

Austar Coal Mine Section 96  
Modification  
*Statement of Environmental Effects*

Austar Coal Pty Ltd

April 2006

0042723 FINAL

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# Austar Coal Mine Section 96 Modification *Statement of Environmental Effects*

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|--------------|-------------------------------------------------------------------------------------|
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Environmental Resources Management Australia Pty Ltd Quality System

Austar Coal Pty Ltd

April 2006

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The former Southland Colliery in the Lower Hunter Valley of New South Wales has recently been acquired by Yancoal Australia Pty Ltd, a subsidiary of Yanzhou Coal Mining Company Limited, one of China's largest coal producers. Now known as the Austar Coal Mine, the mine is an aggregate of old mines including Ellalong, Pelton, Cessnock No.1 (Kalingo) and Bellbird South Collieries near Cessnock. The location of the mine is shown in *Figure 1.1*.

There are several consents for the mine, with the most recent consent issued by the Minister for Planning dated 14 February 1996 (DA29/95) (the "1996 Consent") allowing a continuation of operations within the area applicable to this Section 96 modification application. Other relevant consents issued by Cessnock Council are DA74/75/79 allowing 4000 tonnes per day throughput at Pelton Washery, DA8/1999/1658 for the No.2 ventilation shaft and DA8/2002/655/1 for compressor and pump enclosure buildings.

In December 2003 spontaneous combustion resulted in the cessation of mining and the subsequent appointment of receivers and managers. The site of the underground fire has been sealed and the mine has been operating on a 'care and maintenance' program for approximately 18 months. During the 'care and maintenance' period, all statutory environmental monitoring and reporting requirements have been met.

The mine recommenced development operations on 29 June, 2005 in accordance with the 1996 Consent. It is intended to develop the mine in three stages, with Stage One the subject of this statement of environmental effects (SoEE). Austar intends to recommence longwall operations in an area formerly known as the Bellbird South Extension, which is shown in *Figure 1.2*. Stage One of the mine would involve underground mining of the Greta coal seam within longwall panels A1 and A2 in an area covered by the 1996 consent.

It is proposed to introduce a new method of mining using the longwall top coal caving method (LTCC). Originally developed in France and refined in China, the LTCC method allows for extraction of up to 85 % of seams from five to 12 metres thick. The modification to DA 29/95 sought, and supported by this SoEE, comprises mining up to 6.5 metres face by LTCC and new infrastructure to facilitate the recommencement of mining. These works are detailed in *Chapter 2*.

Stage Two of mine development for which a separate approval would be sought under the *Environmental Planning and Assessment Act, 1979* (EP&A Act) and which would be supported by a separate environmental assessment, would involve LTCC three reconfigured longwall panels (south of Stage One)





Jobs/2005/0042723 /SOEE/fg1.1 Locality Plan.cdr 16.01.2006 SP Environmental Resources Management Australia Pty Ltd

Source: UBD



0 10km

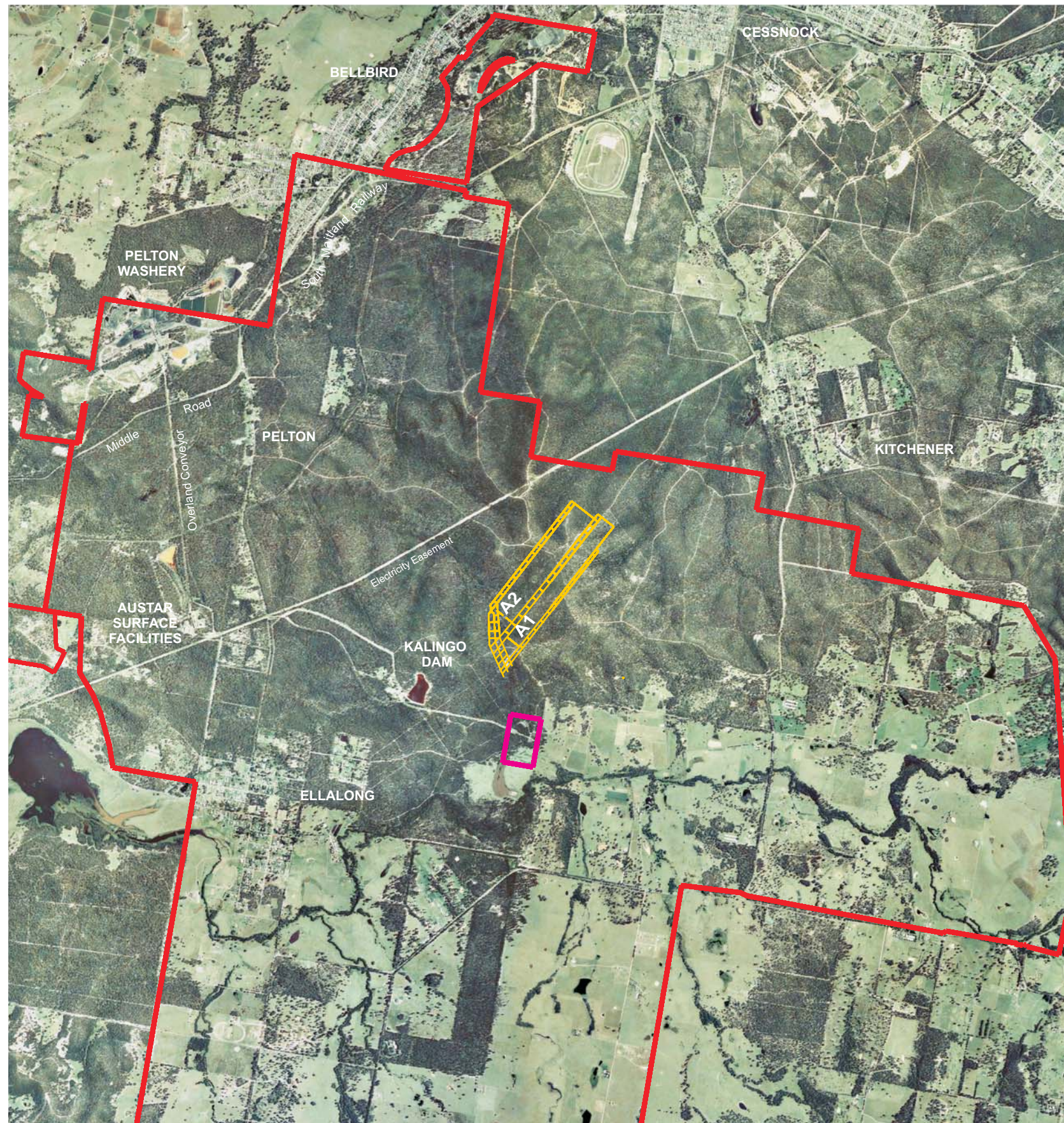
Approximate only

Figure 1.1

Locality Plan

Austar Coal Mine - Paxton, NSW





- Legend**
- Colliery Holding
  - Longwalls A1 & A2
  - Infrastructure Upgrade

Source: Austar Mine



Figure 1.2 Austar Coal Mine



extracting up to 6.5 metre thickness of the Greta seam. Stage Three would entail seeking a further separate approval which would be an application for a new project approval under Part 3A of the EP&A Act and would be supported by a separate environmental assessment and consultation process. Stage Three would aim to secure a longer term mine plan involving construction of mainroads and gateroads and extracting up to 6.5 metre thickness of the Greta seam in 12 longwall panels using LTCC.

## 1.2

### *PROJECT OVERVIEW*

The 1996 consent (DA29/95) permits mining in Consolidated Mining Lease 2 (CML2) with a production rate of up to three million tonnes of run of mine (ROM) coal per annum by conventional retreat longwall mining of the Greta seam with extraction height ranging from 3.5 to 4.5 metres. Additional activities approved under the 1996 consent include:

- transfer of the coal by underground conveyor to the surface;
- raw coal stockpile with a live capacity of 5000 tonnes and maximum capacity of 100 000 tonnes;
- delivery of washed coal to the washed coal stockpile;
- reject emplacement; and
- transport of product coal by rail to Port of Newcastle.

Longwalls A1 and A2 are located in the vicinity of longwalls LW24 and LW23 respectively, planned in the Bellbird South Extension, which are adjacent to the site of the spontaneous combustion in longwall LW25.

It is proposed to introduce the LTCC system rather than using a conventional retreat longwall system to maximise the recovery of coal from the targeted seam and which will have the added advantage of minimising the otherwise sterilized valuable coal of the Greta seam. Production will remain at 3 million tonnes per annum ROM. Handling of the coal from longwalls A1 and A2 would proceed in much the same manner as previously carried out during the operation of the Southland Colliery in accordance with the 1996 consent. Coal would be brought out from the underground mine via the Ellalong drift conveyor and overland conveyor to the Pelton Washery.

As approved in the 1996 consent, coarse rejects would be taken to the old Aberdare Extended Open Cut voids via a private haul road. Product coal would be loaded onto trains at the siding adjacent to the Washery and transported to the Port of Newcastle for export.

### 1.3

#### *PURPOSE OF THE STATEMENT OF ENVIRONMENTAL EFFECTS*

This Statement of Environmental Effects (SoEE) has been prepared to support an application under Section 96(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to modify the 1996 consent (DA29/95) to permit underground mining of longwalls A1 and A2 to permit the extraction of up to 6.5 metres of the Greta seam by using the LTCC method and the construction and operation of minor infrastructure works. Production will continue at the presently approved three million tonnes per annum ROM and other activity will be within the terms of the 1996 Consent.

This SoEE assesses the environmental issues relevant to consideration of the application as required in accordance with Section 79 (C) of the EP&A Act and covers the issues required to be addressed by the Department of Planning (formerly Department of Infrastructure, Planning and Natural Resources) in its letter to Austar dated 22 December, 2005. A copy of this letter and a checklist of the issues and where they are addressed in this SoEE is provided in *Annex A*.

