mining occurs are managed in consultation with Forests NSW. There are six private residences located within the EA Boundary.



EA Boundary
Private Land
Crown land
Coalpac Land
Ben Bullen State Forest (Crown)
Wallerawang Collieries
Not Searched
Private Residence
Private Residence - Acquisition in Progress
Wallerawang-Gwabegar Railway

Hansen Bailey

Coalpac Pty Ltd
Cullen Valley Mine

Coordinate System: MGA Zone 56

COALPAC CONSOLIDATION PROJECT

Land Ownership

Cad File: 0811A.dwg	Date: 30.09.10	Drawn: CP	Figure 4

3 PROJECT DESCRIPTION

This section provides a detailed description of the Project and a brief discussion on the alternatives considered.

3.1 MINING OPERATIONS

The Project seeks to consolidate the mining operations of Cullen Valley Mine and Invincible Colliery under a single contemporary planning approval to allow the continuation of open cut and highwall mining activities and to further develop a thermal coal resource of approximately 83 Mt ROM coal. Disturbance associated with the Project is anticipated to be around 995 ha additional to that currently approved.

In addition, the Project seeks approval for the commencement of quarrying operations targeting the Marangaroo Sandstone below the Lithgow Seam from a resource assessed to be approximately 6 million bank cubic metres (Mbcm) ROM. It is anticipated that the sand resource would be extracted up to a maximum rate of approximately 640,000 tpa.

In summary, Project Approval is sought for the following:

- Consolidation and expansion of the existing Cullen Valley Mine and Invincible Colliery operations to produce up to a total of 3.5 Mtpa product coal, including:
    - The continuation of mining operations at Cullen Valley Mine (the area west of the Castlereagh Highway via both open cut and highwall mining methods to access an additional resource of approximately 35 Mt ROM; and
    - The continuation of mining operations at Invincible Colliery and an extension north into the East Tyldesley area via open cut and highwall mining methods to access an additional resource of approximately 48 Mt ROM;
- Continuation of coal supply to the local MPPS and (emergency supply to) Wallerawang Power Station, with added flexibility for additional supply to domestic destinations and Port Kembla for export;
- Upgrades to existing administration, transport and other infrastructure;
- Construction of the previously approved CDP at the Cullen Valley Mine;
- Construction of a bridge over the Castlereagh Highway to link east and west of the highway and the development of required access roads to the East Tyldesley area;
- Construction of a bridge and haul road across the Wallerawang - Gwabegar Railway line to permit access to mine the previously approved Hillcroft resource;
- The extraction of the Marangaroo Sandstone horizon from immediately below the Lithgow Coal Seam in the northern coal mining area of Cullen Valley Mine. This material is to be trucked for crushing on site prior to sale into the Sydney industrial sand market;
- Construction of a rail loop or rail siding with loading infrastructure to permit transport of product coal and sand products;

- Integration of the water management of both sites into a single closed system; and
- Integration of the management of mine rehabilitation and conceptual final landform outcomes for Cullen Valley Mine and Invincible Colliery.

Indicative mining areas proposed for the Project are presented in **Figure 5**, with conceptual mine plans for the Project shown on **Figure 6** to **Figure 11**. These mine plans present staged overviews of conceptual operations as at the end of 2010 and for Project Years 2, 7, 12, 17 and 21. A general description of Project operations is also provided in **Section 3.1.1** to **Section 3.1.9**. It should be noted that there may be some variation between these conceptual mine plans and those presented in the final EA for the Project as a result of new information arising during further environmental impact assessment processes to be undertaken.

A brief description of the progression of mining is provided below for each of the three mining areas.

3.1.1 Cullen Valley Mine

From 2010, open cut coal mining will progress north beside the Wallerawang - Gwabegar Railway line in mining areas 105 and 106, relocating to mining area 108 and 109 on the western side of the railway line during 2012 and 2013. ROM coal from these areas will be transported to the Cullen Valley Mine CDP until approximately 2013, when all coal from the Cullen Valley Mine will be transported east on a dedicated haul road which traverses across the Castlereagh Highway on an overpass bridge to the relocated Cullen Valley Mine CDP facility at the East Tyldesley Coal Preparation Plant (ETCPP) site. Coal mining in these areas will continue for approximately four years from 2013. Coal mining will then continue in mining area 106 and the mining area 121, with the noise bund located north-east of Cullen Valley Mine to be constructed from the waste generated during these operations.

Quarrying operations in the Marrangaroo Sandstone below the Lithgow Seam are anticipated to commence in mining area 106 in 2012, as shown in **Figure 5**. From 2019, coal mining operations at Cullen Valley Mine will relocate to mining area 120, with operations to be undertaken from north to south behind a noise bund. At the conclusion of coal mining operations in mining area 120, the coal mining operation would then relocate to the south-east to mining areas 111 and 112 adjacent to the Castlereagh Highway for the remainder of the life of the Project.

The sand quarrying operation will continue to develop in the floor of mining areas 106 and 121 following the completion of coal mining activities, with rehabilitation to be undertaken immediately as waste dumps progress with mining operations. Sand quarrying activities for the Project will conclude following the completion of operations in mining area 120 up to 2025.

3.1.2 East Tyldesley Open Cut

The open cut mining operations in the East Tyldesley Open Cut area will commence in 2013, in the north-western corner of the reserve in mining area 302.

The waste from the initial boxcut is planned to be placed in an out of pit dump to the north and west, between the boxcut and the Castlereagh Highway, as a visual and noise bund. This bund will be maintained and extended as mining progresses south through to mining area 301.

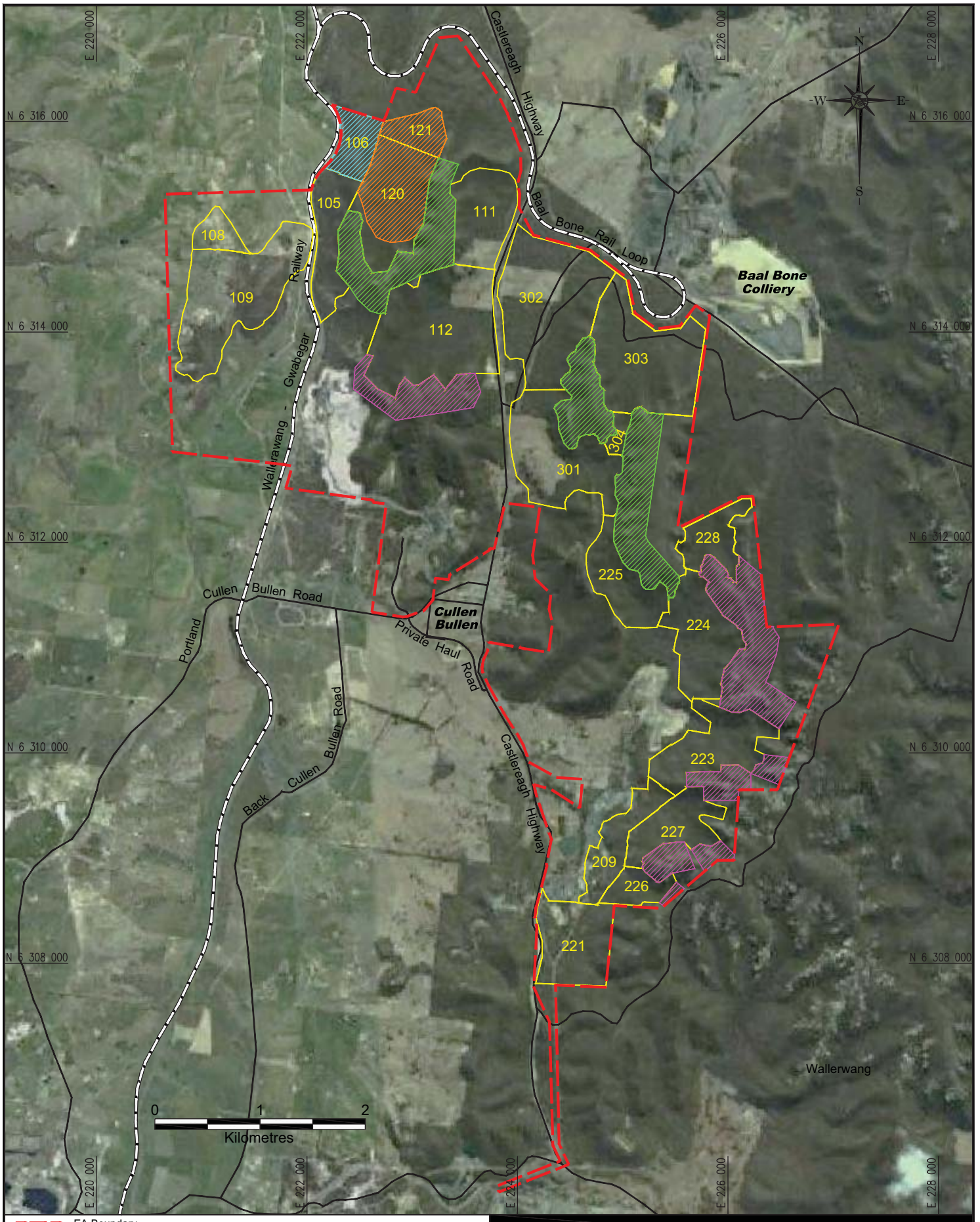
Mining then progresses from west to east in mining area 301. Following the completion of mining area 301, open cut operations will relocate to the north-eastern corner of the reserve in mining area 303 and progress west and then south through mining area 304.

Rehabilitation activities in all mining areas continue to be undertaken behind the waste removal operations, progressively filling the void created by mining. Waste is emplaced up to final rehabilitation surface level, and bulldozers progressively shape the spoil, so as to allow continuous emplacement of clay and topsoil over the shaped dump surface, ready for seeding during spring and autumn periods of each year.

3.1.3 Invincible Open Cut

Mining in the Invincible Colliery open cut will progress south through mining area 209 in the current approval area, before relocating south to mining area 221 in a sub-lease area of Ivanhoe Colliery, as shown on **Figure 8**. As part of open cut operations through mining area 209 and mining area 221, the abandoned Cullen Main East open cut mine will be rehabilitated through waste emplacement from overburden removal operations. Upon completion of mining area 221, open cut mining will progress northward through mining areas 226, 227, 223, 224, 228 and 225. All seams in the geological sequence will be targeted during open cut mining.

Highwall mining is to be carried out progressively as final highwall positions are reached at the various seam horizon levels.



EA Boundary
Roads
Project Mining Areas
Sand Quarrying Years 5-7
Sand Quarrying Years 7-12
Indicative Highwall Mining: Combined Katoomba / Middle River / Moolarben seams, Irondale seam & Coalesced Lidsdale / Lithgow seam
Indicative Highwall Mining: Combined Katoomba / Middle River / Moolarben seams & Irondale seam

Hansen Bailey

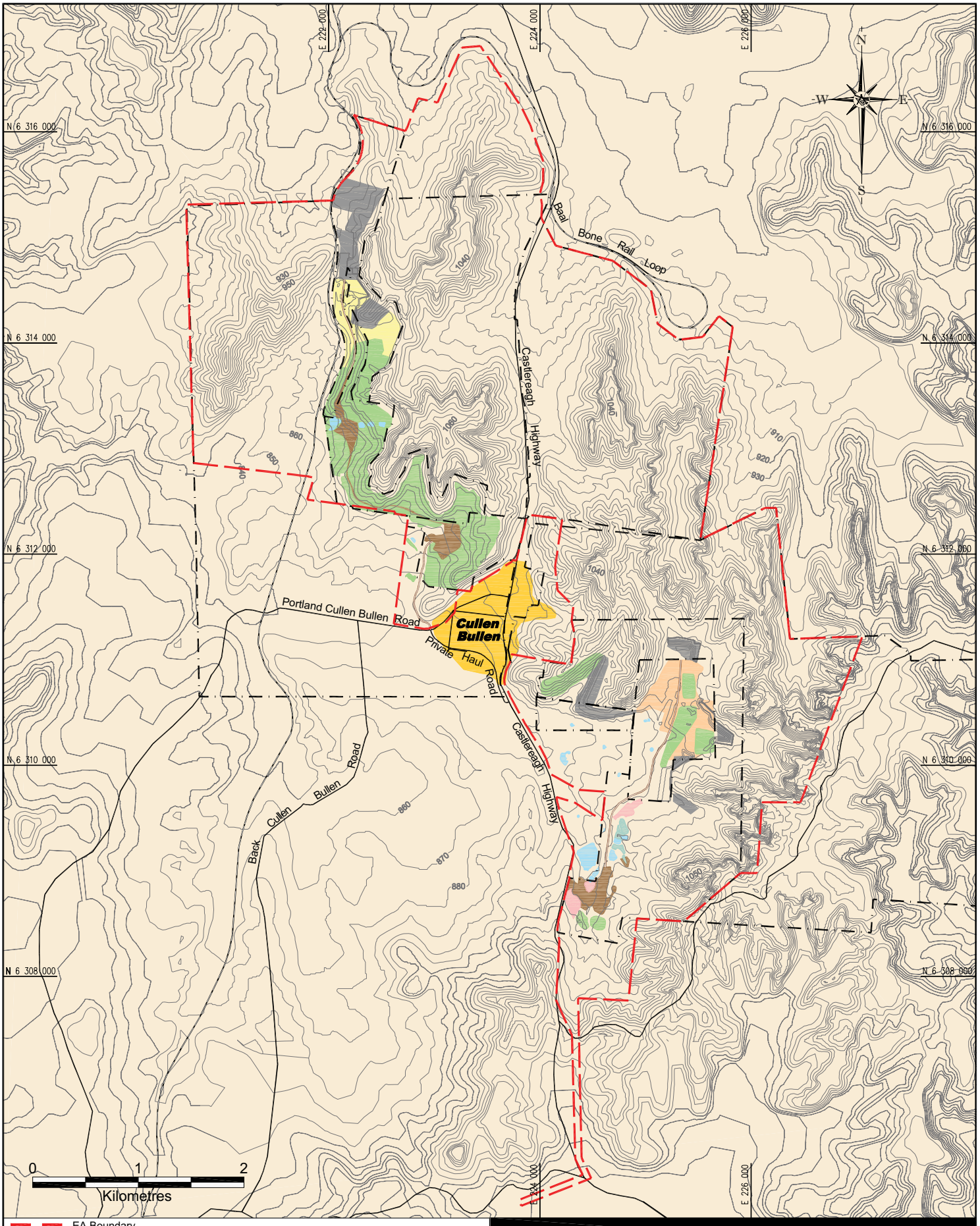
Coalpac Pty Ltd
Cullen Valley Mine

Coordinate System: MGA Zone 56

COALPAC CONSOLIDATION PROJECT

Conceptual Project Mining Areas

Cad File: 06475G.dwg	Date: 29.09.10	Drawn: TB	Figure 5



EA Boundary
Mining Tenement Boundary
Roads
Indicative Haul Road
Infrastructure Area
Tailings Drying Area
Proposed Rehabilitation
Water Strorage
Spoil
Active Mining
Shaped
Coal Stockpile