### 1.4

#### *THE SITE AND SURROUNDS*

The mine is an amalgamation of several mines approximately six kilometres south of Cessnock, the nearest major regional centre. Other nearby settlements include Paxton, Ellalong, Pelton and Bellbird.

The mine is surrounded by abandoned mine workings, rural holdings and forestry activities including:

- Aberdare State Forest to the north and east;
- farms and forested areas to the south; and
- numerous abandoned mines and farmland to the west.

The mine is in the Cessnock local government area, however as the Minister is the consent authority for the 1996 Consent, which is proposed to be modified, the Minister is the approval authority for this modification application.

## 1.5 *LAND OWNERSHIP*

The majority of land that is the subject of the application is company owned by Austar Coal Mine Pty Ltd. The northern section of longwalls A1 and A2 lie within the Aberdare State Forest and Crown land. A list of property descriptions relating to this development is provided in *Annex B* and is shown in *Figure 1.3*.

### 1.5.1 *The Area*

The area in which the mining is to occur is hilly, covered with forest and lacks improvements and as such is not sensitive to any subsidence effects of LTCC mining.

## 1.6 *REPORT STRUCTURE*

This report addresses issues relevant to the proposed modification in the following chapters:

*Chapter 1* provides an introduction to the proposed modification of the mine, an overview of the development of Bellbird South Extension mine and the existing operations, the local setting of the site within its surroundings, the purpose of the SoEE and the structure of this report;

*Chapter 2* provides a description of the existing operations, describes the proposed modifications and consultation undertaken;

*Chapter 3* details the statutory context within which the proposal must be assessed;

*Chapter 4* assesses the potential environmental, social and economic impacts of the proposal; and

*Chapter 5* outlines environmental management and monitoring proposed and draws conclusions regarding the suitability of the proposed modification.

*Annex A* contains the Department of Planning Letter and Section 96 checklist. *Annex B* contains a list of property details. *Annex C* contains a comprehensive ecological report. *Annex D* contains the subsidence report. Finally, *Annex E* contains the surface water and groundwater report.





- Legend**
- Colliery Holding
  - Longwalls A1 & A2
  - Infrastructure Upgrade
  - Aberdare State Forest

Source: Austar Mine

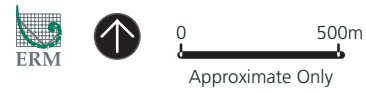


Figure 1.3 Land Ownership



**2.1 INTRODUCTION**

This application under s96(2) seeks approval to mine a 6.5 metre face by LTCC mining in an area where the 1996 consent already approves mining to a face between 3.5 metres and 4.5 metres by traditional longwall extraction. The modification comprises longwall panels A1 and A2 involving:

- up to (but not necessarily) a 6.5 metre working section;
- longwall extraction in panels A1 and A2 using longwall top coal caving method (LTCC); and
- construction and operation of the following new infrastructure:
  - larger capacity ventilation fan;
  - new downcast shaft;
  - new ten MVA substation;
  - 2000 cubic metres per hour nitrogen inertisation plant;
  - emulsion fluids and diesel storage and dispatch system;
  - tube bundle shed;
  - upgraded water treatment plant; and
  - water reticulation and pumping upgrade.

Whilst more coal will be recovered from the resource, the production rate of 3 million tonnes per annum ROM authorised in the 1996 consent by the Minister will remain unchanged.

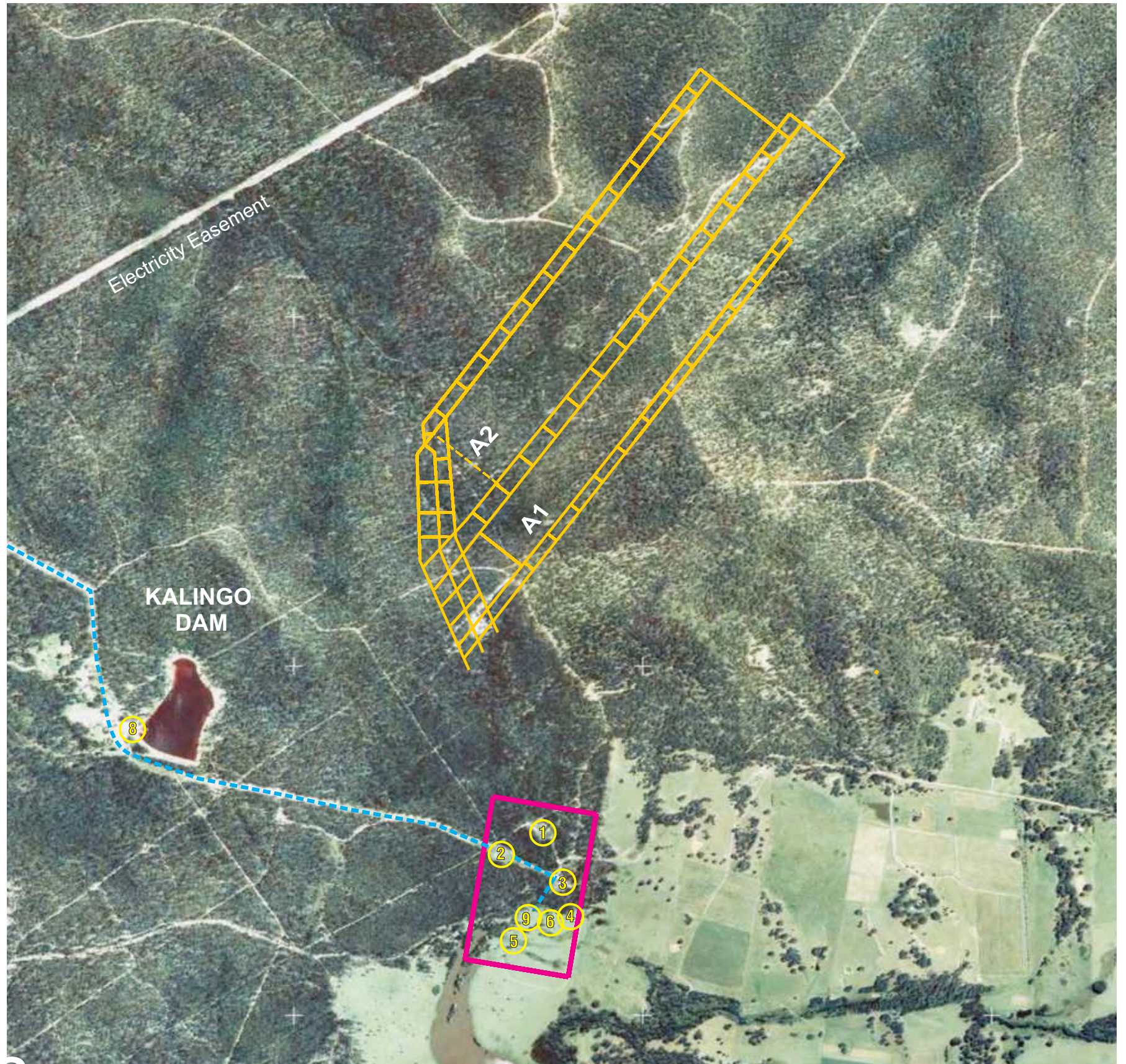
**2.2 KEY MODIFICATION ACTIVITIES**

This SoEE seeks consent for the following activities as shown in *Figure 2.1*.

**2.2.1 Underground Mining by LTCC***Background*

Longwalls A1 and A2 are in the same area as LW24 and LW23 respectively shown in the Bellbird South Extension EIS (HLA Envirosiences, 1995) and approved under the 1996 consent.





**Legend**

- Longwalls A1 & A2
- Infrastructure Upgrade
  
- 1 Existing & New Upcast Ventilation Shaft
- 2 Existing & New Substation
- 3 Existing & New Nitrogen Plant & Compressor
- 4 Downcast Shaft & Boreholes
- 5 Tube Bundle Shed
- 6 Diesel & Emulsion Storage
- 7 Existing & New Water Treatment Plant
- 8 Kalingo Dam Staging Pump
- 9 Freshwater Tank & Pipeline

Source: Austar Mine



Figure 2.1 Key Modification Activities



Longwall A1 is narrower than LW24 due to an isolation barrier being maintained between the new workings and site of the spontaneous combustion in LW25. When the mine was acquired by Southland Coal Pty Ltd in 1998, the longwalls were renamed. *Table 2.1* shows the name changes of the relevant longwalls.

**Table 2.1** *Longwall Names*

| Bellbird South Extension<br>EIS | Southland Colliery | Austar Mine |
|---------------------------------|--------------------|-------------|
| LW23                            | SL6                | A2          |
| LW24                            | SL5                | A1          |
| LW25                            | SL4                | -           |

Development works approved in the 1996 Consent are underway, with access via the North West (NW) Mains. A continuous miner is currently developing the A1 tailgate consisting of a pair of gateroads. A barrier of 30 metres has been retained between the A1 tailgate and the abandoned SL4 (LW25) gateroads to prevent any air leaking into the old workings.

The maingate is being developed towards the east with a pair of gateroads separated by a 45 m solid coal chain pillar. All roadways are being driven at five metres wide by 3.2 m high. Chain pillars are at 100 m spacing.

Longwall panel A1 would be approximately 158 metres wide and approximately 1481 metres long, with an extraction height of up to 6.5 metres. Longwall panel A2 would be approximately 227 metres wide and approximately 1235 metres long, with an extraction height of up to 6.5 metres. This modification will allow the recovery of up to about 1.18 million tonnes that would be sterilized if the modification is not approved and mining proceeded as presently approved in the 1996 consent.

Extracted coal would be loaded on to a conveyor system in the roadways that pass through the NW Mains, Bellbird Mains, 1 East Headings, along the Drift to the overland conveyor and finally to the Pelton Washery as approved in the 1996 consent.

*Use of LTCC*

LTCC technology would result in greater production efficiency compared to standard longwall mining methods by optimising resource recovery and reducing the quantity of coal sterilised within the Greta seam. The estimated resource recovery for longwalls SL4, SL5 and SL6 as part of the Bellbird South Extension was 37%, compared to 63% resource recovery for longwalls A1 and A2 using the LTCC system. It is also considered by the operators of LTCC in China to be a safer method compared to other methods of extracting thick seams (such as multi-slice or single thick slice) and has been shown to reduce the likelihood of spontaneous combustion.

Different forms of LTCC have been in practice for over 130 years and have generally been referenced as sub-level caving. Other names include draw, soutirage or the Valenje method. The techniques were developed in places such as Leon, Spain; Velenje, Slovenia; and Blanzky, France primarily to increase resource recovery or allow mining in areas otherwise considered too geologically difficult to extract (due to seam dip or other reasons).

LTCC was introduced to China 15 years ago and has undergone significant development. Austar's parent company Yanzhou Coal Mining Company Limited is acknowledged in China as the safest and most productive user of the technique.

The LTCC system has been extensively researched in recent years by the CSIRO, UNSW School of Mines and SCT in preparation for the introduction of the system to the Australian Coal Mining Industry. Yanzhou Coal has been actively pursuing a suitable mining lease in Australia since 1999.

#### *What is LTCC?*

LTCC is a conventional retreat longwall face with a second armoured face conveyor (AFC) towed behind the shields to recover coal that would otherwise fall into the goaf and be lost. The roof supports are of a modified design incorporating a system of hydraulically operated tail-canopies at the rear of the support which can be moved up and down to allow the broken coal in the goaf area to spill onto a second AFC. This process is allowed to continue until all of the coal is recovered and waste rock appears. At this time, the tail canopies can be lowered and 'gates' shut, pulling the AFC forward to stop recovery of rock from the goaf.

The operational steps in LTCC are generically described as:

- shearing coal in front of the AFC;
- pushing the front conveyor;
- setting the support forward;
- opening the tail-canopy of support to allow broken coal to spill onto the rear conveyor; and
- pulling the rear conveyor.

*Figures 2.2 and 2.3 show the LTCC system in profile and a diagrammatic representation of longwalls A1 and A2 respectively.*

#### *Reject Handling and Disposal*

Handling and disposal of reject materials would continue in much the same manner as is currently occurring during development works and as approved under the 1996 consent. The analysis used for the EIS (HLA Envirosciences, 1995) was based on washery reject from the Greta seam constituting

Source: Austar Mine

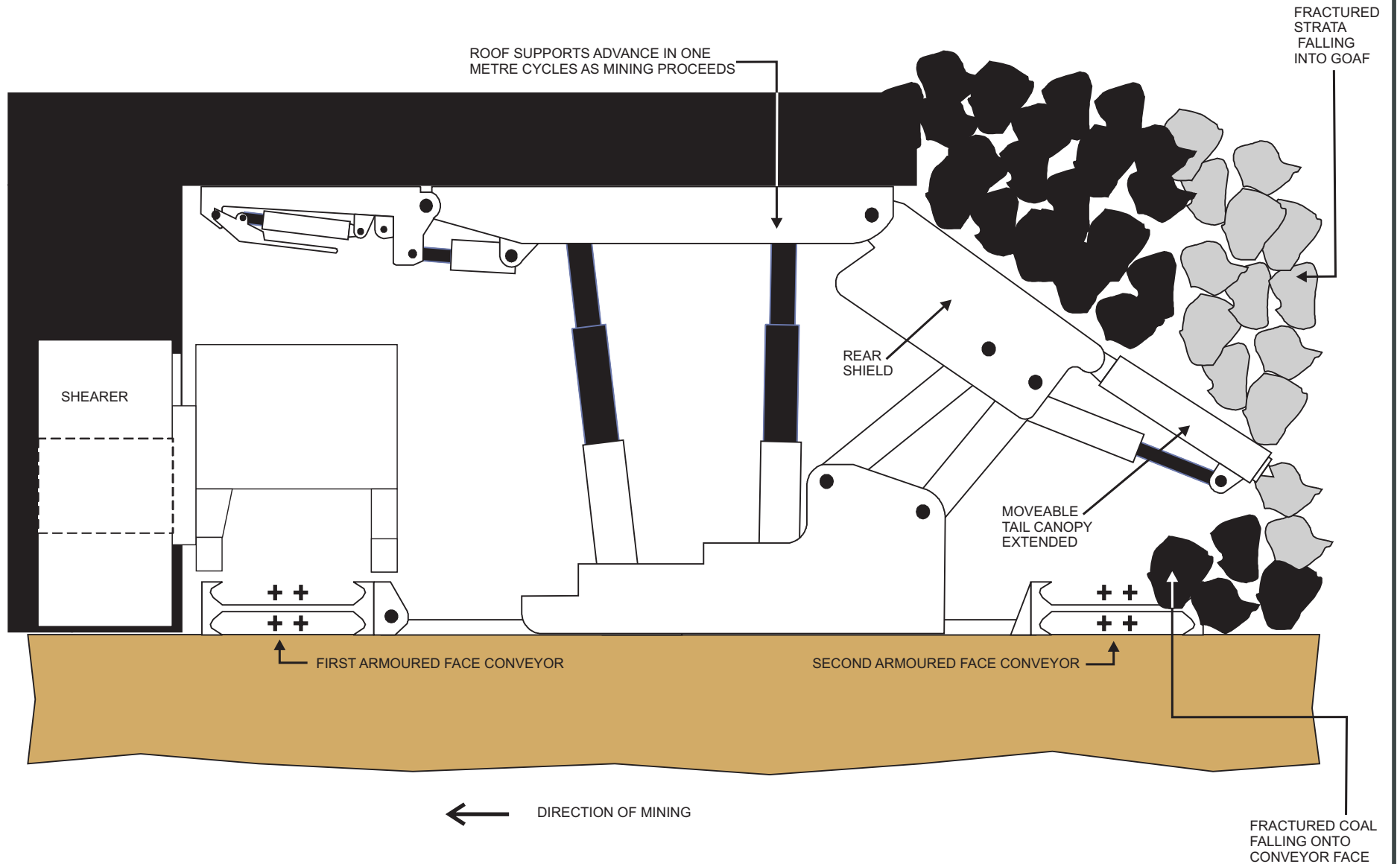
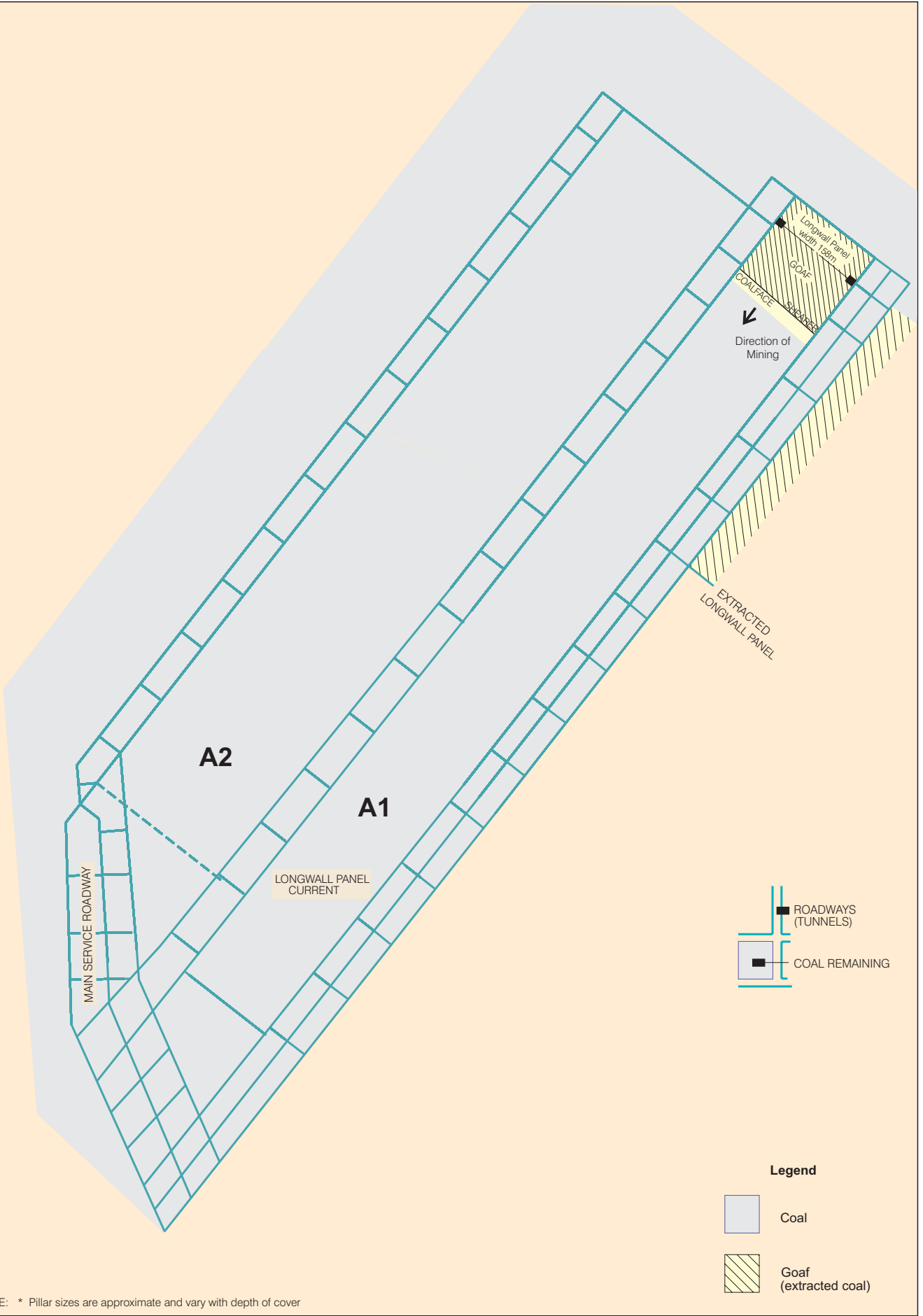


Figure 2.2 Longwall Top Coal Caving Diagram

Austar Coal Mine - Paxton, NSW





NOT TO SCALE

Figure 2.3 Typical Longwall Panel Layout

approximately 20 % of run of mine (ROM) production of which 70 % was coarse reject. At full production of 3 Mt per annum, this would have resulted in 600 000 tonnes dry equivalent of washery reject, of which 420 000 tonnes dry equivalent would have been coarse rejects and 180 000 tonnes of fines per year as approved in the 1996 consent.