Hansen Bailey

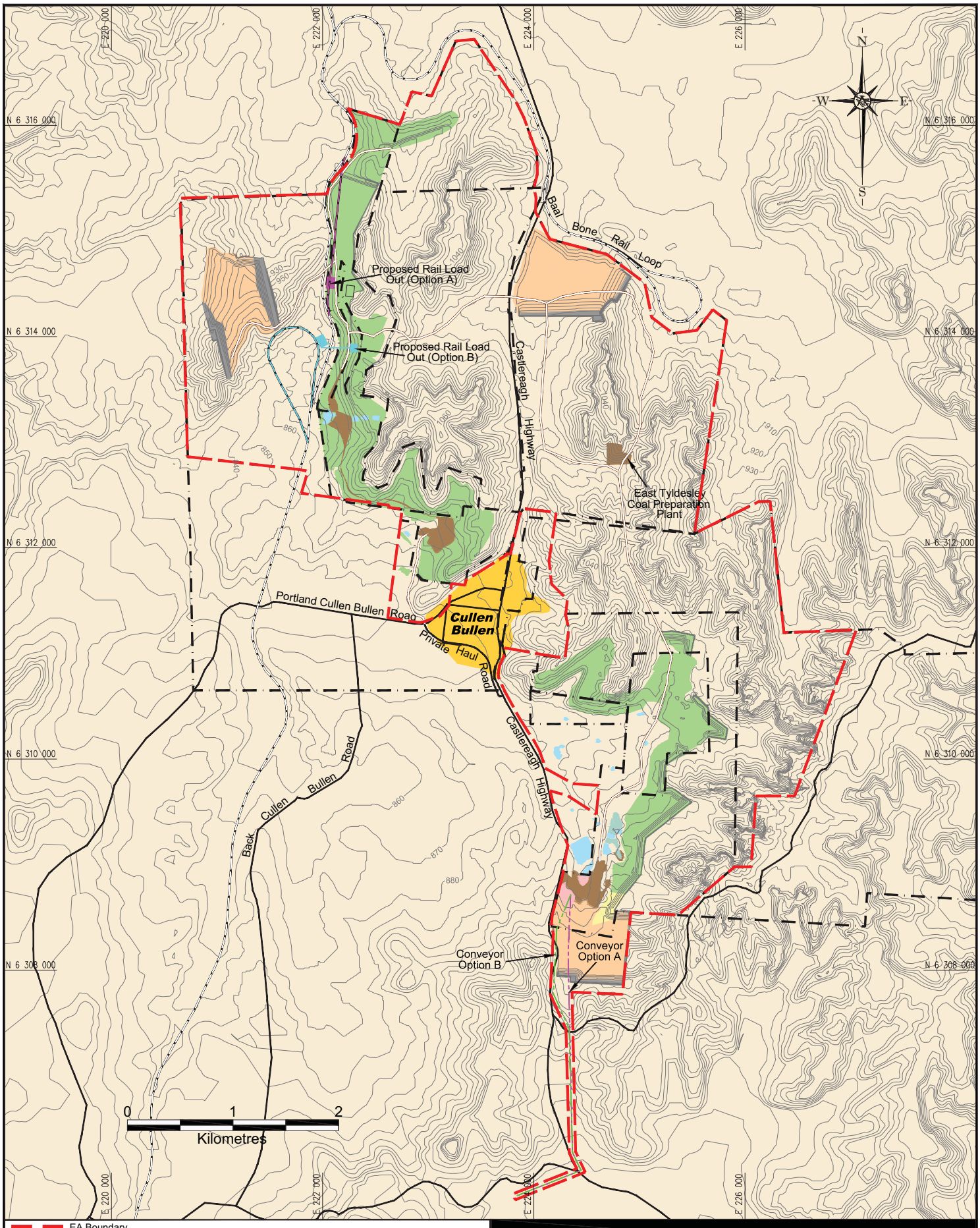
Coalpac Pty Ltd
Cullen Valley Mine

Coordinate System: MGA Zone 56

COALPAC CONSOLIDATION PROJECT

Year 2010 Mine Plan

Cad File: 06388E.dwg	Date: 30.09.10	Drawn: CP	Figure 6



EA Boundary
Mining Tenement Boundary
Roads
Indicative Haul Road
Proposed Rail Siding (Option A)
Proposed Rail Loop (Option B)
Proposed Conveyor (Option A)
Proposed Conveyor (Option B)

Infrastructure Area
Tailings Drying Area
Proposed Rehabilitation
Water Strorage
Shaped
Coal Stockpile
Spoil
Active Mining

Hansen Bailey

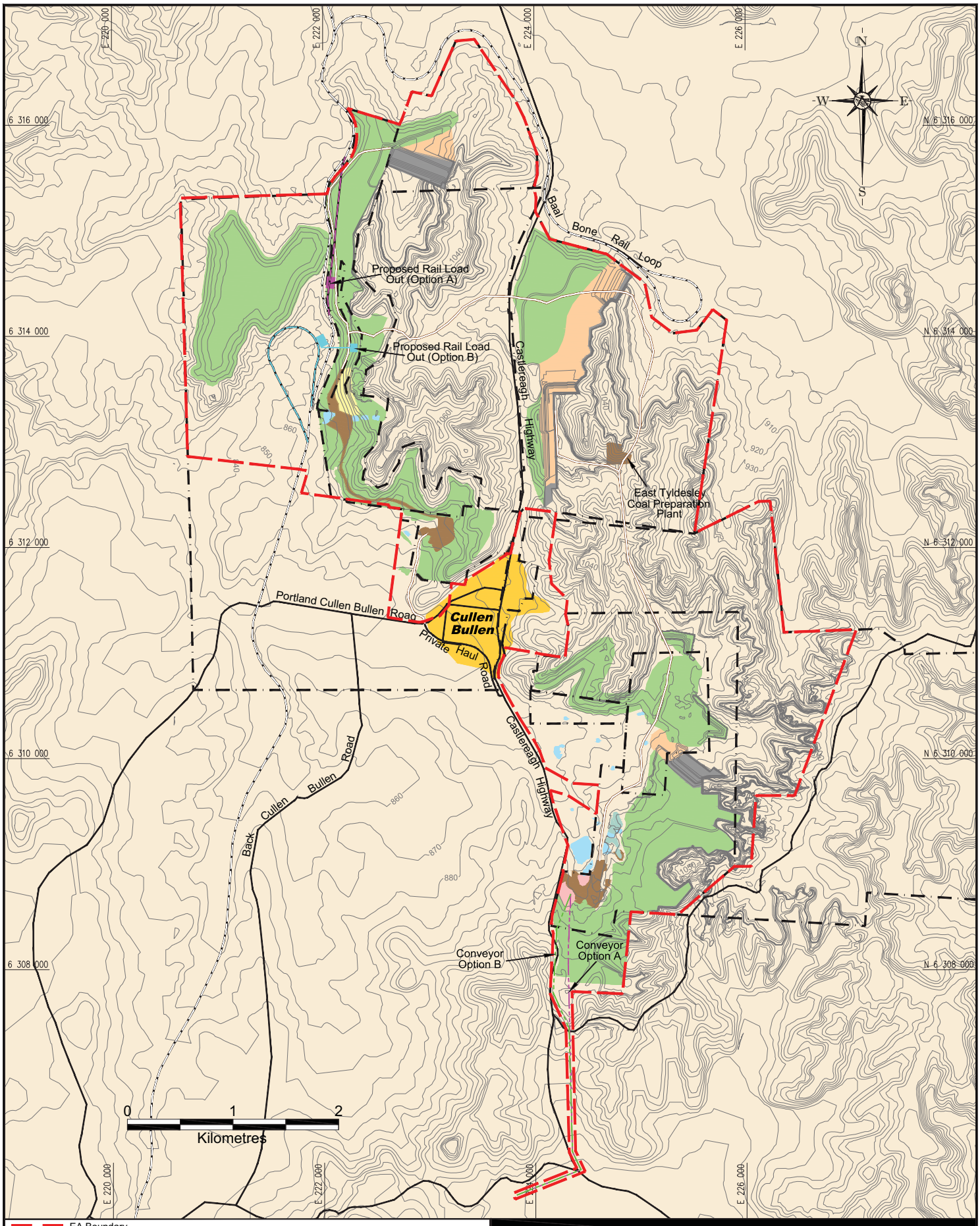
Coalpac Pty Ltd
Cullen Valley Mine

Coordindate System: MGA Zone 56

COALPAC CONSOLIDATION PROJECT

Conceptual Year 2 Mine Plan

Cad File: 06327G.dwg	Date: 29.09.10	Drawn: TB	Figure 7



EA Boundary
Mining Tenement Boundary
Roads
Indicative Haul Road
Proposed Rail Siding (Option A)
Proposed Rail Loop (Option B)
Proposed Conveyor (Option A)
Proposed Conveyor (Option B)

Infrastructure Area
Tailings Drying Area
Proposed Rehabilitation
Water Strorage
Shaped
Coal Stockpile
Spoil
Active Mining

Hansen Bailey

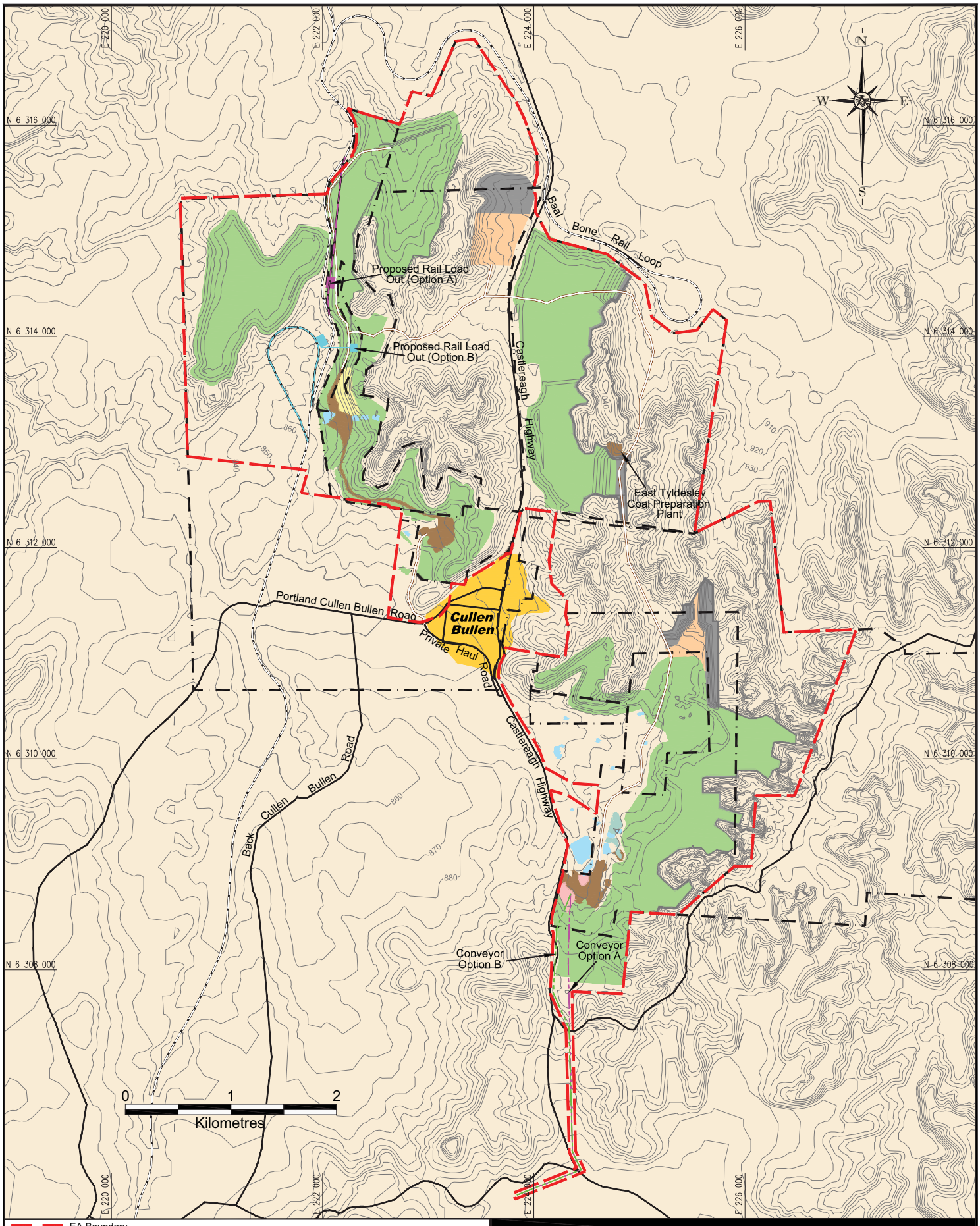
Coalpac Pty Ltd
Cullen Valley Mine

Coordindate System: MGA Zone 56

COALPAC CONSOLIDATION PROJECT

Conceptual Year 7 Mine Plan

Cad File: 06328H.dwg	Date: 29.09.10	Drawn: TB	Figure 8



EA Boundary
Mining Tenement Boundary
Roads
Indicative Haul Road
Proposed Rail Siding (Option A)
Proposed Rail Loop (Option B)
Proposed Conveyor (Option A)
Proposed Conveyor (Option B)

Infrastructure Area
Tailings Drying Area
Proposed Rehabilitation
Water Strorage
Shaped
Coal Stockpile
Spoil
Active Mining

Hansen Bailey

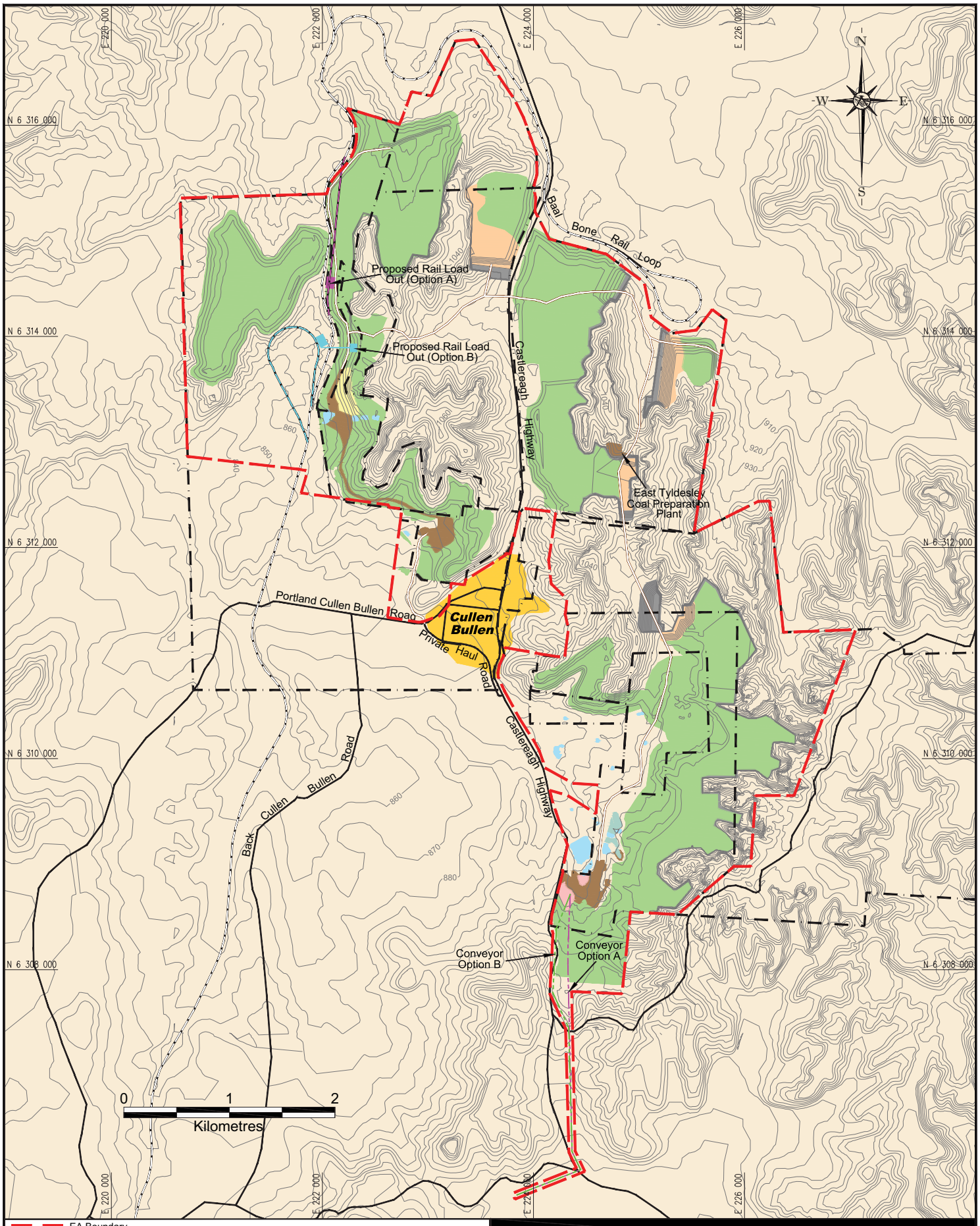
Coalpac Pty Ltd
Cullen Valley Mine

Coordindate System: MGA Zone 56

COALPAC CONSOLIDATION PROJECT

Conceptual Year 12 Mine Plan

Cad File: 06329H.dwg	Date: 29.09.10	Drawn: TB	Figure 9



EA Boundary
Mining Tenement Boundary
Roads
Indicative Haul Road
Proposed Rail Siding (Option A)
Proposed Rail Loop (Option B)
Proposed Conveyor (Option A)
Proposed Conveyor (Option B)