For Stage One, the washery yield is expected to be 90 % recovery, resulting in 300 000 tonnes dry equivalent of washery reject, of which 210 000 tonnes dry equivalent would be coarse reject with the remainder constituting fines based on the presently approved full production of 3 Mt per annum under the 1996 consent. Therefore there will be less coarse reject produced per year than was considered for emplacement and presently approved under the 1996 consent.

The EIS calculation presently authorises 360 000 tonnes of dry equivalent coarse reject under the 1996 consent as compared to an expected 260 000 tonnes of dry equivalent coarse reject.

Coarse rejects would continue to be disposed of to Aberdare Extended Open Cut area and open cut pits at the Pelton Washery as approved in the 1996 consent. These activities are also detailed in the Mine Operations Plan (MOP) and approved by the Environmental Officer of Department of Primary Industries. Some activities associated with the Pelton Washery such as coarse reject emplacement and night lighting may be viewed from sections of Wollombi Road and Mountview Road although no modification is sought to these activities. Fines (less than 1 mm) are treated in the fine coal circuit of the washery and blended with product coal for sale, with excess fines pumped into the Pelton Colliery disused workings as approved in the 1996 consent.

### 2.2.2 *Upcast Ventilation Fan*

The existing fan as approved in Council Consent DA8/1999/1658 would remain with a new impeller motor and control room constructed. A second duplicate fan is required to provide additional airflow to the underground workings to improve mineworker health and safety. The duplicate fan would be located in the same enclosure as the existing No.3 upcast shaft fan at the southern end of the NW Mains as shown in *Photograph 1* and *Figure 2.1* as mentioned in the Bellbird South Extension EIS (HLA Envirosiences, 1995) and Relocation of Ventilation Facilities Review of Environmental Factors (International Environmental Consultants, August 1999). The vertical shaft is three metres in diameter and approximately 450 metres deep. Construction is expected to take six months. The appearance of the new ventilation fan would be similar to the existing fan shown in *Photograph 2*.

### 2.2.3 *Downcast Shaft*

A new downcast shaft is required to permit additional air to enter the underground workings as operations move north, complementing the





**Photograph 1**

Location of new ventilation fan in existing fan enclosure.



**Photograph 2**

Existing ventilation fan - new ventilation fan would be of similar appearance.

installation of the new fan on the upcast shaft. Currently, air enters the mine via the drift and the existing No 1 shaft. This new downcast shaft was previously approved under the 1996 consent as part of the works associated with the Bellbird South Extension, however the exact location and dimensions were not determined at that time. The shaft would be located in a clearing near the junction of the NW and Bellbird Mains (ie south-east of the substation). The shaft would be 2.44 metres in diameter and fitted with a funnel and grate at the surface to prevent entry of animals or debris. No vegetation clearing would be required as the area is in a disturbed clearing. Construction is expected to take three months. Excavated material would be placed in disused underground roadways or removed via the conveyor system and disposed of in the reject emplacement areas.

#### **2.2.4 Substation**

A new 10 MVA substation is required to upgrade the existing 10 MVA substation to provide adequate power for the mine moving to full production. The new substation would be in a compound 12 metres by 25 metres and located adjacent to the existing substation. A small area of vegetation would require removal to maintain a bushfire asset protection zone. Construction of the substation is expected to take six months and would be carried out in consultation with EnergyAustralia. The existing substation is shown in *Photograph 3*.

#### **2.2.5 Nitrogen Inertisation Plant**

The existing nitrogen inertisation plant has a capacity of 70 cubic metres per hour (m<sup>3</sup>/hr) and was installed to stabilise the atmosphere in the SL2 to SL4 goaf area which was the site of the fire in 2003.

The new nitrogen plant would have a capacity of 2000 m<sup>3</sup>/hr to protect the mine development against the risk posed by spontaneous combustion. This plant forms an important safety component of the ongoing spontaneous combustion control strategy. Construction is expected to take six months and the plant would look similar (although larger) to the existing nitrogen plant shown in *Photograph 4*.

#### **2.2.6 Water Treatment Plant**

The mine currently has approval for the existing reverse osmosis water treatment plant that produces 40 % freshwater and 60 % saline water from surplus mine water. The freshwater is used in the underground operations and washery as process water and the saline water is pumped underground into disused workings. An Environment Protection Licence (EPL No.416) permits the discharge of up to 2000 kilolitres per day (kL/day) into Bellbird Creek from the water treatment plant.



**Photograph 3**  
Existing Substation.



**Photograph 4**  
Existing nitrogen inertisation plant.

The mine is working with the Department of Environment and Conservation to optimise water management and treatment. Studies are currently underway to significantly upgrade the water treatment plant to a more efficient process. The capacity and the percentage of freshwater to brine are key parameters for the study. A new duplicate plant is required to double the current mine water treatment capacity of the system. The new plant would be located beside the existing plant and housed in modular shipping containers similar to the existing plant shown in *Photograph 5*.

It is planned to reuse the freshwater as process water in and around the mine site, significantly reducing the potable water demand for the site. Water balance studies indicate that there would be no need to increase the discharge limit of clean water into Bellbird Creek, therefore the EPL does not require modification.

### **2.2.7 Diesel and Emulsion Storage and Dispatch**

Two solcenic tanks and one diesel tank of approximately 45 000 litres capacity each would be located and banded in a clearing near boreholes that access the underground workings in the vicinity of the junction of the NW and Bellbird Mains. The solcenic and diesel would be pumped underground via the service boreholes. Bund construction would comply with the requirements of Australian Standard AS 1940B1993: The Storage and Handling of Flammable and Combustible Liquids. Diesel is classified as a Class 3, C1 Flammable Liquid and Solcenic Oil is classified as a Class 3, C2 Flammable Liquid. A Preliminary Hazard Assessment under State Environmental Planning Policy No. 33 – Hazard and Offensive Development (SEPP 33) is not required as the diesel and solcenic oil tanks would be in separate bands with no other flammable liquids present. The approximate location of the storage tanks is shown in *Photograph 6*.

### **2.2.8 Tube Bundle Shed**

This shed houses the electronic monitoring equipment for the various sensors established throughout the mine. The gas composition of the mine atmosphere is also analysed here.

### **2.2.9 Water Reticulation and Pumping Upgrade**

The old Ellalong Colliery workings (Longwalls 1 to 9a) within the Austar mine are used as the main underground water storage reservoir for the mine. A large borehole pump operating at the No.2 shaft site pumps water to the surface and then overland via a 200 mm diameter poly pipeline back to Pelton Washery. This current system as approved in the 1996 consent and detailed in the EIS (HLA Envirosciences, 1996) has the capacity to pump up to 2.9 ML/day at 8 Bar pressure. This is currently the only method of dewatering the underground workings.





**Photograph 5**

Existing Water treatment Plant - duplicate plant would be of similar appearance.



**Photograph 6**

Location of proposed storage tanks & downcast shaft.

The future total underground pumping requirements for the mine have been estimated at up to 8 ML/day. It is proposed to treat all of the water then re-use the freshwater component for mine operation processes, with the brine pumped into disused workings. To facilitate the additional pumpout capacity requirements the following upgrades are proposed to the water reticulation system.

### 2.2.10 *Mine Water Balance*

As mining extracts larger areas, the pumping load increases. At Austar Coalmine, this is accentuated due to the Longwall's A1 and A2 mining close to the disused and flooded mine workings of Aberdare Central, Kalingo and Bellbird Collieries. A study conducted by the CSIRO has indicated that water ingress due to mining A1 and A2 panels will increase the water inflow by around 1.4 ML/day.

As mentioned in *Section 2.2.6*, the brine from the water treatment plant is returned to the disused workings at Pelton and ultimately reports back to workings within Austar, adding to the load. This results in an increase in the rate of recirculation around the closed loop at the mine, requiring more water to be pumped from underground and more water to be treated on the surface.

To counter this increasing effect, it is proposed to re-use the permeate (fresh water) output from the water treatment plant for all mine operation processes both underground and on the surface inclusive of the coal handling and preparation plant. The aim is to have no reliance on the potable fresh water town supply, reducing the load in the water balance by approximately 2 M litres. Other areas under study that significantly impact the water balance include the efficiency of the water treatment plant (percentage of brine produced that is added to the recirculated loop) and the dewatering of tailings (which also reports back into the closed circuit and increases the pumpout loads).

The future total underground pumping requirements for the mine have been estimated at up to 8 ML/ day. This includes additional capacity for future stages of the mine development. With success in some of the initiatives described above, the water balance could reduce resulting in the proposed pumping system having redundancy. The current water balance inclusive of the existing water treatment plant and tailings handling process indicates that the water will either be within the recirculation loop, being used as potable water around the mine site and washery or discharged at a volume below 2 ML per day as currently authorised by the EP licence.