Infrastructure Area
Tailings Drying Area
Proposed Rehabilitation
Water Strorage
Shaped
Coal Stockpile
Spoil
Active Mining

Hansen Bailey

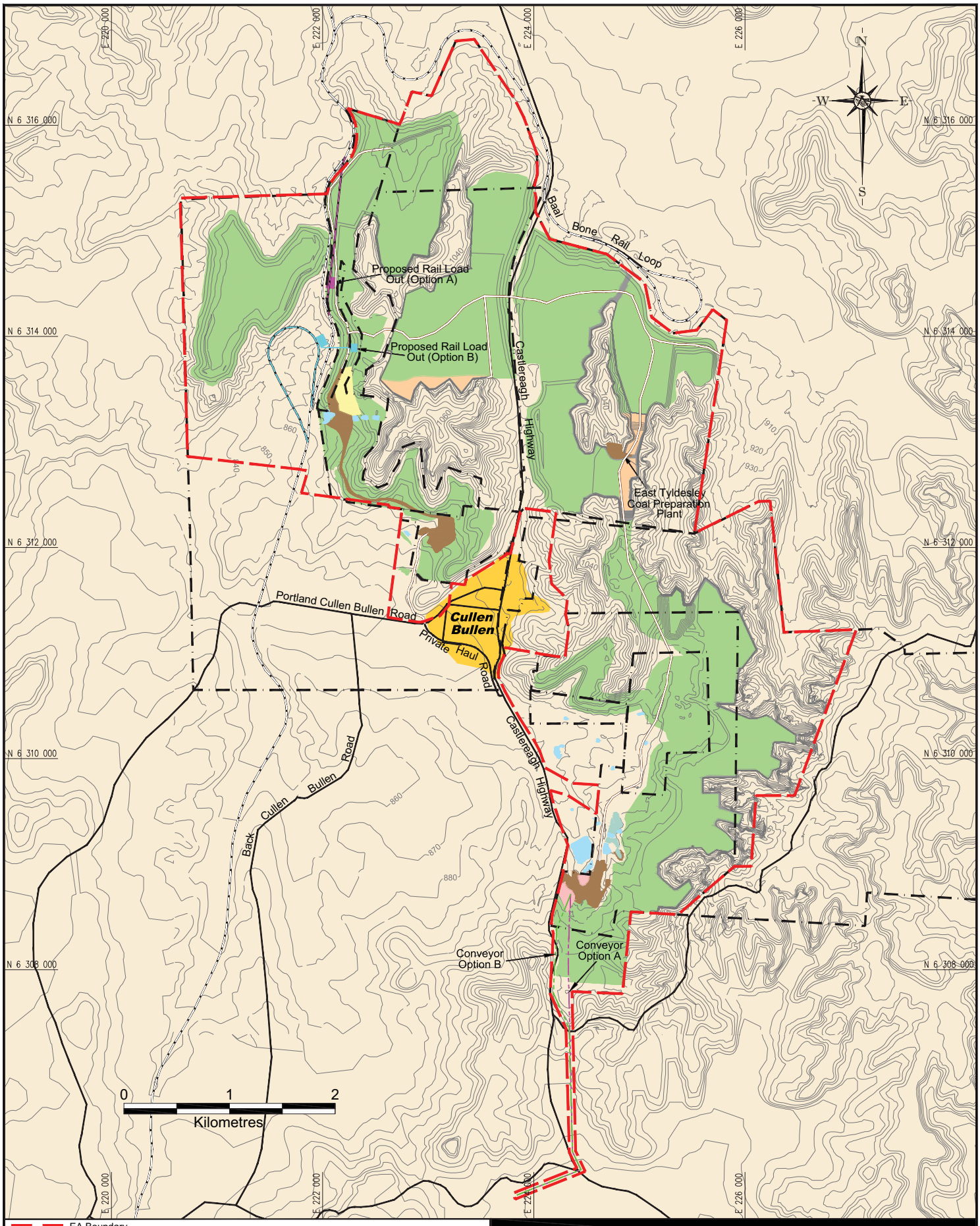
Coalpac Pty Ltd
Cullen Valley Mine

Coordindate System: MGA Zone 56

COALPAC CONSOLIDATION PROJECT

Conceptual Year 17 Mine Plan

Cad File: 06330H.dwg	Date: 29.07.10	Drawn: TB	Figure 10



EA Boundary
Mining Tenement Boundary
Roads
Indicative Haul Road
Proposed Rail Siding (Option A)
Proposed Rail Loop (Option B)
Proposed Conveyor (Option A)
Proposed Conveyor (Option B)

Infrastructure Area
Tailings Drying Area
Proposed Rehabilitation
Water Strorage
Shaped
Coal Stockpile
Spoil
Active Mining

Hansen Bailey

Coalpac Pty Ltd
Cullen Valley Mine

Coordindate System: MGA Zone 56

COALPAC CONSOLIDATION PROJECT

Conceptual Year 21 Mine Plan

Cad File: 06469E.dwg	Date: 29.09.10	Drawn: TB	Figure 11

3.1.4 Coal Mining Methods and Development

Coal mining would be undertaken using the following methods:

- Conventional open cut (haul-back) mining: this involves the sequential removal of soil, overburden and interburden above and between each coal seam, coal removal and progressive backfilling and rehabilitation of mined-out areas; and
- Highwall mining: this enables coal to be mined without the need for overburden or interburden removal. Coal is recovered via the excavation of unmanned entries beyond the final highwall position and allows for the recovery of coal that would otherwise be sterilised beyond the open cut highwall (which represents the economic limit of open cut mining).

The conceptual progression of mine development would generally be as follows:

1. Vegetation Clearing, Soil Stripping and Overburden Removal: The vegetation on the surface the open cut mining block would be cleared and stockpiled for future use in the rehabilitation of the final landform. Any topsoil material able to be salvaged would then be stripped to expose the subsoils and overburden above the coal seam(s). The limit of the open cut mining as represented by the mining block represents the economic limit of open cut mining beyond which the overburden coal stripping ratio becomes too great.

   The overburden above the coal seam(s) would be fractured by blasting, loaded into haul trucks and transferred to a tipping location as part of open cut backfilling operations. In some areas, the use of a dragline or in-pit crushing and conveying (IPCC) may replace the haul trucks for the transfer of overburden to waste dumps. These methods may be employed in areas where the topography exhibits gentle gradients, and is intended to be used where higher stripping ratios require lower overburden removal costs. It is anticipated that where these techniques can be employed for the Project, environmental impacts may be materially reduced.

2. Mining of the Coal Seam: Once exposed, an excavator would be used to mine the coal, and either load the exposed coal directly into haul trucks or be assisted by a front end loader.

3. Highwall Mining of the Coal Seam: Following the completion of conventional open cut operations within the mining block, overburden fracturing and removal would continue down through the various coal seams to the lowest seams in the sequence, the coalesced Lidsdale and Lithgow Seams. As mining progresses down through the coal seam sequence, a temporary bench of at least 35 m will be retained to allow access of highwall mining equipment to the target coal seam (the highwall mining bench). The highwall mining bench would typically dip gently towards the highwall and would be temporarily bunded by the low wall using overburden to facilitate effective water management and provide acoustic shielding for the operating highwall mining equipment.

Once the highwall mining bench is established, a coal auger, or other highwall mining machine, would be set up at the coal seam face in the highwall. The cutting head of the highwall mining machine would advance into the coal face by application of suitable rotation and thrust. The coal would be mined in this way to various lengths up to 300 m penetration depth from the highwall face, leaving an adequate pillar width or 'web' between each entry to maintain the stability of the highwall and manage subsidence. The pillar or web widths will be designed by a suitably qualified and experienced geotechnical engineer to an adequate Factor of Safety to manage subsidence to an acceptable level. The mined coal would be conveyed from the cutting face to the bench and transferred to an elevating conveyor for stacking or loading directly into trucks. **Figure 12** presents the relevant specifications and safe working distances for a typical auger mining system described above.

3.1.5 Proposed Sand Quarrying Operations

There is a significant resource of sand contained within a friable, weakly-cemented sandstone seam which is stratigraphically located within a few metres of the floor of the Lithgow Seam. It is proposed to quarry this material, treat the sandstone by washing and separating out the matrix of clay and minerals in the sandstone and load and transport the processed sand by truck to domestic destinations. This transportation of processed sand would require a maximum of approximately 64 one way truck movements per day. The anticipated market for the sand is the greater Sydney area for use in construction materials. There is a significant shortage of construction sand in the greater Sydney area since the closure of Penrith Lakes, and as a result the proposed development of this sand resource within the footprint of an existing open cut mine would allow that market to be partially satisfied with a minimal additional environmental impact to that which is currently approved.

As outlined below in **Section 3.4**, it is anticipated that the waste materials from washing of the sandstone would be pumped into the abandoned Tyldesley Colliery underground via boreholes drilled to intersect the workings. This would facilitate the filling of the workings on the western side of the abandoned Tyldesley Colliery.

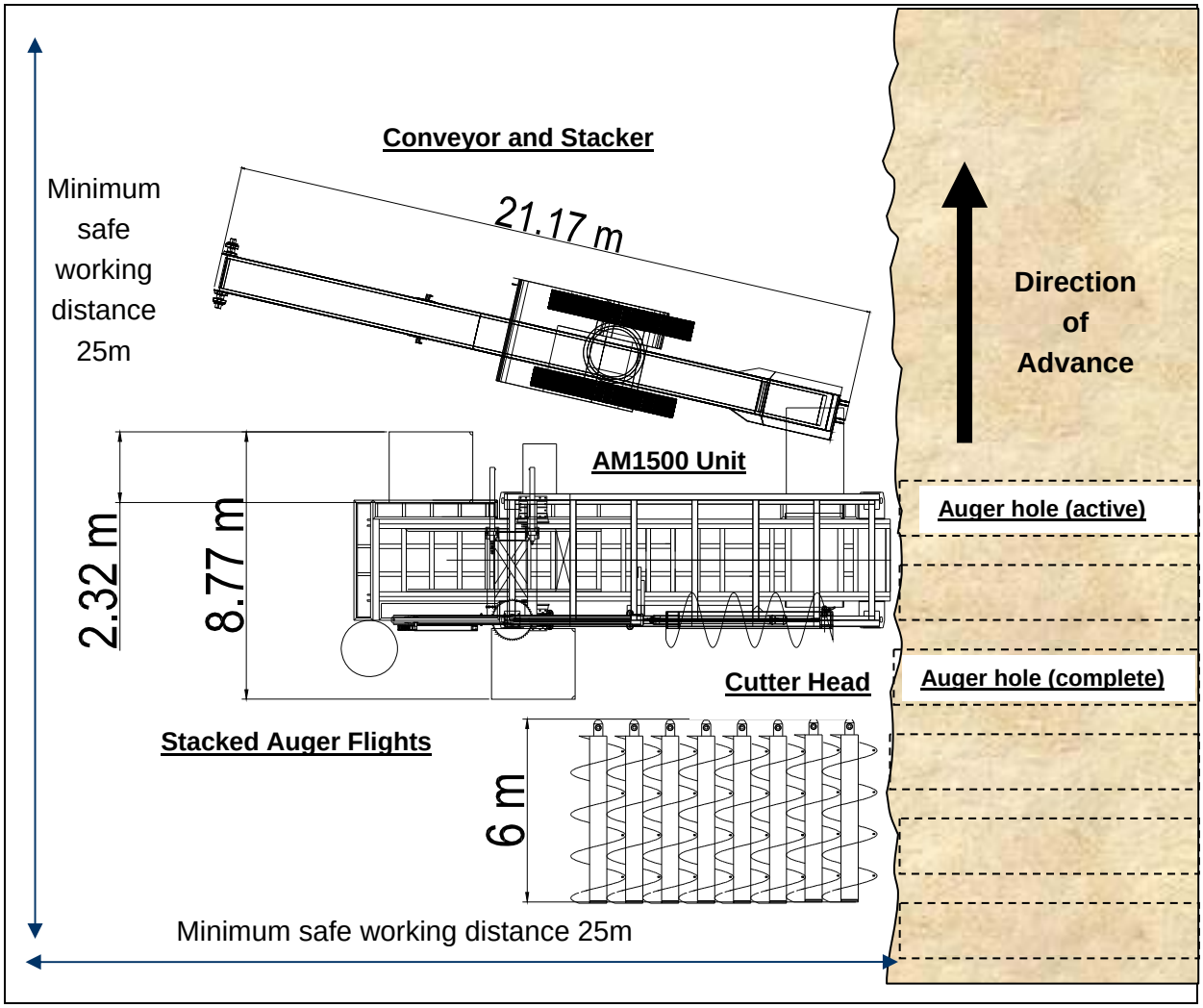
3.1.6 Overburden and Interburden Removal

Where sufficiently friable, the initial few metres of overburden would be fractured by ripping, however, as the overburden hardens with depth, the material would generally be drilled and blasted before loading into haul trucks by excavator or front end loader.

Coalpac would minimise the number of blasts by maximising blast size without compromising compliance with the environmental criteria and it is anticipated that an average of four to eight blasts would be initiated per month. Each blast will be designed, loaded and fired by a suitably qualified and experienced blasting engineer holding a shotfirer's certificate issued by the I&I NSW (Minerals), to provide an adequate level of fragmentation.

Following blasting (or ripping), the overburden / interburden materials would be loaded by excavator into 150 t capacity haul trucks and transported to the nominated out-of-pit or in-pit emplacement ("load and haul").

Figure 12
Highwall Mining (Coal Auger) Equipment – Plan View



3.1.7 Mining Equipment and Rate

The Project will require the replacement of the equipment currently operating at Cullen Valley Mine and Invincible Colliery with an alternative fleet. An indicative list of equipment fleet types and numbers which would be used throughout the life of the proposed Project is presented below in **Table 3**.

A maximum production rate of 3.5 Mtpa product coal is sought for the Project. The mine design and mining sequence would generally enable coal to be produced from each of the three mining areas of Cullen Valley Mine, East Tyldesley Open Cut and Invincible Colliery at a rate of between 0.9 and 1.2 Mtpa ROM (plus some additional ROM coal from highwall mining at a rate of approximately 0.5 Mtpa). Rates may vary from area to area as a result of seasonally unfavourable wind conditions in order to minimise noise and dust impacts on the local community.

There may also be times when production is scaled back or ramped up in different areas as a result of market forces, coal quality variations, or major equipment breakdowns, and therefore flexibility is required for production to vary by area over the life of the Project.

Sand quarrying in the north-western area of Cullen Valley Mine is planned at a production rate of 450,000 bcm per annum.

3.1.8 Internal Coal Transportation

ROM coal would be hauled from the active mine bench within the open cut mine, or from stockpiles adjacent to the highwall mining unit to the ROM coal stockpile at the closest processing plant via an established internal haul road which connects the open cut areas.

Alternative waste removal and transport systems are currently being considered that may significantly reduce both environmental impacts as well as operating costs of the Project. These options include waste removal using a small dragline, predominantly in the East Tyldesley area, and use of an IPCC system. Both of these options are being assessed with the aim of reducing the number of internal haul truck movements required, thereby reducing the noise and dust impacts of the Project.

3.1.9 Dewatering

Minimisation of mine dewatering requirements from potential inflows would be achieved by the progressive installation and / or extension of diversion / contour banks and drains on the upslope margin of the limit of mining areas and the transfer of the collected water to the drainage line to the south of the advancing excavation.

Table 3
Indicative Project Mining Fleet

Equipment Type	Project Fleet (Indicative Maximum)	
	Coal Mining	Sand Mining
Waste Excavator (Hitachi EX2500 or equivalent)	4	-
Rear Dump Truck (Cat 785 or equivalent)	13	-
Rear Dump Truck (Cat 777 or equivalent)	4	2
Push to Fill Waste Dozer (Cat D11R)	3	-
Bench Dozer (D11R)	3	
Dump Dozer (Cat D10R)	3	1
Rehabilitation Dozer (Cat D11R)	2	-
Coal Excavator (Hitachi EX1200 or equivalent)	2	-
Coal Front End Loader (Cat 992 or equivalent)	1	1
Coal Hauler	4	-
Grader	2	-
Water Cart	2	-
Service Truck	2	-
Blasthole Drill	2	-
Highwall miner	1 - 2	-
Mobile Impact Crusher	-	1

3.2 MINE INFRASTRUCTURE

3.2.1 Surface Facilities

Existing mining infrastructure and coal processing facilities located within the EA Boundary for the two approved operations are described above in **Section 2.1**. This existing approved infrastructure, consistent with the Cullen Valley Mine EIS and Invincible Colliery EA, will generally be retained for the consolidated Project operations in its current locations and shall continue to be used. Modifications to existing site infrastructure and additional requirements for the Project are discussed below.

A road overpass bridge over the Castlereagh Highway will also be constructed to allow connectivity between the western and eastern mining areas of the Project for the movement of personnel, equipment, ROM coal and to a lesser extent, overburden materials.

Product Handling and Preparation Facilities

In accordance with the Cullen Valley Mine EIS and Invincible Colliery EA, it is anticipated that a proportion of the ROM coal extracted for the Project will continue to only require crushing and screening prior to transportation to the domestic destinations approved for product coal. Remaining ROM coal extracted for the Project will need to be crushed, washed and screened through the currently approved facilities at Cullen Valley Mine and Invincible Colliery to address specific customer requirements.

All coal handling and beneficiation activities will be carried out using the currently approved infrastructure and processes up to 2013. At that time, the total throughput would increase as a result of the proposed increase in production proposed for the Project. This increase will therefore require the relocation and expansion of the Cullen Valley CDP at a new location in the south-eastern corner of the East Tyldesley open cut area. This new infrastructure area, referred to as the ETCPP, will include the relocated coal crushing and preparation facilities, along with ROM and product coal stockpiles and associated heavy equipment repair and maintenance workshops. The proposed location of the ETCPP is shown on **Figure 7**.

Sand product from quarrying operations in the north-western area of the Cullen Valley Mine is anticipated to require in pit crushing, and minor washing and centrifuging to separate the sand grains from the sandstone matrix of minerals and clays. This minor operation will be undertaken at the location of the existing coal crushing plant at Cullen Valley Mine and the resultant product will then be stockpiled prior to being hauled by truck or rail to domestic markets.

ROM and Product Coal Stockpiling

As with the coal handling and processing infrastructure, the existing ROM and product coal stockpiles would continue to be utilised for the Project up until 2013 as these areas retain sufficient additional capacity to meet expected demand from the increase in ROM and product coal stockpiling volumes proposed.

From 2013, the additional capacity required for the proposed coal extraction increase for the Project would be available from the ROM and product coal stockpiles to be established at the ETCPP. These new stockpiles to be established at the ETCPP will have capacities of 80,000 t ROM and 100,000 t product coal, respectively.

Site Buildings and Facilities

As outlined in **Section 2.1.2**, both Cullen Valley Mine and Invincible Colliery utilise a range of administrative and operational support infrastructure under current approvals. These include site offices, bathhouse, first aid station, crib facilities, ablution facilities, heavy vehicle workshop, access roads, car parks and site security infrastructure. These will be retained and remain largely unchanged for the Project, being supplemented from 2013 with the construction of the additional facilities at the ETCPP.

Services

The Project would require the installation of a range of safety, security and environmental management infrastructure to increase efficiencies through the consolidation of Cullen Valley Mine and Invincible Colliery. These works would include the establishment of additional lighting, communications, waste and water management systems, including consolidated surface water reticulation structures, dams, fire management measures and sewage treatment systems.

The Project will also require the relocation of some existing communications, power and water supply infrastructure.

3.3 PRODUCT TRANSPORT

The increase in product coal sought for the Project will create the need for a requisite increase in the approved volume of product coal to be transported.

A combined Project fleet of up to 17 (in peak periods) road haulage trucks of varying configurations up to 40 t in capacity will continue to be utilised for the transportation of product coal and are anticipated to enter and exit the Project area during the period up to 2013 via both:

a) Invincible Colliery access intersection with the Castlereagh Highway that is currently approved for use in the operations described in the Invincible Colliery EA. From this intersection (where there is an existing overtaking lane on the Castlereagh Highway that allows vehicles already travelling on the road to pass the trucks as they leave the site) haul trucks travel southbound until the intersection with Boulder Road. At this intersection, trucks turn west onto Boulder Road to access the dedicated heavy vehicle entry to MPPS.

b) The Cullen Valley Mine private haul road. This road will continue to be used for the transportation of product coal from the site to bypass the township of Cullen Bullen up to 1 Mtpa within the approval limits of 140 one-way truck movements per day currently in place.

From 2014, it is anticipated that any remaining volume of product coal from the Project that is not supplied to MPPS by the proposed conveyor link may be transported to the Wallerawang Power Station (for emergency supply purposes only) and to other approved domestic and export destinations.

The impact of the truck haulage of product coal on public roads will be considered for the Project and presented in the EA. This will include the assessment of the current and future traffic volumes and the safety of intersections on the key haul routes proposed to be used during the Project. This assessment will also include the development of options for the upgrade or management of key intersections on the haul route to MPPS, if required, to address any significant traffic impacts associated with the proposed increase in coal production. Any additional management measures identified in the EA will be discussed with Roads and Traffic Authority (RTA) and Lithgow City Council, as appropriate.

From 2013, product coal delivery to MPPS is planned to increase to 2.625 Mtpa, and the existing truck-receiving infrastructure at the MPPS may not be capable of accepting this amount under the existing approved hours for transport of coal from Invincible Colliery and Cullen Valley Mine. It is therefore proposed to utilise the existing flexibility to haul product coal from Invincible Colliery to MPPS from 7:00 am to 9:30 pm, Monday to Saturday.

Product coal haulage from Cullen Valley Mine would continue via the private haul road to the south of Cullen Bullen village under the current approval conditions that restrict operations from 7:00 am to 5:30 pm, Monday to Friday and up to 1 Mtpa, with a maximum of one way truck movements of 140 per day. Haulage of coal from Cullen Valley Mine from 7:00 am to 5:00 pm on up to 30 Saturdays per annum would also be required.

As an alternative to road haulage of product coal, an overland conveyor will be constructed to operate from 2014, linking the MPPS with the existing ICPP area. The conveyor is proposed to operate 24 hours per day, 7 days per week to convey a total of 2.625 Mtpa to the MPPS facility.

The flexibility to transport product coal by road would be retained for use during limited periods of major conveyor downtime, so as to allow the continued delivery of coal to MPPS. Any haulage of product coal by truck during periods of conveyor downtime would be undertaken solely on a limited basis from the existing Invincible Colliery site access intersection with the Castlereagh Highway used under current approvals. The Cullen Valley Mine private haul road would no longer be utilised for product coal haulage once the conveyor option to MPPS is developed. Product sand haulage would continue to use this route to domestic markets.

The route of the proposed conveyor option being considered would generally follow the areas disturbed for existing power infrastructure easements.

As shown on **Figure 7**, it is proposed that a rail load out facility and connection to the Wallerawang - Gwabegar Railway line will be constructed to allow the transportation of domestic and export coal and sand products from 2014.

3.4 REJECT AND TAILINGS MANAGEMENT

Consistent with the existing approval for Invincible Colliery, tailings produced from the ICPP would continue to be disposed of and managed in the existing tailings emplacement areas as shown in **Figure 6** to **Figure 11**. Tailings emplacement areas will be managed and rehabilitated in accordance with regulatory requirements.

All coarse reject that remains following coal processing will continue to be back-loaded onto empty ROM coal haul trucks and emplaced within the open cut pit void against the completed face. This existing strategy will provide adequate capacity for the ongoing management of all coarse rejects produced from the ICPP as a result of the Project.

At the Cullen Valley CDP, it is anticipated that waste water generated after processing in the fines circuit will be pumped into the abandoned Tyldesley Colliery underground workings via boreholes drilled to intersect the workings. This methodology is recommended to maintain water levels in the western side of the abandoned workings and also to progressively fill the voids with fine solids, ultimately filling the old workings. Coarse rejects from the Cullen Valley CDP would be emplaced into the available open cut void, using the same methodology as currently practised at Invincible Colliery.

Similarly, waste from the washing of quarried sandstone proposed for the Project would also be pumped into the abandoned underground workings.

Tailings produced from the ETCPP will be transported to storages constructed within active overburden areas in the East Tyldesley operational areas whereby they will be allowed to dry prior to covering with at least 2 m of clay material and rehabilitating as usual.

3.5 WORKFORCE AND HOURS OF OPERATION

Mining operations are proposed 24 hours per day and 7 days per week. However, mining within each operational area will be managed to avoid sensitive activities in noise and dust weather enhancing conditions to be defined in the EA.

Product coal will be transported for the Project as follows:

- Via road trucks to the MPPS from Invincible Colliery 24 hours per day and 6 days per week to 2014;
- Via road trucks to the MPPS from Cullen Valley Mine and along the Cullen Valley Mine private haul road in accordance with current approvals (i.e. 7:00 am and 5:30 pm Monday to Friday and between 7:00 am and 5:00 pm Saturday for no more than 30 days annually) to 2014;
- Via conveyor to the MPPS from the ICPP area 24 hours per day and 7 days per week from 2014;
- Via rail to domestic destinations and Port Kembla for export 24 hours per day and 7 days per week; and

- Via trucks to other domestic markets in accordance with the existing limits in place for Invincible Colliery under PA 07_0127 (i.e. 7:00 am to 9:30 pm, Monday to Saturday, public holidays excluded). All haulage of product coal to other domestic markets will be carried out using the existing Invincible Colliery site access.

Maintenance activities, deliveries and safety procedures are proposed to be carried out 24 hours per day, 7 days per week. It is proposed that all product sand for the Project will be railed to Sydney.

The Project will not initially require any significant increase in the total workforce described in the Cullen Valley Mine EIS and Invincible Colliery EA. Currently, approximately 90 full-time personnel and contractors are employed across both operations. It is anticipated that this would increase to approximately 120 full-time personnel plus additional contractors, based on the proposed operations and the required mobile equipment fleet.

3.6 ALTERNATIVES CONSIDERED

Coalpac has undertaken comprehensive pre-feasibility studies for the Project, which included the review of various mine planning and operational scenarios. The key objective of these studies was to minimise environmental and social impacts on Cullen Bullen township and other nearby receivers, whilst maximising resource recovery and operational efficiencies that could be achieved through the consolidation of Coalpac's two existing operations.

The review process for the alternative mine plan options considered various additional mining areas and production scenarios. A range of infrastructure, equipment fleet and coal processing options and methodologies were also considered during the feasibility phase to assist in the definition of the conceptual mine plans proposed for the Project. The location and extent of the proposed operational areas is dictated by the location of the coal and sand resources and the topography of the Project area.

Detailed mine planning and engineering assessment completed during the preliminary studies has identified that the proposed resources can only feasibly be extracted via the proposed combination of open cut and highwall mining methods in order to meet government expectations and to maximise resource recovery. The existing infrastructure approved for Cullen Valley Mine and Invincible Colliery is proposed to be used wherever feasible for the Project so as to minimise additional environmental impacts and land disturbance. Any additional infrastructure is proposed in areas where there would be a net reduction in additional environmental impacts on the local community and environment.

The 'Do-nothing' approach in regard to the Project would result in the sterilisation of a total resource of approximately 83 Mt of ROM coal, the loss of 90 existing full time jobs upon the expiration of current approvals and significant socio-economic benefits and royalties to both the Federal and New South Wales governments not being realised. In addition, the loss of 45% of the existing coal supply for MPPS (increasing to 75% in 2014 when 2.5 Mtpa is proposed to be supplied to MPPS from the Project) will cause a serious threat to continued supply of electricity from the MPPS, and significantly affect the viability of the proposed extension to that facility.

4 REGULATORY FRAMEWORK

This section provides a discussion of the relevant State and Federal environmental legislation applicable to the Project. In addition to gaining Project Approval for the proposed consolidation of operations, the Project may also require ancillary approvals under a number of additional Acts and / or applicable State Environmental Planning Policies (SEPP), as discussed below.

4.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Coalpac will seek Project Approval under Part 3A of the EP&A Act from the Minister for Planning as the Project is a class of development listed under Schedule 1 of SEPP Major Development. Under Part 3A of the EP&A Act, the Project is declared to be a development to which Part 3A applies and as such will be determined by the Minister for Planning.

4.1.1 NSW State Environmental Planning Policies

SEPP (Major Development) 2005

This SEPP defines certain developments which are classified as Major Projects under Part 3A of the EP&A Act for determination by the Minister for Planning. In accordance with Schedule 1 of the *SEPP (Major Development) 2005* the Project is required to be assessed under Part 3A of the EP&A Act.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007

SEPP (Mining, Petroleum Production and Extractive Industries) 2007 (SEPP Mining) was gazetted on 16 February 2007. Under SEPP (Mining) open cut mining on any land is permissible with Development Consent:

- On land where development for the purposes of agriculture or industry may be carried out (with or without development consent); or
- On land that is, immediately before the commencement of this clause, the subject of a mining lease under the Mining Act 1992.