To facilitate the additional pumpout capacity requirements the following upgrades are proposed to the water reticulation system.



### *Kalingo Dam Staging Pump*

A staging pump at Kalingo dam would increase capacity of the No.2 shaft pump system from 2.9 ML/day to 3.4 ML/day. The operating pressure would reduce from 8 Bar to approximately 4 Bar giving additional protection against pipes bursting. The approximate location of the pump is shown in *Photograph 7*.

### *A New Underground Pump Station*

A new underground pump station is required to capture and discharge water from the current and future mine workings. Water would be discharged up a service borehole located adjacent to the compressors on Austar pasture improved land. This would increase the pumping capacity of the existing system to 5 ML/day. It is proposed to lay an additional 300 mm diameter pipeline with increased pressure rating beside the existing overland 200 mm diameter pipeline. This would increase the pumping capacity to 8 ML/day and provide redundancy of a spare pipeline.

### *Freshwater Pipeline and Tank*

A new fresh water holding tank with a capacity up to 200 000 litres and 150 mm diameter pipeline is required to provide fire fighting capacity (as required under Clause 116 of the Coal Mines (Underground) Regulation 1999) and supply fresh water to the surface infrastructure for mine operations. The tank would be located in the vicinity of the other new surface works in the cleared pasture improved area. The pipeline would be buried in the same trench as the mine water pipelines. This trench lies beside existing access roads. No vegetation clearing would be required.

## **2.3 OTHER ACTIVITIES**

Other minor works are required to maintain existing infrastructure that already have approval under the 1996 consent. These activities are described below.

### **2.3.1 Kalingo Dam**

Minor embankment stabilisation works are required to ensure the integrity of the dam wall. This would involve the clearing of a small stand of vegetation near the embankment, however all mature trees would be retained. A bulldozer and excavator would then proceed to reinforce the dam wall. The potential impacts of this work are discussed in more detail in the Flora and Fauna Assessment in *Annex C*. This work is expected to take approximately two weeks.



**Photograph 7**

Location of proposed Kalingo Dam staging pump.



**Photograph 8**

View towards Austar mine from Mountview Road.



**Photograph 9**

Motorists view from Wollombi Road towards pollution control ponds in Pelton Washery.

## Photographs

Austar Coal Mine - Paxton, NSW

### 2.3.2 *Asset Protection Zone*

A clearing 20 metres wide would be required to be maintained around the perimeter of the ventilation compound to provide a fire asset protection zone. Much of this area is already disturbed or cleared; however an area of woodland approximately eight metres wide would need to be underscrubbed. All mature spotted gums, ironbarks and red gums in this 20 metre cleared area would be retained.

## 2.4 *RESOURCE ASSESSMENT*

The coal resources in Stage One are in the Greta seam, part of the Greta Coal Measures. The seam is approximately 6.5 metres thick and dips to the south-east at three to six degrees. The Greta seam contains only minor non-coal bands, while the seam floor is usually sandstone and mudstone, and the seam roof is usually coarse pebbly sandstone and conglomerate. The upper levels of the Greta seam commonly contain high levels of pyrite. Overburden depth ranges from 350 metres in the west to a maximum of 530 metres.

The 1996 consent allows for the removal of a seam thickness of up to 4.5 metres, however the introduction of LTCC technology would allow up to the full thickness of the Greta seam (ie 6.5 metres) to be extracted. *Table 2.2* provides a comparison between the coal resource and recovery rates of the approved Bellbird South Extension and the proposed modified mining.

*Table 2.2 Resource and Recovery Rate Comparison*

| <b>Approved under 1996 consent - Bellbird South Extension</b> |                        |                  |                      |                       |
|---------------------------------------------------------------|------------------------|------------------|----------------------|-----------------------|
| In-situ resource<br>(Mt)                                      | Total ROM coal<br>(Mt) | % recovery       | Product Coal<br>(Mt) | Final Recovery<br>(%) |
| 5.929                                                         | 2.583                  | 44               | 2.38                 | 40                    |
|                                                               |                        | <b>Stage One</b> |                      |                       |
| 5.929                                                         | 3.750                  | 63               | 3.38                 | 57                    |

Source: Austar Coal Mine

The coal is classified as a high volatile low ash bituminous coal, with high specific energy, high fluidity and medium to high sulphur content, making it suitable for export as a coking coal.

## 2.5 *BENEFITS FROM MODIFICATION*

There are a number of benefits that arise from mining longwall panels A1 and A2 using the LTCC system. These benefits are discussed below. Socio-economic benefits of the proposed modifications are discussed in *Section 4.10*.

### 2.5.1 *Longwall Systems*

The LTCC system has several major advantages over standard longwall machinery for extracting thick coal seams. Up to 23 % of the coal reserves along the Eastern States of Australia have been identified as suitable for extraction by the LTCC method.

Standard longwall machinery is capable of mining up to a 4.5 metres seam thickness that result, in the case of thick seams such as the Greta seam, in a significant portion of coal being sterilised. The LTCC system can extract up to 80 % of the additional seam section that would otherwise be sterilised and lost in seams ranging five to 12 metres thick.

The system has proven to provide safety advantages to thick single slice operations in the areas of face stability and control of operation as well as spontaneous combustion management. The use of the new technology in the Greta seam for Longwalls A1 and A2 represents an opportunity to implement a new mining technique that potentially has widespread application to other coal mines in Australia.

### 2.5.2 *Longwall Locations*

Investigations during the planning of the Bellbird South Extension determined the optimum longwall layout in the Stage One area. The eastern extent of the longwalls was determined by the presence of fault zones. Lying to the north and north west are extensive abandoned mine workings. The only changes in the design of longwalls A1 and A2 (compared to SL5 and SL6) are small changes in the panel width to provide a safety barrier to the abandoned SL4. Retaining the approved longwall orientation would maximise resource recovery and fully utilise existing infrastructure and development works.

### 2.5.3 *Infrastructure*

Various locations for infrastructure were considered during the planning of Stage One to determine the optimum location from an operational efficiency and environmental impact perspective. In each case, the final locations selected are adjacent to, or very close to, existing infrastructure, in clearings and remote from neighbours. The ventilation shaft is the only infrastructure that could have residential amenity impacts, however modelling has shown that noise levels are below acceptable criteria at the nearest receptor.

## 2.6 CONSULTATION PROCESS

### 2.6.1 Overview

A consultation strategy was developed as part of the SoEE process to assist in the identification of key issues for consideration by Austar and the SoEE project team. Consultation with government bodies and key stakeholders was incorporated into the strategy to both inform the stakeholders of the project and to allow any issues of concern to be raised at an early stage in the planning process.

The key stakeholders identified as part of the Stakeholder Consultation Strategy and the communications methods used to consult with each group are summarised in *Table 2.3*.

**Table 2.3 Consultation Summary**

| <b>Stakeholder</b>                                                                                | <b>Communication Method</b>                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Near neighbours                                                                                   | Personal visits and presentation<br>Telephone calls                                                                                                                                                            |
| Cessnock Council                                                                                  | Project presentation to Mayor<br>Briefings for Councillors and staff                                                                                                                                           |
| Department of Planning                                                                            | Project presentations<br>Site visit<br>Formal correspondence regarding<br>Development Consent                                                                                                                  |
| State Members                                                                                     | Personal briefings including site visit                                                                                                                                                                        |
| Department of Primary Industries (Minerals) -<br>Safety                                           | Personal briefings including site visit<br>Visit to mines in Shandong Province in China<br>to view the LTCC technique<br>Scoping session for the introduction of the<br>LTCC technique                         |
| Department of Primary Industries (Minerals)<br>- Resource Recovery, Subsidence and<br>Environment | Personal briefing for Principal Subsidence<br>Engineer<br>Briefing paper to Environment branch<br>Co-ordinated project presentation to technical<br>officers of subsidence and environment                     |
| Department of Primary Industries (Forestry)                                                       | Personal phone discussions<br>Issue of a briefing paper<br>Workshop proposed for May 2006 covering<br>public safety, rehabilitation, monitoring and<br>management of mine subsidence areas in State<br>Forests |
| Department of Environment and<br>Conservation                                                     | Personal phone discussions<br>Issue of a briefing paper<br>Formal reply received                                                                                                                               |
| CFMEU members                                                                                     | Visit to mines in Shandong Province in China<br>to view the LTCC technique<br>Scoping session for the introduction of the<br>LTCC technique                                                                    |

Source: Austar Coal Mine Pty Ltd and Coakes Consulting



## 2.6.2

### *Community Consultation*

Coakes Consulting are undertaking community consultation, informing local residents of the change in ownership of the mine and the intention to recommence longwall mining.

Information sessions are being held at local schools, informing students of the increase in train movements and the risks of being close to the rail line.

Local motorists are being notified of an increase in rail movements by the erection of prominent road signs near level rail crossings. Local newspaper advertisements and radio announcements have informed the local community of the impending resumption of train movements.

Consultation with the community during the impact assessment process and initial stages of the recommencement of mining will be ongoing. Local residents will be kept informed of mine operations through personal visits, phone calls and newsletters. A complaints line operates 24 hours per day, seven days a week. The time and date of complaints, the complainant and who took the call are recorded along with the nature of the complaint and the action taken.

## 2.6.3

### *Government Consultation*

The Department of Planning have been consulted regarding the proposed modifications for Stage One and this correspondence is provided in *Annex A*.

Presentations have been made to eight of the Department of Primary Industries officers most relevant to the operations at Austar Coalmine.

Discussions and briefing papers have been delivered to the Department of Environment and Conservation and Forestry.

Presentations have been made to Local Council and State members.

### 3.1 INTRODUCTION

This chapter considers the legal framework within which the application is made and in which it will be considered by the Minister for Planning.