Facilities for the processing or transportation of minerals are permissible with or without Development Consent on land on which mining may be carried out if the minerals were mined from that land or adjoining land. An outline of the *Lithgow City Local Environmental Plan 1994* (Lithgow City LEP) is provided in **Section 4.1.2**.

As shown in **Table 1** and **Table 2**, Coalpac holds several existing mining tenements over the Project area which were granted prior to SEPP (Mining) being enacted.

SEPP No 33 - Hazardous and Offensive Development

SEPP 33 requires the consent authority to consider whether an industrial Project is a potentially hazardous industry or a potentially offensive industry. As the Project represents an extension and consolidation of the current operations and existing land uses of Cullen Valley Mine and Invincible Colliery, a detailed hazardous assessment is not considered necessary for inclusion in the EA.

4.1.2 Lithgow City Local Environment Plan 1994

The EA Boundary is located within the Lithgow City Council LGA, in which the relevant Environmental Planning Instrument (EPI) is the Lithgow City LEP. All components of the Project (i.e. the entire area occupied by the EA Boundary) falls in lands zoned as either 1(a) – Rural (General) or 1(f) – Rural (Forestry) under the Lithgow City LEP.

Mining is permissible on lands within zoned as 1(a) with development consent.

Within lands zoned as 1(f) under the Lithgow City LEP, development for any purpose is permitted with development consent, if authorised by the Forestry Commission (now Forests NSW) under the *Forestry Act 1916* (Forestry Act). The implications of the Forestry Act for the Project are summarised below in **Section 4.8**.

4.2 MINING ACT 1992

The *Mining Act 1992* (Mining Act) provides for the control and management of mining and exploration titles for the access to mineral resources including coal. The Mining Act determines the issuance of relevant mining authorities to undertake mining related activities in accordance with the provisions of the Act.

Coalpac holds a number of mining authorities for the two operations, as summarised in **Table 1** and **Table 2**. The mining activities proposed for the Project will continue to occur within these tenements.

4.3 COAL MINE HEALTH AND SAFETY ACT 2002

The establishment of the new emplacement and tailings disposal areas proposed for the Project are likely to require an approval under Section 100 of the *Coal Mine Health and Safety Act 2002*.

4.4 PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997

As part of the Project, a single EPL relevant to the consolidation of the two operations will be sought. This process will involve the review of the two separate existing EPLs held for Cullen Valley Mine (EPL 10341) and Invincible Colliery (EPL 1095). A consolidation of EPL requirements will then be sought from DECCW under the *Protection of the Environment Operations Act 1997* (POEO Act) to maintain consistency with the EA and any subsequent Project Approval.

4.5 THREATENED SPECIES CONSERVATION ACT 1995

The *Threatened Species Conservation Act 1995* (TSC Act) identifies and lists endangered species, populations, communities and critical habitat within NSW and also defines key threatening processes and provides appropriate frameworks for their protection. It also provides a methodology for the assessment of the effects of developments on threatened species which would be relied upon in the EA for the evaluation of ecological impacts.

4.6 ROADS ACT 1993

The *Roads Act 1993* (Roads Act) provides for the dedication of classified and unclassified roads and confers certain functions to Lithgow City Council in relation to the management of roads. Under Section 138 of the Roads Act, consent from Lithgow City Council is required to erect a structure or carry out work in, on or over a public road.

Approvals under Section 138 of the Roads Act will be sought from Lithgow City Council and RTA as required, for any modification to the existing public road network and during the construction of the proposed Castlereagh Highway overpass linking the eastern and western parts of the Project site.

4.7 FORESTRY ACT 1916

The *Forestry Act 1916* encourages the sustainable and responsible use of State Forests in NSW. This includes the extraction of timber and the management of the environment. The Project is located predominantly within lands dedicated for the Ben Bullen State Forest. Coalpac will continue to consult regularly with Forests NSW regarding the access and management of lands within the Ben Bullen State Forest for the Project.

4.8 COMMONWEALTH LEGISLATION

4.8.1 Environmental Protection and Biodiversity Conservation Act 1999

The *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) prescribes the Commonwealth's role in environmental assessment and provides a mechanism for engagement with biodiversity conservation and the management of protected areas of significance on a national level. The EPBC Act is administered by Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) and provides protection for listed Matters of National Environmental Significance (NES), which include:

- Listed species and communities (e.g. listed threatened species, ecological communities and migratory species);
- Protected areas (e.g. World heritage properties, Ramsar Wetlands of international significance, conservation zones); and
- National, Commonwealth and Indigenous Heritage.

Species and communities listed under the EPBC Act which are present or are likely to be present in the vicinity of the Project will be identified. A Referral including a supporting assessment of significance for each species will be made to DSEWPC to obtain confirmation of whether or not a Project constitutes a "Controlled Action".

Given the findings of previous ecological assessments undertaken for both Cullen Valley Mine and Invincible Colliery and preliminary surveys undertaken for the EA, it is anticipated that an EPBC Referral will be prepared and submitted to DSEWPC to support the Project.

5 STAKEHOLDER ENGAGEMENT

This section describes the existing stakeholder engagement undertaken by Coalpac for the Cullen Valley Mine and Invincible Colliery and the consultation process proposed for the EA.

5.1 INTRODUCTION

Coalpac is committed to quality stakeholder engagement with the community in which it operates. Following commencement of the management of Invincible Colliery in 1989 and Cullen Valley Mine in 2008, Coalpac has established and developed relationships with key community stakeholders and regulators. Consultation over the Project will be consistent with the open and honest two-way communications and engagement with stakeholders undertaken by Coalpac to date.

5.2 EXISTING STAKEHOLDER ENGAGEMENT

Coalpac has actively participated in formal engagement activities utilising regular Community Consultative Committee (CCC) meetings for both Invincible Colliery and Cullen Valley Mine. Since their involvement with Invincible Colliery and Cullen Valley Mine commenced, Coalpac has continued to explore further opportunities for its community engagement processes through the development of stakeholder relationships with neighbouring landholders, government and surrounding local industry.

Ongoing engagement and social impact assessment in conjunction with an established community contributions program aim at enhancing the potential benefits associated with the operation at the local and regional level. Examples of stakeholder engagement methods for the Project are provided in **Table 4**.

Table 4
Coalpac Stakeholder Engagement

Activity	Details
Community Engagement and Communications	• CCC and associated community members • State and Local Government briefings and meetings • Employee briefings
Community Concern Management	• Community Response Line • Near neighbour engagement / activities • Reporting of concerns in the CCC and in the AEMR
Community Support	• Contributions to the Cullen Bullen community
Environmental Monitoring and Management	• Annual Environmental Management Report (AEMR)

5.3 PROJECT ENGAGEMENT

The Project team aims to build on the existing stakeholder relationships in place from the current operations of Cullen Valley Mine and Invincible Colliery. Key aims of the stakeholder engagement process for the Project include:

- Providing all stakeholders with relevant and consistent information on the Project to facilitate effective two-way communication and feedback;
- The determination of potential impacts associated with the proposed Project as raised by stakeholders; and
- The identification and implementation of appropriate strategies for impact management, mitigation and enhancement for the Project.

The above processes will be put in place for the Project to ensure that existing relationships with key Coalpac stakeholders are maintained and that constructive stakeholder feedback is garnered. All relevant issues raised by community and regulatory stakeholders during consultation will be incorporated and addressed during the EA process for the Project. Initially, it is proposed to use the broad engagement methods summarised in **Table 5** for each of the respective stakeholder groups, which are also discussed below.

Table 5
Stakeholder Engagement Methods

Stakeholders	Method
Department of Planning	Briefing
DSEWPC	Briefing
I&I NSW	Briefing
NSW Office of Water	Briefing
Department of Environment, Climate Change and Water	Briefing
Roads and Traffic Authority	Briefing
Lithgow City Council Mayor, Councillors & Officers	Personal meetings and CCC
Relevant State and Federal MPs	Personal meetings and briefings
Cullen Valley Mine / Invincible Colliery CCC	Briefings, Newsletters
Aboriginal Community	Personal meetings, Guidelines
Landholders / near neighbours	Personal meetings, Newsletters
Relevant neighbouring mines and power generation industry	Offer of Briefing, Newsletters
Coalpac Employees and Contractors	Toolbox Talks

5.3.1 Regulatory Engagement

Discussions have occurred with various regulators including DoP, I&I NSW, DECCW, Forests NSW and Lithgow City Council in relation to the existing mining operations which will continue for the Project. It is also anticipated that consultation with DSEWPC would also be required during the preparation of a Referral under the EPBC Act that will be required to support the Project (see **Section 7.1**).

Stakeholder engagement such as offers of face to face briefings and presentations to regulators will be undertaken for the Project. These presentations will be prepared to provide regulatory stakeholders with an initial overview of the Project and to identify the relevant associated issues which will require assessment in the EA.

Project newsletters will be distributed to complement the regulatory engagement program and provide regular updates on the progression of the EA.

5.3.2 Community Engagement

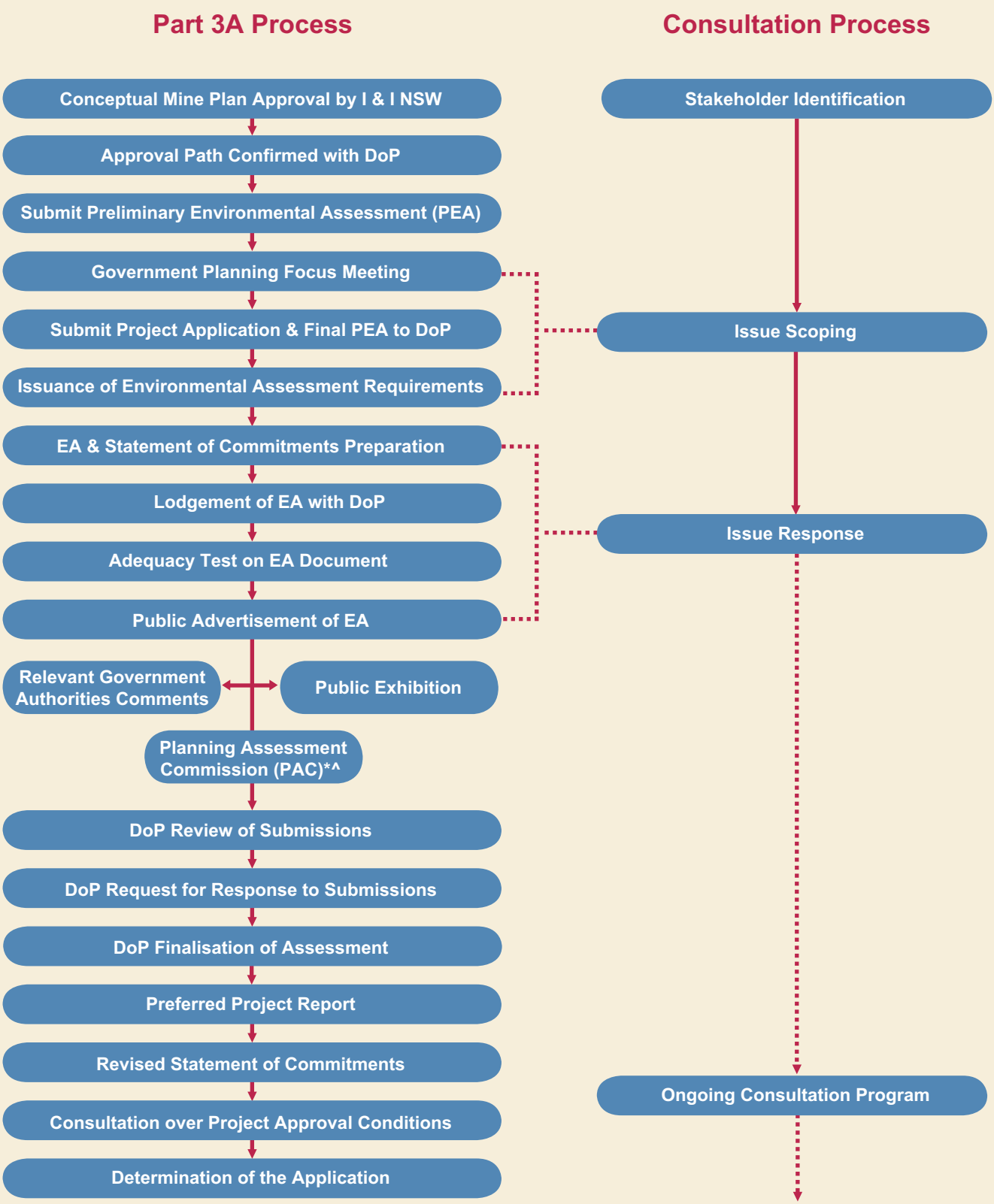
Engagement with the community will be undertaken during the preparation of the EA, with issues raised being integrated into the EA as required. Existing stakeholder engagement measures established by Coalpac will be utilised to ensure ongoing community involvement in the assessment program. Information gathered during consultation will assist in informing Project planning and developing strategies to address issues of concern and of relevance to the local community.

Initial briefings on the Project will be offered to near neighbours and information will be provided on the Project to determine community issues. Where required, further meetings will be offered to provide feedback and obtain additional community input on the Project. Community engagement will commence in October 2010 with an offer of personal meetings with near neighbours via an introductory Project Newsletter.

The consideration of and response to issues raised by the community throughout the EA consultation program is essential in ensuring that relevant concerns are identified and evaluated in the assessment program. This will allow the development and management of appropriate strategies to minimise impacts associated with the Project.

Additional newsletters will be distributed to complement the stakeholder engagement program and provide regular updates on key aspects of the Project.

A flowchart illustrating the indicative relationship between the planning approvals and community consultation processes is presented below in **Figure 13**.



* Avenue available to the Minister

Hansen Bailey

Coalpac Pty Ltd

COALPAC CONSOLIDATION PROJECT

Planning Approvals & Consultation

Filename: 0915 Fig 13 Part 3a.ai	Date: 14.07.10	Drawn: BD	Figure 13

6 PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT

A preliminary environmental risk assessment was completed utilising the Coalpac Risk Assessment Matrix to assist in identifying the key environmental and social impact issues associated with the Project.

Each of the potential environmental issues identified for the Project were ranked in accordance with the Coalpac Risk Matrix as being of either Extreme, High, Significant, Moderate or Low risk. The initial findings of the preliminary environmental risk assessment have been used to prioritise and focus the scope of the assessment of environmental issues for the Project EA as discussed in **Section 7**. The scopes for the assessment of potential environmental impacts have been developed to ensure that the key potential issues for each are appropriately addressed and that appropriate management and mitigation options are developed for each.

As shown in **Table 6**, Project impacts were predominantly assessed as being of high or significant risk, with the remainder categorised as moderate to low. No risks were identified which could be considered extreme. It is anticipated that with the completion of detailed assessments for each issue as outlined in **Section 7**, any high risk issues will be able to be reduced to moderate or low through the identification and implementation of appropriate management controls and mitigation measures.