### 3.2 MODIFICATION UNDER SECTION 96 (2)

Section 96(2) of the EP&A Act empowers the consent authority to modify a consent under certain conditions as follows:

#### (2) Other Modifications

*A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:*

*(a) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all), and*

*(b) it has consulted with the relevant Minister, public authority or approval body (within the meaning of Division 5) in respect of a condition imposed as a requirement of a concurrence to the consent or in accordance with the general terms of an approval proposed to be granted by the approval body and that Minister, authority or body has not, within 21 days after being consulted, objected to the modification of that consent, and*

*(c) it has notified the application in accordance with:*

*(i) the regulations, if the regulations so require, or*

*(ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and*

*(d) it has considered any submissions made concerning the proposed modification within the period prescribed by the regulations or provided by the development control plan, as the case may be.*

### 3.3

#### *SUBSTANTIALLY THE SAME DEVELOPMENT*

The Minister has the power to modify consent DA29/95 provided he “*is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified*”

Advice from the Department of Planning (DoP) (by letter dated 2 December, 2005 in *Annex A*) indicated that the proposed modification of Stage One can be considered by the Minister for Planning under s96(2) of the EP&A Act as modifications to the existing Bellbird South Extension consent. The DoP letter raised a number of issues that needed to be specifically addressed in the SoEE as shown in *Table 3.1*.

**Table 3.1** *Issues to be Addressed*

| Issue                                                                                                              | Addressed in SoEE       |
|--------------------------------------------------------------------------------------------------------------------|-------------------------|
| Description of the proposal including:                                                                             |                         |
| Alterations and additions                                                                                          | Through-out SoEE        |
| Coal resource                                                                                                      | Section 2.4             |
| Existing and proposed site                                                                                         | Through-out SoEE        |
| Existing and proposed works including rehabilitation                                                               | Section 2.2 and 5.1     |
| Existing and proposed intensity of operations                                                                      | Section 1.2 and 2.2     |
| Proposed management responsibilities                                                                               | Chapter 5               |
| Inter-relationships - proposed and existing operation                                                              | Through-out SoEE        |
| Describe the benefits (operational, social and economic)                                                           | Section 2.5.1 and 4.10  |
| Demonstrate proposed modifications are substantially the same development for which consent was originally granted | Section 3.3 and Annex A |
| Statutory requirements                                                                                             | Chapter 3               |
| Subsidence impacts as a result of using the LTCC method                                                            | Chapter 4.1             |
| Flora and fauna, in particular, potential impacts on the Lower Hunter Spotted Gum - Ironbark Forest                | Annex C                 |
| Environmental monitoring and management                                                                            | Chapter 5               |
| Noise                                                                                                              | Section 4.4             |
| Air quality                                                                                                        | Section 4.5             |
| Surface and groundwater                                                                                            | Annex E                 |
| European and Aboriginal heritage                                                                                   | Section 4.6             |
| Visual amenity                                                                                                     | Section 4.8             |
| Consultation                                                                                                       | Section 2.6.2           |
| Source: Department of Planning letter dated 22.12.06.                                                              |                         |

This SoEE demonstrates that the proposed Stage One of the mine as proposed to be modified would be substantially the same development as was originally approved under the 1996 consent.

Longwalls A1 and A2 are in the same location as the approved longwalls SL5 and SL6 and there would be no increase above the approved extraction rate of 3 mtpa ROM.

The proposed infrastructure works necessary to allow the mine to gradually reach full production capacity as approved in the 1996 consent do not

materially change the infrastructure as approved in the 1996 consent. Coal treatment reject management, water management, staffing and coal transport will continue generally as approved in the 1996 consent.

A comparison of the proposed Stage One modifications with the 1996 consent is provided in the Section 96 checklist in *Annex A*.

### 3.4 **CONDITIONS REQUIRING MODIFICATION**

While the Minister would decide whether to grant approval and if so the terms of any such approval, the applicant seeks the following modification to the 1996 consent (DA29/95).

Existing condition:

#### **SCHEDULE 2**

##### General

*I. The development is to be carried out generally in accordance with the development application (DA29/95) and the accompanying Environmental Impact Statement prepared by HLA Envirosciences Pty Limited dated August, 1995 certified by Jane Gouldstone, as may be modified by the conditions set out herein.*

This condition is sought to be modified to reference this SoEE as follows:

*I. The development is to be carried out generally in accordance with the development application (DA29/95) and the accompanying Environmental Impact Statement prepared by HLA Envirosciences Pty Limited dated August, 1995 certified by Jane Gouldstone, and as amended by the **Statement of Environmental Effects dated April 2006 prepared by Environmental Resources Management (ERM)** as may be modified by the conditions set out herein.*

### 3.5 **PLANNING AND REGULATORY FRAMEWORK**

As specified in Section 96(3) of the EP&A Act in determining an application for such a modification, the consent authority must take into consideration matters referred to in section 79C(1) of the EP&A Act which are relevant to the modification. These matters are as follows:

*'(a) the provisions of:*

*(i) any environmental planning instrument, and*



- (ii) *any draft environmental planning instrument that is or has been placed on public exhibition and details of which have been notified to the consent authority, and*
- (iii) *any development control plan, and*
- (iv) *the regulations (to the extent that they prescribe matters for the purposes of this paragraph),*  
*that apply to the land to which the development application relates,*
- (b) *the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,*
  - (c) *the suitability of the site for the development,*
  - (d) *any submissions made in accordance with this Act or the regulations, and*
  - (e) *the public interest.'*

Relevant planning instruments, development control plans and policies related to the proposed modification are addressed in this chapter. The likely environmental, social and economic impacts of the proposed modification are addressed in *Chapter 4*.

## **3.6 REGIONAL PLANNING**

### **3.6.1 Hunter Regional Environmental Plan 1989**

The Hunter Regional Environmental Plan 1989 (HREP) aims to promote the balanced development of the Hunter Region, to encourage orderly and economic development and to bring about optimum use of land and other resources consistent with conservation of natural features and the needs and aspirations of the community.

Part 6, Division 1 of the HREP specifically addresses objectives concerning extractive materials. The policies in Clause 41 of the HREP for control of mineral resources and extractive industry developments are reproduced below in italics. Each policy is followed by a comment on how Austar mine addresses these issues.

- (1) *Consent authorities, in considering proposals for mining or extraction (including dredging):*
  - (a) *should consider the conservation value of the land concerned and apply conditions which are relevant to the appropriate post-mining or*

*extraction land use.* The conservation value and existing land use (woodland and State Forest) of the land would remain unchanged;

- (b) *should, in respect of extraction from river banks or channels, ensure that instability and erosion are avoided.* Not applicable to this proposal;
- (c) *should consult with officers of the Department of Mineral Resources, and of the Department of Agriculture, to determine appropriate post-mining or extraction land uses.* Mining longwalls A1 and A2 would not impact on the current land use of woodland and State Forest;
- (d) *should ensure the progressive rehabilitation of mined or extracted areas.* Any minor rehabilitation or remediation works of cracking or eroded areas over longwalls A1 and A2 would be progressively undertaken. A rehabilitation plan for the emplacement areas has been completed and is part of the Mine Operations Plan (MOP);
- (e) *should minimise the likelihood and extent of a final void and the impact of any final void, or facilitate other appropriate options for the use of any final void.* Not applicable as this is an underground mine;
- (f) *should minimise any adverse effect of the proposed development on groundwater and surface water quality and flow characteristics.* Minor impacts on surface flows of the ephemeral creeks are anticipated with no areas of ponding or erosion predicted. Groundwater impacts are expected to be minor and have no adverse effect on nearby bores.
- (g) *should consider any likely impacts on air quality and the acoustical environment.* No additional long term sources of dust are proposed. Some dust emissions from construction works over a period of six to eight weeks may occur, and mitigation measures would be implemented to minimise any emissions. Additional noise from the ventilation fan and nitrogen plant would not exceed amenity criteria at the nearest residence.
- (h) *should be satisfied that an environmentally acceptable mode of transport is available.* Coal would be transported by rail; and
- (i) *should have regard to any relevant Total Catchment Management strategies.* The proposed modifications are compatible with the Hunter Catchment Management Strategy (2002) management targets of:
  - maintaining riparian health - ephemeral streams above longwalls A1 and A2 are not expected to be adversely affected;
  - prevent soil degradation - no proposed activities would impact on soil degradation;

- conserving native vegetation and biodiversity – all mature trees would be retained in the asset protection zone and stand of vegetation near Kalingo dam. Subsidence impacts on mature trees are expected to minimal; and
- prevent increased salinity – all saline water from the mine is treated in the water treatment plant, and the 40% residual brine would be pumped into the disused workings as approved.

### 3.6.2 *Draft Lower Hunter Regional Strategy*

The Draft Lower Hunter Regional Strategy (Department of Planning, 2005) was released on 4 November 2005 and came off public exhibition on 20 January, 2006.

The primary purpose of the Draft Regional Strategy is to ensure that adequate land is available and appropriately located to sustainably accommodate the projected housing, employment and environmental needs of the region's population over the next 25 years. The Draft Regional Strategy plans for an estimated 125 000 new residents (which is a 25 % increase in population) and 50 000 more jobs over this period. Key initiatives include ensuring additional employment lands are available, promoting growth in specified major regional centres and planning for 95 000 new dwellings (approximately 45 000 of these in existing zoned areas and the remainder in new release areas).

The site is not identified in the Draft Regional Strategy as a new release area, future investigation area or being within an existing urban area. The Draft Natural Resources Map 4 shows the area as a Native Vegetation Mine Subsidence Area.

## 4 IMPACT ASSESSMENT

### 4.1 INTRODUCTION

This chapter addresses the likely impacts of the proposed modifications and where appropriate, management and mitigation measures are outlined and discussed in greater detail in *Chapter 5*.

### 4.2 SUBSIDENCE IMPACTS

#### 4.2.1 Introduction

A subsidence impact assessment was conducted for the Bellbird South Extension (G.E Holt and Associates, Appendix 10, in EIS, HLA Envirosciences, 1995) on longwall panels LW23 and LW24 which corresponds to the area of the proposed longwall panels A1 and A2 for Stage One of the mine. A more recent subsidence investigation has been conducted for longwall panels A1 and A2 as proposed to be modified (SCT, 2006) and information from both of these reports is summarised below. The full subsidence report for Stage One (SCT, 2006) is provided in *Annex D*.

#### 4.2.2 Mining Layout

Modelling subsidence impacts in the Bellbird South Extension (G.E Holt, 1995) considered standard longwall mining in eight panels (LW15 to LW22) in the former Ellalong Workings south of Stage One mine and another six panels (LW23 to LW28) to the north. Of these six panels, LW26, 27 and 28 have since been mined as part of the Bellbird South Extension, LW25 was the site of the spontaneous combustion and LW24 and LW23 approximately corresponds to longwalls A1 and A2 respectively. A mining height of 3.4 m to 4.5 m was assumed which was a greater height than had been previously mined at Bellbird. Other parameters include a panel width of 255 m and overburden depth ranged from 420 m to 550 m.

The SCT (2005) report considers subsidence impacts that may result from LTCC mining longwalls A1 and A2. Parameters used in this consideration include panel widths of 158 m (A1) and 227 m (A2) and mining a maximum seam height of 6.5 m.



### 4.2.3 *Surface Features*

Surface features are predominantly bushland with the ridgeline of Broken Back Range accounting for the large variation in depth of cover in the area of interest. Various four-wheel drive tracks including Pelton Road, Sand Pit Road and other minor link roads traverse the area.

The terrain of the area is hilly and not occupied with minimal improvements and no dwellings or other buildings. There are several unnamed ephemeral first and second order channels, which flow into Black Creek north of Broken Back Ridge, or flow into Congewai Creek south of the ridge. Mt Howard trig station is on the chain pillar between longwalls SL3 and SL4.

As such the area is not susceptible to significant consequences from subsidence.

### 4.2.4 *Subsidence Predictions*

Subsidence impact predictions for the currently approved Bellbird South Extension for 4.5 m face longwalls LW23 to 28 were maximum subsidence of 1.58 m, tensile strain of 1.15 mm/m, compressive strain of 1.72 mm/m and tilt of 5.15 mm/m (G.E Holt, 1995).

STC in its report (*Annex D*) considers the potential for subsidence from 6.5 m face extraction. It is recognized that proposed LTCC extraction heights exceed the face heights for longwall extraction experienced previously in Australia.

In seeking to predict the subsidence effects of the proposed LTCC mining SCT has considered the two commonly used methods of prediction being:

- an empirical prediction incorporating some engineering judgement; and
- computational numerical modelling using FLAC 2 dimensional simulation.

The empirical approach indicates subsidence in the order of 1.1 m to 1.6 m, which is generally consistent with those assessed by Holt and HLA Envirosciences in the 1995 EIS.

The computational modelling indicates that subsidence could range between 2 m and 3 m. The accuracy of a numerical model is traditionally validated or cross referenced to known subsidence results in the geology conditions. Calibration of the numerical model in this instance has only been possible against subsidence generated by the extraction of approximately 3.5 m (previous subsidence monitoring at Ellalong Colliery).

STC further reports that apart from the empirical and numerical predictive methods it can confidently be predicted that subsidence from 6.5 m in LTCC extraction will not exceed 65 % of the height of the seam extracted or, in this case, 3.9 to 4.2 m.

Whilst there is confidence that subsidence from the proposed LTCC mining with a 6.5 m face will result in subsidence nearer that indicated by the empirical modelling approach (1.1 m to 1.6 m) or the numerical modelling approach (2 m to 3 m) the lack of experience with this level of extraction in Australian conditions has lead to a decision to assume subsidence at the maximum possible (3.9 m to 4.2 m) for the purpose of environmental assessment of the proposed modification.

The modelling results are shown in *Table 4.1*.

**Table 4.1**      ***Subsidence Parameters***

| <b>Subsidence Predictions</b>   | <b>empirical</b> |           | <b>numerical</b> |       | <b>absolute maximum</b> |           |
|---------------------------------|------------------|-----------|------------------|-------|-------------------------|-----------|
| At completion of longwall panel | A1               | A1+A2     | A1               | A1+A2 | A1                      | A1+A2     |
| Max. subsidence (m)             | 0.1              | 1.1 - 1.6 | 0.2              | 2 - 3 | 0.2                     | 3.9 - 4.2 |
| Max. tensile strain (mm/m)      | 0.1              | 2         | 0.1              | 4     | 0.1                     | 5         |
| Max. compressive strain (mm/m)  | 0.2              | 4         | 0.2              | 7     | 0.2                     | 10        |
| Max. tilt (mm/m)                | 0.8              | 11        | 0.8              | 21    | 0.8                     | 30        |

Source: Subsidence Assessment for Austar Coal Mine – Longwalls A1 – A2. SCT, 2006 in *Annex D*.

#### **4.2.5**      ***Subsidence Impacts***

The prediction of impacts on surface features for the possible Bellbird South Extension in the area of SL6 (LW23) and SL5 (LW24) were generally low due to the depth of cover and mine layout. Due to the topography and vegetation cover, subsidence was unlikely to have any visible effect. On steeper slopes some ground creep may have occurred and the likelihood of surface cracking was low.

This has been compared to the maximum possible subsidence outcomes that could result from extracting up to 6.5 m in longwalls A1 and A2. This level of subsidence at 4.2 m is not considered likely but, as discussed, has been adopted for the purposes of this environmental assessment as maximum subsidence against which the relative impacts can be assessed.

Subsidence at this level has been assessed in the following way.

- impact upon landforms, land surface use and improvements by SCT (detail provided in *Annex D*);
- impact upon the surface water and groundwater systems both locally and regionally by Geoterra (detail provided in *Annex E*); and
- Impact upon flora and fauna by ERM (detail provided in *Annex C*).

### *Impact upon Landforms, Land Surface Use and Improvements*

Subsidence is expected to develop, for the most part, slowly and incrementally as mining proceeds. It is likely that some vibrations and rock breaking sounds will be perceptible on the surface as rock fracturing occurs. However there is no potential for craters or subsidence holes to suddenly develop.

It is possible, but unlikely, that step changes in surface subsidence may occur adjacent to geological structures, but no significant geological structures have so far been identified in the area of Longwalls A1 and A2. That outcome would also be possible by mining up to 4.5 m thickness allowable under the current consent.

The trig station on Mt Howard is likely to be affected by subsidence when longwall A2 is mined by movements in the range of a few centimetres, most likely in a horizontal direction to the north-west. This trig station has already been impacted by the mining of SL2. Re-survey of the Mt Howard trig station is likely to be required. The Department of Lands have been notified of this potential and of the timing of the proposed mining.

There may be some tensile cracking apparent on extensive bare surfaces such as access tracks. Such cracking is likely to be concentrated near the top of steep slopes but is not expected to substantially alter the character of the tracks recognising that they are bush tracks and suitable only for four-wheel drive vehicles and other recreational vehicles. Warning signs notifying that the area is subject to mining subsidence movements will be erected in the area. Maximum crack widths of 90 mm have been estimated for the area.

There are no dwellings, buildings, fences, dams, farming or other improvements or other active land uses of the area affected by Stage One.

It is likely that subsidence of 4.2 m, subsidence impacts would remain essentially imperceptible for most practical purposes.

### *Impact Upon Surface Water and Groundwater Systems*

The Geoterra report (*Annex E*) shows that the surface water and groundwater will not be materially affected by subsidence of 4.2 m if the maximum level of subsidence was to occur. The related assessments were made for the maximum anticipated subsidence of 3.9 m to 4.2 m, as outlined below.

#### *Streams*

It is not anticipated that the geomorphology, stream flows or stream water quality of the low order creeks over the panels will be adversely affected by subsidence.

### *Dams*

No dams are located over the potential 20 mm subsidence zone

### *Groundwater*

The following predictions are sourced from Geoterra (2006).

No registered groundwater extraction bores are located in the subsidence zone, and therefore, any temporary depletion of groundwater levels that may occur through subsidence will not be significant.

The nearby area contains three low yielding (<1L/sec), high salinity coal measures aquifers and one shallow alluvial bore of 9.1m deep in the Quorrobolong Creek

No known significant groundwater dependent ecosystems are present in the study area.

Groundwater is not extracted from alluvial or coal measures aquifers in the proposed subsidence area.

It is not anticipated that the ecological, environmental or agricultural/domestic receptors in the area will be adversely affected.

### *Impact upon Flora and Fauna*

The full ecological assessment is provided in *Annex C*. The site contains three vegetation communities being, lower Hunter spotted gum-ironbark forest, Hunter lowlands redgum forest and mainly cleared. The site has been subjected to considerable past disturbance, such as logging for mine supports, grazing and a relatively high frequency of fires.

Lower Hunter spotted gum-ironbark forest and Hunter lowlands redgum forest have been identified as endangered ecological communities. The lower Hunter spotted gum-ironbark forest was recorded overlying the proposed longwall panels A1 and A2. This community also dominates the surrounding ridges and slopes. On the lower slopes the spotted gum-ironbark forest mixes with the Hunter lowlands redgum forest, which occurs adjacent to the proposed infrastructure sites. The redgum forest is also consistent with the central Hunter riparian forest as described by House (2003). This community has been assessed as the endangered ecological community and is concluded that A1 and A2 will not impact upon these vegetation communities.