Table 6
Summary of Preliminary Environmental Risk Assessment

Category	Project Issue(s)
Extreme	None
High	Air quality, acoustics, ecology, surface water management
Significant	Aboriginal archaeology and cultural heritage, Non-Indigenous heritage, groundwater, geochemical, visual, noise and blasting, rehabilitation and final landform, spontaneous combustion, community concern
Moderate	Subsidence, traffic and transport, waste, bushfire
Low	Hazardous materials

7 KEY ENVIRONMENTAL AND COMMUNITY ISSUES

This section provides a discussion on key environmental and community issues identified as part of the initial environmental risk assessment outlined above in **Section 6**. It also provides a summary of any background data presently available from previous environmental assessments undertaken for Cullen Valley Mine and Invincible Colliery and the proposed methodology in relation to each assessment to be undertaken for incorporation in the EA.

7.1 ECOLOGY

7.1.1 Background

The EA Boundary consists of lands that have been disturbed by several previous land uses, including coal mining, forestry and agricultural activities. As shown on **Figure 1**, a large portion of the EA Boundary falls within the Ben Bullen State Forest and contains a range of habitat, including steep forested slopes and gullies, woodlands on lower slopes and sandstone outcrops with heath and woodland. The sandstone pagodas around the top of the steep plateaus in the area are a significant geological feature which form additional habitat for fauna species through the formation of caves, crevices and other refugia.

Numerous ecological surveys have previously been undertaken in the local area, including a range of field studies of the areas surrounding Cullen Valley Mine and Invincible Colliery (Lembit, 1997, 2003; AES, 2003; Wildsearch, 1997; R.W. Corkery 2008a, 2008b). These previous surveys and assessments will be used to provide background information for the ecological assessment to be completed for the Project.

Further to the information available from existing field studies, preliminary surveys have been undertaken for the EA in late 2009 and early 2010 by Cumberland Ecology. This included the preliminary assessment and identification of the vegetation communities present within the EA Boundary, in accordance with the *Vegetation of the Western Blue Mountains* (DEC, 2006) mapping project.

Threatened Species

Previous assessments and surveys commissioned for the Cullen Valley Mine and Invincible Colliery sites have identified several threatened flora and fauna species and communities which are known to occur, or have the potential to occur, within the Project area. These species and communities are listed below in **Table 7**.

Table 7
Threatened Flora and Fauna Relevant to the Project

Species	EPBC Act Listing[1]	TSC Act Listing[2]
Ecological Communities		
Box Gum Woodland and Native Grassland	CE	E
Flora		
Darwinia peduncularis	Not listed	V
Grevillea obtusiflora	Not listed	E

Species	EPBC Act Listing[1]	TSC Act Listing[2]
Bynoe's Wattle	Not listed	E
Wollemi Mint-bush	Not listed	V
Mount Vincent Mint-bush	Not listed	V
Capertee Stringybark	V	V
Sliver-leafed Gum	V	V
Evans Grevillea	Not listed	V
Needle Geebung	Not listed	V
Clandulla Geebung	Not listed	V
Rylstone Bell	Not listed	V
Derwentia blakelyi	Not listed	V
Fauna		
Bathurst Copper Butterfly	V	E
Broad-headed Snake	V	E
Rosenberg's Goanna	Not listed	V
Square Tailed Kite	Not listed	V
Glossy Black Cockatoo	Not listed	V
Gang-gang Cockatoo	Not listed	V
Speckled Warbler	Not listed	V
Brown Treecreeper	Not listed	V
Diamond Firetail	Not listed	V
Regent Honeyeater	E	E
Black-chinned Honeyeater	Not listed	V
Painted Honeyeater	Not listed	V
Grey-crowned Babbler	Not listed	V
Little Lorikeet	Not listed	V
Turqiose Parrot	Not listed	V
Hooded Robin	Not listed	V
Powerful Owl	Not listed	V
Barking Owl	Not listed	V
Masked Owl	Not listed	V
Yellow-bellied Sheathtail-bate	Not listed	V
Eastern Freetail Bat	Not listed	V
Large-eared Pied Bat	V	V
Eastern False Pipistrelle	Not listed	V
Little Bent-wing Bat	Not listed	V
Eastern Bent-wing Bat	Not listed	V
Greater Broad-nose Bat	Not listed	V
Eastern Pygmy Possum	Not listed	V
Spotted-tailed Quoll	E	V
Brush-tailed Rock-wallaby	V	E
Koala	Not listed	V
Yellow-bellied Glider	Not listed	V
Squirrel Glider	Not listed	V

Notes: 1 – EPBC Act, CE = Critically Endangered, V = Vulnerable, E = Endangered, M = Migratory.
2 – Threatened Species Conservation Act 1995, V = Vulnerable, E = Endangered.

Vegetation Communities

As stated above, a preliminary assessment was undertaken for the Project by Cumberland Ecology, including short field surveys in 2009 and 2010. This assessment applied the vegetation community nomenclature of DEC (2006) and identified at least seven within the areas assessed. These vegetation communities included the following:

- Pagoda Shrubland;
- Capertee Rough-barked Apple Red Gum Yellow Box Grassy Woodland;
- Rough-barked Apple Red Gum Woodland – non grassy;
- Tableland Gully Ribbon Gum – Blackwood Apple Box Forest;
- Tableland Gully Mountain Gum – Broadleaved Peppermint Grassy Forest;
- Tableland Scribbly Gum – Narrow-leaved Stringybark Shrubby Open Forest / Woodland; and
- Exposed Blue Mountains Sydney Peppermint – Silvertop Ash Shrubby Woodland.

As indicated above in **Table 7**, the White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box Gum Woodland and Derived Grassland) was assessed to be present in proposed mining areas during the preliminary ecological surveys for the Project (Cumberland Ecology, 2010). This community is listed as a Critically Endangered Ecological Community (CEEC) under the EPBC Act and as an Endangered Ecological Community (EEC) under the TSC Act.

For the Project, the Box Gum Woodland and Derived Grassland community was found to be present in the form of the Capertee Rough-barked Apple Red Gum Yellow Box Grassy Woodland. The community corresponds to Map Unit 20 in the *Vegetation of the Western Blue Mountains* mapping project (DEC, 2006).

7.1.2 Potential Impacts

The Project is located largely within existing mining tenements the Ben Bullen State Forest, which is characterised by woodland vegetation communities that have been previously disturbed by forestry, grazing or mining related activities.

Specific flora and fauna impacts identified in the preliminary environmental risk assessment include:

- Clearance of vegetation within the mining areas proposed for the Project;
- Loss of biodiversity and impacts to threatened species and ecological communities; and
- The disturbance and displacement of fauna species and communities, potentially creating increased competition for habitat in the surrounding environment.

7.1.3 Assessment Methodology

For the Project EA, a detailed ecological impact assessment will be undertaken by Cumberland Ecology in accordance with the *Draft Guidelines for Threatened Species Assessment* (DECC, 2004) under Part 3A of the EP&A Act.

Preliminary spring and summer targeted species assessments have been completed to date as part of the preliminary EA assessment. Further flora and fauna assessments will be completed within the EA Boundary, including the following:

- A further desktop review of relevant databases and available literature to identify flora and fauna species and communities potentially found within the EA Boundary;
- Mapping the distribution of vegetation communities in the EA Boundary by ground survey and air photo interpretation;
- Listing of flora species and descriptions of vegetation communities identified within the EA Boundary;
- Targeted searches for the identification of threatened flora species and the definition of threatened ecological communities and critical habitat (as listed under the schedules of the TSC Act and EPBC Act) that may potentially occur in the EA Boundary;
- Habitat assessment of the EA Boundary;
- Assessment of impacts on listed vegetation communities and threatened flora and fauna species and identification of any impact minimisation and mitigation measures deemed necessary for the Project; and
- Development of mitigation and management measures including the development of an ecological offsets strategy with relevant regulators as required.

As noted in **Section 4.8.1**, it is anticipated that an EPBC Referral will be required to be prepared and submitted to DSEWPC for the Project.

7.2 ABORIGINAL ARCHAEOLOGY AND CULTURAL HERITAGE

7.2.1 Background

The current approval areas for both Cullen Valley Mine and Invincible Colliery have previously been surveyed to determine impacts to Aboriginal archaeology and cultural heritage. A brief description of the studies completed as relevant for each approved operation is provided below.

Cullen Valley Mine

- Mills (1996), supporting the Feldmast EIS; and
- Central West Archaeological and Heritage Services (2002), supporting the Cullen Valley Mine EIS.

The Aboriginal archaeological assessment undertaken by Mills assessed the mining disturbance areas proposed for the Feldmast EIS and reviewed other related studies completed in the area that were available at that time. This assessment located and recorded three Aboriginal heritage sites, including one open campsite, one grinding groove site and one isolated artefact. Each of these three sites was found to be located outside of the predicted direct and impact zones for the Feldmast EIS.

The Cullen Valley Mine EIS also included a review of previous studies and an assessment of the development extension area proposed. One open campsite / stone artefact scatter site was identified during the 2002 survey, which also included a single associated area of Potential Archaeological Deposit. In addition, a potential Aboriginal rock shelter was identified, however use of the site by Aboriginal occupants has not been confirmed due to the absence of any visible archaeological material and the location of the site within the landscape.

Invincible Colliery

Five Aboriginal archaeology and cultural heritage studies have previously been undertaken in areas currently approved for Invincible Colliery, or parts thereof. These include:

- Haglund (1982), for the then proposed operations of Cullen Main Colliery southern operations;
- Haglund (1985), which surveyed the then proposed surface infrastructure areas and access road alignments for Invincible Colliery;
- Silcox (1997), supporting the open cut coal mining area and haul road development proposed within ML 68 for Invincible Colliery;
- OzArk (2006); supporting the EA prepared for the initial approval (PA 05_0065) for extension of open cut mining at Invincible Colliery; and
- OzArk (2008) supporting the Invincible Colliery EA for current site operations.

The above surveys of operational and infrastructure areas for Invincible Colliery and the surrounding lands did not locate any Aboriginal archaeological sites in the areas assessed to be disturbed by mining operations or associated activities.

Two sites were recorded by Haglund in 1982 as being located to the south-east Invincible Colliery infrastructure area. These sites remain in situ. Further to this, a single large open site designated as Invincible OS1 was identified in the surveys for the Invincible Colliery EA (OzArk, 2008). Although it was noted at that time that the site would not be disturbed by mining activities approved under PA 07_0127, the site has since been fenced off to avoid any inadvertent damage by the use of equipment, other work related activities or changes in local drainage flows.

7.2.2 Potential Impacts

Potential impacts on Aboriginal archaeology and cultural heritage include the disturbance or removal of archaeological sites and items within and surrounding the proposed Project area, including those identified in previous assessments and any sites that may be identified during the field surveys to be completed for the Project EA.

The Project also has the potential to impact on the Aboriginal cultural heritage values of the local area. Although no specific cultural heritage values have been identified in previous studies undertaken at either Cullen Valley Mine or Invincible Colliery, this issue will be re-examined in the EA for the Project through consultation with the local Aboriginal community.

7.2.3 Assessment Methodology

The Aboriginal Archaeology and Cultural Heritage Impact Assessment for the Project will be undertaken by AECOM Australia Pty Ltd in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010).

The proposed scope of the Aboriginal archaeological and cultural heritage assessment includes:

- Desktop review, including an Aboriginal Heritage Information Management System (AHIMS) database search, Native Title Search and a review of previously completed archaeological studies in the region;
- A field-based Archaeological and Aboriginal Cultural Heritage impact assessment with members of the local Aboriginal community in attendance. The fieldwork will focus on surveying areas not previously the subject of assessment, revisiting the recorded locations of known sites with members of the Aboriginal community to attempt to relocate these and identifying any additional sites of Aboriginal cultural heritage within the EA Boundary;
- Preparation of an Aboriginal Archaeology and Cultural Heritage Impact Assessment to meet the DECCW guidelines and the expectations of the local Aboriginal community. This will include the assessment of any additional Aboriginal cultural heritage issues or places identified during the site survey;
- All consultation with the Aboriginal community will be completed in accordance with the process provided in the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010); and
- Development of appropriate management and mitigation strategies for any Aboriginal heritage sites that are identified as likely to be disturbed by the Project.

7.3 NON-ABORIGINAL HERITAGE

7.3.1 Background

Non-Aboriginal settlement adjacent the Cullen Bullen area dates back to the 1820's when the first land grant was taken up in the area by Roger Dulhunty. Since that time, the township and local area have been settled for agricultural activities and a connection to the major rail and road transport routes in the region influence the development of coal resources and forestry activities in the area from the late 1870's.

No significant Non-Aboriginal heritage sites have been identified to be present within the approved operational areas for Cullen Valley Mine or Invincible Colliery.

7.3.2 Potential Impacts

As the Project is predominantly located within the Ben Bullen State Forest and no heritage sites have been previously identified for Cullen Valley Mine or Invincible Colliery, it is not anticipated that the Project will disturb any sites of Non-Aboriginal heritage significance.

7.3.3 Assessment Methodology

A Non-Aboriginal heritage impact assessment will be completed for the Project in accordance with the relevant Commonwealth and NSW legislation and heritage guidelines. The scope of assessment will include:

- A review of any relevant existing Non-Aboriginal heritage assessment reports and other sources of information containing information on heritage items in the local area;
- A brief field survey within the EA Boundary;
- The assessment of the heritage significance of any identified Non-Aboriginal heritage items located within the EA Boundary;
- Determination of potential impacts to sites of heritage significance; and
- Mitigation and management measures as required.

7.4 NOISE AND BLASTING

7.4.1 Background

Cullen Valley Mine and Invincible Colliery have the potential to create noise impacts from a range of sources associated with approved operations, including mining equipment, blasting, coal processing infrastructure and the haulage of ROM and product coal. This issue is a significant one due to the close proximity of the Project to the township of Cullen Bullen and rural properties in the surrounding lands.

A number of operational noise controls and blast management measures for both Cullen Valley Mine and Invincible Colliery have therefore been developed to minimise impacts from these sources to receivers in the local community.

The existing program for the monitoring of impacts from approved operations comprises quarterly attended and unattended noise monitoring at a total of 10 locations (five locations for each of Cullen Valley Mine and Invincible Colliery).

Blast monitoring for overpressure and ground vibration is undertaken at a total of five representative sites in closest proximity to the operational areas of each mine, including two monitoring locations for Invincible Colliery and three locations for Cullen Valley Mine. The existing noise and blast monitoring sites are shown on **Figure 3**.

7.4.2 Potential Impacts

Potential noise and blasting impacts as a result of the Project as identified in the preliminary environmental risk assessment include:

- Noise generation from operational activities associated with open cut and highwall mining (land preparation, drilling, blasting, loading and movement of haul trucks, shovel operation, overburden emplacement, CHPP and supplementary activities);
- Noise impacts associated with the transport of ROM and product coal along internal haul roads;
- Traffic noise associated with the movement of product coal by truck on the Castlereagh Highway to domestic destinations;
- Traffic noise associated with the transport of materials, personnel, consumables, and waste materials to and from the site;
- Rail infrastructure and rail load out noise;
- Noise generation associated with short term construction activities for the Project;
- Cumulative noise impacts with surrounding industry;
- Low frequency noise from the coal processing infrastructure;
- Sleep disturbance; and
- Blasting vibration and overpressure impacts to local receivers.

7.4.3 Assessment Methodology

The noise and blasting impact assessment is being undertaken by Bridges Acoustics for the Project will include the following components:

- A review of noise monitoring data and the monitoring results of previous assessments undertaken at both Cullen Valley Mine and Invincible Colliery to determine appropriate background levels;
- Predictive noise modelling for the Project and infrastructure at Years 5, 10, 15 and 20 in accordance with the *Industrial Noise Policy* (INP), for both construction and operational activities;
- Assessment of prevailing weather conditions in accordance with the INP;

- Consideration of the potential for sleep disturbance impacts to residential neighbours;
- Traffic noise impact assessment in accordance with the *Environmental Criteria for Road Traffic Noise 1999*;
- Determination of vibration and overpressure blasting impacts for near neighbours;
- Cumulative noise and blasting impact assessment, considering significant influences from other local sources;
- Assessment of low frequency noise levels; and
- The identification of additional mitigation and management measures that may be required for noise and blasting impacts.

7.5 AIR QUALITY

7.5.1 Background

Coalpac's existing air quality monitoring network for Cullen Valley Mine and Invincible Colliery is shown on **Figure 3**. It comprises two meteorological stations, two HVAS sites and 11 dust depositional gauges.

The existing operational controls put in place by Coalpac to assist in the management of air quality impacts from both Cullen Valley Mine and Invincible Colliery will be reviewed and incorporated into the development of the mine plan for the Project. This assessment will include the consideration of current management practices such as:

- Minimising land disturbance ahead of active open cut mining operations;
- Deploying water carts across the mine site to minimise dust emissions;
- Ensuring that progressive rehabilitation of mining areas occurs in an ongoing manner;
- Modifying operations in exposed areas during unfavourable conditions; and
- Management of coal stockpiling, processing areas and infrastructure to air quality impacts.

7.5.2 Potential Impacts

Potential air quality, spontaneous combustion and greenhouse gas impacts identified in the preliminary environmental risk assessment including:

- Dust generation from land disturbance (vegetation clearing and topsoil stripping);
- Dust generation from open cut mining and highwall activities (blasting, loading and movement of haul trucks, overburden emplacement and in-pit activities);
- Short term dust impacts associated with construction activities;
- Greenhouse gas emissions (Scope 1 and 2) as a result of the actual mining operations and the associated use of energy by mining equipment and coal processing infrastructure;

- Greenhouse gas emissions (Scope 3) as a result of non-mining activities at the site and in the combustion of product coal in the energy generation process; and
- Emissions of odorous gasses from spontaneous combustion and the ongoing management of subsurface heating.

7.5.3 Assessment Methodology

An air quality, spontaneous combustion and greenhouse gas impact assessment will be completed for the Project by PAE Holmes in accordance with the *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in New South Wales* (DEC, 2001) and the *Australian Greenhouse Office's (AGO) Factors and Methods Workbook* (AGO, 2005). The scope of assessment will include:

- A review of local meteorology data, including wind speed and direction, temperature, humidity, rainfall and evaporation;
- A review of background ambient air quality monitoring data to identify representative values for existing background dust deposition, PM_{10}, and Total Suspended Particulate (TSP) concentrations for relevant averaging periods;
- Development of a air quality model for the Project to predict and assess associated air quality impacts (and cumulatively with other approved and proposed developments in the region) at Years 5, 10, 15 and 20 against regulatory criteria;
- An assessment of the potential for dust generation associated with infrastructure development proposed;
- An assessment of spontaneous combustion impacts and emissions;
- An assessment of potential Scope 1, 2 and 3 greenhouse gas emissions;
- A review of the existing monitoring network in place for Cullen Valley Mine and Invincible Colliery and provision of recommendations for any potential enhancements required for the Project; and
- The identification of appropriate management and mitigation measures in relation to dust generation, greenhouse and spontaneous combustion as required.

7.6 SURFACE WATER

7.6.1 Background

The Project is located within the upper reaches of the Turon River catchment within the broader Burrendong Catchment Area, which drains from the western extent of the Great Dividing Range. Regional drainage flows in a northerly direction along the Turon River, then westerly into the Macquarie River and eventually into the Darling River, the main natural drainage line in western NSW.

On a local level, a number of minor drainage lines are present in the area surrounding the Project, with the local catchments consisting of a number of ephemeral creeks and watercourses that will generally have significant surface water flows during wet weather.

Surface runoff from the Project flows in a westerly direction through grazing land along natural watercourses to Cullen Creek and Dulhuntys Creek, which then flows northwards to the Turon River (see **Figure 1**).

Coalpac monitors surface water quality on a monthly basis from four water sampling points at regulated discharge sites. Surface water is currently analysed for pH, TSS and oils and grease, with additional monitoring for a range of pollutants required during discharge events, in accordance with the requirements of EPLs 1095 and 10341. Key objectives for surface water management that shall be continued for the Project and include:

- Maintaining appropriate water management structures to effectively segregate water from disturbed and undisturbed areas, diverting runoff from undisturbed areas and allowing them to drain from the site, where possible;
- Collection of runoff from all active mining areas, overburden emplacement areas and establishing rehabilitation areas in catch drains and direction to sediment traps and settling dams for management and utilisation in site operations. Water management will continue to occur in a closed loop system;
- Providing water access and storages to ensure sufficient capacity for use in the consolidated operations proposed; and
- Provide an adequate level of flood protection for mining operations.

7.6.2 Potential Impacts

Potential impacts in relation to surface water for the Project have been identified through the risk assessment and include:

- Impacts to surface water quality through the impacting on water quality downstream;
- Potential for increased demand from existing sources for any operational water deficits to make up the volumes required for the Project;
- Changes to the catchment area, with consequent impacts on catchment yields and drainage downstream of the site;
- Any required changes to approved controlled discharge, with consequent potential impacts on downstream water quality and drainage; and
- Post-mining surface water impacts on catchment yields, water quality and drainage.

7.6.3 Assessment Methodology

A surface water impact assessment will be completed for the Project and shall include:

- Assessment of the existing surface water environment including major flow paths, drainage, water storage locations and water quality;
- Preparation of a water balance and identification of water demands and management requirements for the consolidation of Cullen Valley Mine and Invincible Colliery operations;

- Assessment of impacts on nearby catchment yields and on-site drainage systems during and post-Project mining operations;
- Review of the management systems and controls established for surface water and erosion impact mitigation in approved operations and their current effectiveness; and
- Provision of recommendations for the integration of existing water management systems and any additional impact mitigation measures deemed to be required.

7.7 GROUNDWATER

7.7.1 Background

Regionally, the coal seams and other strata exhibit a gentle downward dip to the north-east from the Project. Characteristic of the sedimentary strata in the area, the variation in permeabilities between the rock and coal seams create a range of water bearing systems. Groundwater assessments undertaken to date for Cullen Valley Mine and Invincible Colliery indicate that the coal bearing seams represent the main water bearing zones currently intercepted by approved operations. In addition to the current open cut mining, however, extensive underground mining of the Lithgow Coal Seam has previously been carried out within the Project area using various extraction methods for the operations of Tyldesley Colliery and Invincible Colliery. Previous assessments have determined that the old workings in the Lithgow Seam of both the operations store large volumes of water.

The Marangaroo Sandstone proposed to be extracted for the sandstone quarrying component of the Project underlies the Lithgow Coal Seam, being separated by a thin seam of conglomerates and mudstone. These horizons are permeable and highly porous, acting as aquifers above relatively impermeable mudstone and siltstones that underlie them.

7.7.2 Potential Impacts

Potential groundwater impacts identified in the preliminary environmental risk assessment include:

- Groundwater drawdown effects, impacts to groundwater quality and flows;
- Potential for localised depressurisation of aquifers in the area;
- Increased groundwater inflows to open cut pits;
- Loss of groundwater yield at existing bore locations; and
- Long term changes (post mine closure) to groundwater levels, groundwater quality and direction of flows.

7.7.3 Assessment Methodology

A groundwater impact assessment will be completed for the Project and will include:

- An assessment of the potential for mine groundwater impacts (including impacts on alluvial systems and old underground workings in the vicinity of Project and neighbouring landowners boreholes) via predictive numerical modelling in a two dimensional finite-difference simulation package;

- Estimation of mine groundwater inflow rates suitable for input into the water balance for the Project;
- An assessment of any groundwater impacts from infrastructure;
- An assessment of cumulative groundwater impacts incorporating surrounding mining and other activities;
- An assessment of post-mine groundwater impacts; and
- Identification of any groundwater impact mitigation measures necessary for the Project.

Recent exploration and survey data will be used to assign geographic and geological parameters for the Project. Seam geometry of the coal seams and Marangaroo Sandstone formations, other smaller subsurface drainages, the old underground workings in the Lithgow Seam and adjacent mining operations will also be considered in the groundwater model.

7.8 GEOCHEMISTRY

7.8.1 Background

An overview of Project geology and coal resources is provided above in **Section 2.2.5** and **Section 2.2.6**. Previous assessments of mine geology and Coalpac's experience with the management of existing mining operations at Invincible Colliery and Cullen Valley Mine have resulted in geochemical issues being well understood and a number of management measures being put in place to minimise potential impacts.

7.8.2 Potential Impacts

Potential geochemical impacts identified in the preliminary environmental risk assessment include:

- Potential acid generation from overburden and rejects generated by Project mining operations;
- Salinity and erosive dispersivity issues for stockpiled materials;
- Some propensity for spontaneous combustion impacts; and
- The leaching of metals from coal rejects.

7.8.3 Assessment Methodology

The scope geochemical assessment to be undertaken for the project will include the following:

- A review of existing geological data and any prior geochemical assessments undertaken in the vicinity of the Project;
- Completion of a limited geochemical field survey to gather representative overburden and potential reject materials for the Project. It is anticipated that this program will be integrated with any current Coalpac Exploration drilling programs;

- Analysis of materials gathered during the field survey to allow the characterisation of overburden and reject materials and the assessment of potential geochemical impacts for the Project; and
- Mitigation and management as required.

7.9 TRAFFIC AND TRANSPORT

7.9.1 Background

The principal road network adjacent to Project is shown on **Figure 1** and includes:

- The Castlereagh Highway (to the east of Cullen Valley Mine and the west of Invincible Colliery);
- Portland – Cullen Bullen Road (to the west of the EA Boundary);
- The Cullen Valley Mine private haul road (to the south-west of Cullen Bullen);
- Boulder Road (west of the Castlereagh Highway, providing access for coal haulage trucks to MPPS); and
- Back Cullen Bullen Road.

Excepting the existing Cullen Valley Mine private haul road, which allows road haulage trucks carrying product coal from the site to bypass the township of Cullen Bullen, all roads are under the control of the RTA or Lithgow City Council. The Castlereagh Highway represents the major transport corridor in the region and links Lithgow in the south to Mudgee and Gulgong to the north of the Project. Under existing approvals, both Cullen Valley Mine (DA 200-5-2003) and Invincible Colliery (PA 07_0127) utilise the Castlereagh Highway for the transportation of product coal by road truck. The majority of product coal is supplied under contract to MPPS, although there is provision under current approvals for limited supply to other domestic destinations.

As discussed in **Section 3**, all product coal from the Project that is transported from site using the public road network will occur via the existing Invincible Colliery site access intersection and the Cullen Valley Mine private haul road until 2014. Both of these access points provide connectivity to the Castlereagh Highway. As stated in **Section 3.3**, it is anticipated that there will be no increase in movements on the Cullen Valley Mine private haul road and that road transportation of product coal will not be undertaken once the conveyor to MPPS from the ICPP is operational (except in emergency situations).

7.9.2 Potential Impacts

Specific traffic and transport impacts identified in the preliminary environmental risk assessment include the potential to increase light vehicle movements associated with employees and contractors, the increase in heavy vehicle movements associated with transportation of product coal to domestic customers from the Invincible Colliery site access road and an increase in heavy vehicle movements in transporting materials to the site.

In addition, increased traffic flows immediately before and after shift changeover times are predicted, albeit at an increased rate for the consolidated Project.

The construction and operation of the proposed rail loop also has the potential for minor impacts on the local rail network.

7.9.3 Assessment Methodology

A Traffic and Transport Impact Assessment will be completed for the Project in accordance with the *Guide to Traffic Generating Developments* (RTA, 2002). The scope of assessment will include:

- Evaluation of the existing road transport environment (e.g. road hierarchy, road conditions, traffic conditions and safety);
- Review and analysis of background traffic counts and the analysis of key intersections (with additional traffic counts undertaken as required);
- Assessment of the capacity of the affected road network to cater for the traffic volumes proposed for the Project. This will necessarily involve assessment of the capacity of affected public roads and intersections in accordance with Austroad guidelines;
- Identification of impacts for the Project relating to any works deemed to be required on the public road network, to ensure safety requirements continue to be met;
- Quantification of predicted increases in traffic during the construction and operational phases of the Project (including the consideration of predicted future traffic flows);
- Assessment of potential impacts on traffic conditions, levels of service and intersection operation during peak periods of the Project;
- The assessment other local traffic generating developments to determine cumulative impacts;
- Assessment of the existing rail transport environment and impacts of the operation of the proposed rail loop; and
- Identification of any impact mitigation measures necessary for the Project.

7.10 VISUAL

7.10.1 Background

The EA Boundary for the Project includes the elements such as the elevated sandstone ridgelines and escarpments of the Ben Bullen State to the north, east and south, with the rural lands of Cullen Valley located to the west. The Project is also bisected by the Castlereagh Highway and the township of Cullen Bullen. Views to the east are also dominated by the Great Dividing Range. The visual character of the landscapes within and adjacent to the existing operations of Cullen Valley Mine and Invincible Colliery are generally defined by mining, forestry and agricultural land uses. The EA Boundary is dominated by the undulating, forested hills and escarpments of the Ben Bullen State Forest and the existing mining and infrastructure areas of Cullen Valley Mine and Invincible Colliery.

7.10.2 Potential Impacts

The key viewing locations for the Project will be from Cullen Bullen and privately owned rural residences in surrounding areas.

These locations are generally located on the undulating valley floor along the Castlereagh Highway and the Portland – Cullen Bullen Road. The road alignments will also represent key assessment locations, with limited views available for passing traffic.

Due to the screening effects provided by vegetation and the intervening topography, views of the Project available from some residences in Cullen Bullen township are anticipated to be limited due to long distances generally exceeding 3 km.

The Project will also retain a number of the existing features of site infrastructure and operational areas of both approved sites that can be viewed by receivers travelling along the Castlereagh Highway, the local road network and by some near neighbours in and surrounding Cullen Bullen township. Generally, views to infrastructure and mining areas from the existing operations are afforded some screening due to the ridge and valley topography characteristic of the area and the existing intervening vegetation.

7.10.3 Assessment Methodology

A Visual Impact Assessment will be completed by JVP Environmental for the Project with the following scope:

- Characterisation of the existing visual environment and landforms, taking into consideration existing approvals;
- Identification of sensitive viewsheds (including for nearby residential receivers);
- Assessment of the visual sensitivity of these viewsheds;
- Assessment of potential impacts due to night lighting for the Project;
- Development of a digital terrain model that incorporates photomontages at relevant viewing locations;
- Assessment of the degree of visual landscape alteration that the Project would have on sensitive viewsheds, including the use of visual simulations, where appropriate; and
- Identification of any impact mitigation measures necessary for the Project.

7.11 SOCIAL IMPACT ASSESSMENT

The Project is located on lands surrounding the township of Cullen Bullen to the north, east and south. Cullen Bullen is a small town with a population of approximately 300 people and is located on the Castlereagh Highway, which provides a major road transport connection between the regional centres of Lithgow to the south of the Project and Mudgee to the north.

Cullen Bullen (and the greater district) is largely sustained by local coal mines and power stations, and has a long history of economic benefits from mining activities, beginning with gold mining nearby in the 1840's and the commencement of coal mining in the town in the 1880's.

The population of the town and the surrounding Lithgow LGA has been declining over the past decade, is aging, and has seen a decline in the younger sector of the population due to the decline in coal mining, manufacturing and rail services in the district, the overall changing economic environment and the drift towards larger cities with better facilities.

The consolidation of the operations of Cullen Valley Mine and Invincible Colliery for the Project has a potential to continue the positive contributions to the wider local and regional economies that already occur through the capital expenditure in existing operations, employee salaries and associated local spending.

At the peak of employment for the Project it is anticipated that in addition to the 120 full time direct employment positions (plus contractors) required, there will be a approximately 300 additional indirect jobs created throughout NSW in support roles. The continuation of operations and the construction of additional components as proposed for the Project will also result in an increase in NSW government revenue.

Hansen Bailey will complete a social assessment for the EA that will include the consideration of all relevant demographic, social, cultural and economic factors that may have an influence on potential beneficial and adverse impacts associated with the Project.

7.12 ECONOMICS

7.12.1 Background

The Lithgow LGA in which the Project is located covers an area of approximately 4,551 km^2 and has a population of approximately 20,000 people. Key areas of the LGA include the major regional centre of Lithgow, the two townships of Portland and Wallerawang and a number of rural villages and localities. The mining industry is a major economic sector in the Lithgow LGA, employing approximately 10% of the total workforce.

The continuation of mining via the consolidation and ongoing development of operations at Cullen Valley Mine and Invincible Colliery will involve additional capital investment, ongoing operational expenditure and the maintenance of up to 90 full time equivalent employment positions. Further, it is anticipated that the development of the operation under this proposal will increase the existing workforce to approximately 120 full time positions, plus additional contractors. The mining operations proposed by Coalpac for the Project have the potential to enhance the existing contribution of flow-on effects to the local and state economies on a number of levels.

7.12.2 Potential Impacts

The Project will continue to provide revenue to the State government through the payment of royalties and taxes contributing to the NSW economy. The Project will also maintain existing employment positions, further strengthen the local economy and create significant revenue at a State and Federal level. The Project will also result in additional and ongoing demand for community infrastructure and services (such as skill levels, trade, health and educational opportunities and population demographics).

7.12.3 Assessment Methodology

The Economics Impact Assessment to be undertaken for the Project will be completed by Gillespie Economics in accordance with the DoP *Guideline for Economic Effects and Evaluation in EIA* (2002). This assessment will include:

- A benefit cost analysis (threshold value analysis) for the Project;
- A regional economic impact assessment of the consolidation and operation of the Project;
- Quantification of the economic cost, benefits and impacts of the Project; and
- The provision of recommendations on any relevant management and mitigation measures in addition to those Coalpac already has in place.

The economic impact study to be completed for the EA will assess the potential incremental economic costs and benefits of the Project to the community (i.e. consideration of economic efficiency). This assessment will also consider the regional economic impact or economic activity generated by the Project and any incremental costs and benefits to the environment due to the consolidation and enhancement of the two existing operations.

7.13 SOILS AND LAND CAPABILITY

7.13.1 Background

Previous soils surveys completed for the Cullen Valley Mine EIS and Invincible Colliery EA have identified that soils within the EA Boundary consist of two major landscape units, as listed under the Wallerawang 1:100,000 soil landscape map (DCLM, 1993). These soil landscapes include:

- Colluvial landscape (Hassans Walls), derived from Narrabeen Group sandstones and colluvial talus sideslopes developed over the Illawarra Coal Measures and the Shoalhaven Group. These soils are generally shallow on the slopes of the steep remnant escarpments, becoming deeper toward valley floors; and
- Erosional Landscape (Cullen Bullen), overlying the Illawarra Coal Measures and Marangaroo Conglomerates as rolling hills and as steep rises. Upper slopes generally consist of talus slopes characterised by large cobbles and gravels, with localised outcrops on the upper slopes and smaller rock benches at lower elevations. Cullen Bullen Erosional soils range from shallow to moderate depths across the Project area and have hard setting topsoils.

The above soil landscapes are generally low in fertility, slightly acidic and have a moderate potential for erosion.

7.13.2 Potential Environmental Impacts

Many of the soil types within the EA Boundary include horizons with a slight to high potential for dispersion and are therefore likely to be subject to erosion if they are not adequately managed during Project mining activities. Potential impacts on soil structure, integrity and fertility may occur as a consequence of extended periods of topsoil storage. This would potentially affect rehabilitation success as well as the establishment and long term sustainability of rehabilitated areas.

The post mining land capability of the Project will be modified from its original condition due to disturbance and this will need to be addressed as part of the EA.

The final land capability is anticipated to be returned to a level similar to the pre-mining environment, however this will also be influenced by the conceptual mine plan, proposed post mining land use development and the final landform design.

7.13.3 Assessment Methodology

A Soils and Land Capability Impact Assessment will be undertaken for the Project, which shall include the following:

- A review of existing information from assessments previously undertaken and current management practices for soils and land capability;
- A field survey, with test pits undertaken as required;
- Mapping of soil types within the proposed mining areas and a description of their physical and chemical characteristics;
- Identification of any soil materials with potentially adverse quality (e.g. acid sulphate generating);
- Identification of the suitability of topsoils for use as topdressing material and potential soil amelioration measures for stabilising soils;
- A pre and post mining land capability and class assessment; and
- Identification of any additional impact mitigation measures necessary.

7.14 REHABILITATION, LAND USE AND FINAL LANDFORM

7.14.1 Background

The surrounding land use for the Project is predominantly NSW State Forest. With the cessation of logging in the area, it is now primarily relied upon for recreational uses such as hunting, motorcycling, four wheel driving and bushwalking. Some private rural landholdings are located adjacent to the Project and within the EA Boundary, where grazing of cattle is the predominant activity. Also adjacent to the Project area are the coal mines of Baal Bone Colliery, Angus Place Colliery, Pinedale Mine, Lamberts Gully Mine and Ivanhoe Colliery, as well as the MPPS to the south.

It is considered that the continued operation of Invincible Colliery and Cullen Valley Mine is consistent with the primary land uses in the vicinity of the Project and the wider LGA in general.

Rehabilitation activities at both Cullen Valley Mine and Invincible Colliery are undertaken progressively to ensure the total area of disturbance at any one time. This minimisation of disturbed areas reduces the potential for wind-blown dust, visual impacts and increases in sediment-laden runoff. Rehabilitation is developed in accordance with conceptual landform design objectives and guidelines so that disturbed areas are returned to a condition that is compatible with the surrounding landscapes of the Ben Bullen State Forest and is sustainable in the long term.

To ensure the establishment of a stable final landform, the majority of final overburden emplacement slopes will continue to be shaped to 14 degrees or less at Invincible Colliery and 18 degrees or less at the Cullen Valley Mine.

Rehabilitated land is topsoiled and seeded with a mixture of native trees and shrubs to re-establish vegetation communities similar to those of the pre-mining landscape that provides appropriate habitat for local fauna species. Post-mining landforms have been developed to integrate Cullen Valley Mine and Invincible Colliery with the surrounding landscape and vegetation communities adjacent to the mines.

7.14.2 Potential Impacts

The Project will represent the continuation of impacts to rural lands and the Ben Bullen State Forest from the existing mining areas of Cullen Valley Mine and Invincible Colliery. Coalpac will maintain and adapt their existing management measures as required for the Project, to ensure the rapid and successful completion of rehabilitation. As discussed in **Section 3**, the mine plan has been thoroughly refined during the design phase to maximise the areas accessible for rehabilitation throughout the life of the Project.

The long term rehabilitation and landscape strategies for Cullen Valley Mine and Invincible Colliery will be required to be reviewed and compiled for the Project to reflect the consolidation of the two operations, activities within the East Tyldesley area and any additional rehabilitation objectives and goals.

7.14.3 Assessment Methodology

The conceptual mine plans for the Project as outlined in **Figure 7** to **Figure 11** have been developed to support the progressive establishment of an undulating, free-draining and sustainable landform, consistent with the existing environment of the surrounding areas.

Further detail will be provided in the EA regarding the specific measures to be put in place for the Project to assist in the management of rehabilitation and revegetation works in the long term and the integration of these outcomes with the final landform design. It is anticipated that these measures will be based on those already developed by Coalpac for Cullen Valley Mine and Invincible Colliery, where a number of rehabilitation areas have been successfully established following the completion of open cut mining in current operational areas.

7.15 MINOR ENVIRONMENTAL ISSUES

Various minor assessments will also be undertaken to a relevant level including subsidence, bushfire, waste and closure.

7.16 ENVIRONMENTAL MANAGEMENT AND MONITORING

The existing Cullen Valley Mine and Invincible Colliery Environmental Monitoring Programs will be consolidated and enhanced as required to ensure that the provision of accurate environmental monitoring data is maintained for the Project and to assist in the management of environmental impacts.

Accordingly, a review of all other existing management plans and procedures in place for both sites will be also undertaken in accordance with the findings of the EA. The management documents to be revised for the Project will reflect the consolidation of Cullen Valley Mine and Invincible Colliery under a single Planning Approval.

8 PRELIMINARY PROJECT JUSTIFICATION

The Project is located within the Lithgow LGA and the Western Coalfield of NSW, an area that has a long association with the mining and power generation industries. Coal mining and quarrying operations in the lands surrounding the town of Cullen Bullen have occurred in various forms for the past 130 years and the industry remains significant to the regional economy due to continued strong domestic demand for thermal coal. The continuation of coal mining at the Invincible Colliery and Cullen Valley Mine as a consolidated operation will allow the extraction of valuable coal resources to continue to supply the demand in both the domestic and export coal markets. Coal is a valuable commodity that economically satisfies growing energy demands worldwide and, in particular, the growth of NSW industry and investment.

The coal mining operation will maximise the recovery of a diminishing resource in the Lithgow region of the Western Coalfields of NSW, with a minimal impact on the environment, as has been demonstrated by the existing mines that Coalpac operates. Existing operations at Cullen Valley Mine and Invincible Colliery have also demonstrated that successful mining operations and rehabilitation activities can occur within State Forests and that responsible use of water resources through recycling water and ensuring a 'closed-loop' system can minimise impacts on other users of water in the area. Further, Coalpac has demonstrated a clear and dedicated commitment to the rehabilitation of surrounding grazing lands through the development of biodiversity offset strategies to promote the resurgence in the pre-mining ecology of the area.

The Project is also a driver for direct employment and service provision and will serve to stem the decline in population and the growth in unemployment of the greater Lithgow district. It is also a boost for the local Cullen Bullen community, at a time when the proposed closure for the neighbouring Baal Bone Colliery is due in 2012, with the loss of some 190 direct jobs, and an estimated further 475 associated jobs in support of that mine.

The Project will continue to provide substantial economic benefits to the local community and the State and Federal governments through the continued employment of a workforce of up to 120 full time personnel and additional contractors and the recovery of up to an additional 83 Mt ROM coal and 6 Mbcm ROM sand for domestic use.

In addition, the consolidation of Coalpac's operations for the Project will result in the continued efficient and cost effective supply of a large component (up to 70%) of MPPS coal demand, which in turn is a significant contributor to electricity generation in NSW.

The cumulative environmental impacts of the continued operation of the Invincible Colliery and Cullen Valley Mine for the Project in relation to community effects are anticipated to be low. An ongoing commitment to continuous improvement exhibited in responsible environmental management of the existing operations of Cullen Valley Mine and Invincible Colliery will further advance Coalpac's environmental management practices and the mitigation of impacts on the surrounding environment and the community for the Project.

The Project represents the continuation of the existing mining operations at Cullen Valley Mine and Invincible Colliery to maximise operational efficiencies in the recovery of a known open cut coal resource and to access a sand resource for the Sydney industrial sand market. The Project will also facilitate the consolidation of the existing development consents and environmental management measures of Coalpac's operations under a single contemporary Planning Approval and environmental licensing regime.

A comprehensive assessment of all environmental, social and economic impacts associated with the Project will be undertaken in accordance with the preliminary scopes developed for this PEA, the requirements of the Director-General and the objectives of the EP&A Act.

* * *

9 REFERENCES

- AES (2003), *Fauna Assessment for Cullen Valley Mine Extension*.
- Australian Greenhouse Office (2005), *Factors and Methods Workbook*.
- Australian Greenhouse Office (2005), *AGO Factors and Methods Workbook*.
- Central West Archaeological and Heritage Services (2002), *An Aboriginal Archaeological Investigation & Non-Indigenous Heritage overview of the proposed Cullen Valley Mine Extension near Cullen Bullen, NSW.*
- Craven Elliston Hayes (2006), *Environmental Assessment for Proposed Extension of Invincible Open Cut Mine and Rehabilitation Activities*.
- Department of Environment and Conservation (2005), *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*.
- Department of Environment and Conservation (2005), *Draft Guidelines for Threatened Species Assessment*.
- Department of Environment and Conservation (2006), *The Vegetation of the Western Blue Mountains*.
- Department of Environment and Climate Change (2004), *Draft Guidelines for Threatened Species Assessment*.
- Department of Environment and Climate Change (2005a), *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation.*
- Department of Environment and Climate Change & Water (2010), *Aboriginal Cultural Heritage Consultation Requirements for Proponents*.
- Department of Conservation and Land Management (1993), *Soil landscapes of the Wallerawang 1:100 000 sheet.*
- Department of Planning (2002), *Guideline for Economic Effects and Evaluation in EIA.*
- Environment Protection Authority (1985), *Environmental Noise Control Manual*.
- Environment Protection Authority (2000), *NSW Industrial Noise Policy.*
- Environment Protection Authority (1999), *Environmental Criteria for Road Traffic Noise.*
- International Environmental Consultants (1997), *Feldmast Coal Project Environmental Impact Statement*.
- International Environmental Consultants (2004), *Cullen Valley Mine Open Cut Extension Environmental Impact Statement*.
- Lembit, R. (1997), *Flora Survey for Feldmast Coal Project*.
- Lithgow City Council (1994), *Lithgow City Local Environmental Plan*.

- Mills, R. (1996), *An Archaeological Survey for the Proposed Feldmast Coal Project, Cullen Bullen, NSW*.
- OzArk Environmental & Heritage Management (2006), *Heritage Assessment: Proposed Extension to ML 68; the Invincible Open Cut Coal Mine, Cullen Bullen NSW*.
- OzArk Environmental & Heritage Management (2008), *Ecological / Aboriginal Heritage Assessment of the Proposed Extension to the Invincible Colliery Open Cut Mine and Production Increase*.
- Roads and Traffic Authority (2002), *Guide to Traffic Generating Developments*.
- RW Corkery & Co. Pty Limited (2008), *Environmental Assessment of the Proposed Extension to the Invincible Colliery Open Cut Mine and Production Increase*.
- RW Corkery & Co. Pty Limited (2008b), *Augmented Biodiversity Offset Strategy for the Invincible Colliery Open Cut Mine Extension*.
- RW Corkery & Co. Pty Limited (2009), *Proposed Modification to Project Approval 07_0127 for the Invincible Colliery Open Cut Mine.*
- Sinclair Knight Merz (2009), *Mt Piper Power Station Extension Environmental Assessment*.
- Wildsearch (1997), *Fauna Survey, Proposed Feldmast Coal Project Cullen Bullen NSW*.