No threatened flora species were recorded on site during the recent survey. *Macrozamia flexuosa* and *Grevillea montana* were recorded within the spotted gum-ironbark vegetation community and are recognised as being rare in accordance with the Briggs and Leigh criteria. These species were recorded within the subsidence impact zone and will not be impacted by the proposed modification.



No threatened fauna species were recorded within the site although potential habitat is available for 19 threatened fauna species considered likely to utilise the site and surrounding habitats. Although none were located in the area of longwall panels A1 and A2, should any be present, they would be unlikely to be significantly impacted directly by the proposed longwall mining operations or indirectly through significant alteration to the habitat resources on the site and surrounding lands.

#### 4.2.6 *Subsidence Conclusions*

The conclusion is that subsidence impacts as a result of mining up to 6.5 m thickness with an assessed maximum possible level of 4.2 m in the area will be of relatively minor significance to the environment.

The experience of Stage One will advance the understanding of the subsidence effects of thick seam extraction in the Australian environment and at the Austar Mine and will lead to an ability for accurate determination of predictions.

#### 4.2.7 *Subsidence Monitoring*

Austar already has approval from the Department of Primary Industries under section 138 of the Coal Mines Regulation 1988 for second workings for Stage 1 for 3.5 m to 4.5 m face. An application has been made to modify this approval to allow 6.5 m extraction. The approval anticipated will impose specific and extensive controls on the proposed workings including the monitoring of subsidence. The general principles are outlined below:

- two subsidence monitoring lines would be established at convenient locations across the central part of longwalls A1 and A2 with peg spacings at 20 to 25 metres (ie perpendicular to the longwalls). These lines would be surveyed in three dimensions with two remote locations at either ends of the line surveyed for reference;
- a longitudinal subsidence line with pegs at 20 m centres would be placed centrally over the combined areas of longwalls A1 and A2. Pegs would be kept some distance from access tracks to prevent loss or damage of the pegs. This line would measure the development of the combined subsidence of longwalls A1 and A2 and would be measured in three dimensions;
- two surface extensometers would measure the height of caving above a 6.5 m mining section, and confirm the compressibility characteristics of the chain pillar; and
- an initial survey would be conducted prior to commencement of mining to provide baseline information. Subsequent surveys would be conducted at the completion of each longwall panel.

This monitoring program would provide useful data for future subsidence predictions at the mine.

A Public Safety Management Plan would be prepared for the portion of the longwalls within Aberdare State Forest. This plan will be required as a standard condition of the granting of the s138 approval and would involve regular visual inspections and signage along access tracks and steep slopes. This indicative subsidence monitoring and management program has already been discussed with the Principal Subsidence Engineer.

### 4.3 *SURFACE AND GROUNDWATER MANAGEMENT*

An assessment of subsidence impacts from mining longwalls A1 and A2 on surface water and groundwater by Geoterra Pty Ltd (2006) assuming the maximum possible subsidence of 4.2m is provided in *Annex E* and summarised below.

#### 4.3.1 *Surface Water*

Any effects on the surface water regime of the area will be minimal in the context of the assumed subsidence of 4.2m.

Up to second order ephemeral channels are located over longwalls A1 and A2, and were dry at the time of assessment. Consequently, no stream water quality assessment was conducted.

When flowing, stream water quality and flow in these channels should not be adversely affected by extraction of longwalls A1 and A2. If any adverse effects are observed, remediation works would be undertaken to an appropriate standard.

No significant erosion or bedload sediment transport has been observed in the gullies over Panels A1 and A2 due to the stabilising effect of woodland and riparian vegetation. It is anticipated that no significant additional erosion of the stream bed or banks would occur and that no significant additional quantity of sediment would be mobilised due to mining A1 and A2. If adverse effects due to subsidence are observed, the gullies would be rehabilitated to an appropriate standard.

The creek catchments comprise hilly woodlands within the Aberdare State Forest, Crown land and Austar land, traversed by four wheel drive tracks. It is not anticipated that vegetation or existing land uses would be adversely affected by the assumed subsidence, however the safety and serviceability of the tracks would be monitored and rehabilitated if adverse cracking occurs.

The mining depth of 350 to 460 metres is anticipated to be sufficient to avoid surface water entering the mine through connection of surface cracks to the goaf. As a result, no loss of stream flow is anticipated.

Significant redistribution of surface flow to shallow groundwater or generation of new stream paths is not anticipated. No areas of ponding are anticipated and there are no dams within the 20 mm subsidence zone.

#### 4.3.2 *Groundwater*

There will be no material effects on the groundwater of the area with the assumed level of subsidence.

The area contains four low yielding (<1 litres per second) bores within alluvial sediments and basement of up to 55 m deep, although none are within the 20 mm subsidence zone and therefore any temporary depletion of groundwater levels that may occur through subsidence would not be significant.

No bore yield or water quality data is available for the alluvial aquifer. The coal measure strata are low yielding (<1 l/sec) and contain saline water (to 14 000 µS/cm) that is not of beneficial use for domestic or agricultural purposes. No known significant groundwater dependent ecosystems are present in the proposed subsidence area. Groundwater is not extracted from alluvial or coal measures aquifers in the proposed subsidence area.

#### 4.4 *NOISE*

##### 4.4.1 *Ambient Noise Environment*

A noise logger was set out approximately 100 m north of the nearest residence to the east of the ventilation fan from Wednesday 4 January 2006 until Thursday 12 January 2006. It was noted upon collecting the noise logger that cicadas affected daytime noise levels.

##### 4.4.2 *Criteria*

The New South Wales Industrial Noise Policy, prepared by the Department of Conservation, details procedures for establishing relevant criteria. Based on measured noise levels, a Rating Background Level (RBL) is established, and an intrusiveness criterion is set at 5 dB(A) above the RBL. Where the RBL is less than 30 dB(A), it is assumed to be equal to 30 dB(A). The RBL for each time period and the corresponding criterion are shown in *Table 4.2* below. In addition to the intrusiveness criterion, there are amenity criteria based on the type and location of the sensitive receptor. For residences in a rural area, the amenity criteria are as stated in *Table 4.2*.

**Table 4.2**      *Noise Criteria*

|                         | Day | Evening | Night |
|-------------------------|-----|---------|-------|
| Rating Background Level | 38  | 39      | 35    |
| Intrusiveness Criteria  | 43  | 44      | 40    |
| Amenity Criteria        | 50  | 45      | 40    |

Notes: 1. All levels in dB(A)

As the proposed fan is to run 24-hours, the lowest of the above criteria is appropriate, and noise impacts will be assessed against a criterion of  $L_{eq}$  40 dB(A).

#### 4.4.3      *Source Noise Levels*

Sound data on the fan was supplied by Fitzpatrick Engineering. The in-duct discharge sound power of the fan was adjusted by the attenuation provided by the discharge silencer to give a radiated sound power level. Acoustic data for the fan and attenuator are shown in *Table 4.3*. Directivity of the discharge noise was included in the model, in line with typical values for exhaust ducts. The assessment also included noise from casing breakout and the fan drive motor.

**Table 4.3**      *Fan Sound Power Data*

|                           | 63Hz | 125Hz | 250Hz | 500Hz | 1kHz | 2kHz | 4kHz | 8kHz | Overall |
|---------------------------|------|-------|-------|-------|------|------|------|------|---------|
| In-duct sound power       | 84   | 95    | 102   | 103   | 105  | 105  | 102  | 95   | 111     |
| Silencer Attenuation      | -4   | -8    | -15   | -28   | -35  | -35  | -21  | -8   | -       |
| Fan discharge sound power | 80   | 87    | 87    | 75    | 70   | 70   | 81   | 87   | 92      |

Notes: 1. All levels in dB(A).

In addition to the fans, noise impacts from the nitrogen inertisation plant and compressor to the south were included. Information from Air Liquide indicated a number of sources for each of two skids comprising the plant. The total sound power of the nitrogen plant is approximately 94 dB(A), less than the sound power from the two fans combined.



#### 4.4.4 *Predicted Impacts*

A model was prepared using SoundPLAN software, version 6.2 based on terrain contours at 2m intervals for the area of interest. Sources were placed at the planned locations for both the existing and proposed new fans (including discharge, casing breakout, and motor for each fan) and nitrogen plant. A receptor was placed at the location of the nearest residence, approximately 630 m to the east. No shielding was included for any structures or buildings in the vicinity of the fans or receiver.

Calculations were carried out within the SoundPLAN program according to the CONCAWE algorithms. Atmospheric stability class 'F' with light winds blowing from source to receiver were set in the model. These conditions represent a "worst case" scenario with stable atmosphere, temperature inversion conditions present. Wind direction was set as "worst case". With this option, the software assumes a downwind condition for all receptor locations (ie wind blowing from source to receiver). This represents an aggregate 'worst case' scenario. With wind blowing from a specific direction, such as an easterly wind, for example, noise levels would be lower at points east of the fans (such as the nearest residence), and would match the predicted level west of the fans.

Using this model, a noise level of 29 dB(A) was predicted at the nearest residence. *Figure 4.1* shows the predicted noise levels as a series of noise contours for the "worst case wind" scenario. The effect of the fan exhaust directivity is clearly evident, with a "lobe" of noise directed to the north-north-west. The nitrogen plant has local impact to the south, but little impact to the east-north-east in the direction of the nearest residence.

As the predicted noise level with both fans running is below the criterion level of 40 dB(A), no noise mitigation is required. It is worth noting that the predicted level is also below the minimum intrusiveness criterion of 35 dB(A) provided for in the Industrial Noise Policy (with an RBL of 30 dB(A)).

## 4.5 *AIR QUALITY*

### 4.5.1 *Climate*

Meteorological data was obtained from the Bureau of Meteorology Station 061242 at Nulkaba near Cessnock and is presented in *Table 4.4*. There is a weather station at the mine, however recent data has been unreliable so it has not been included.

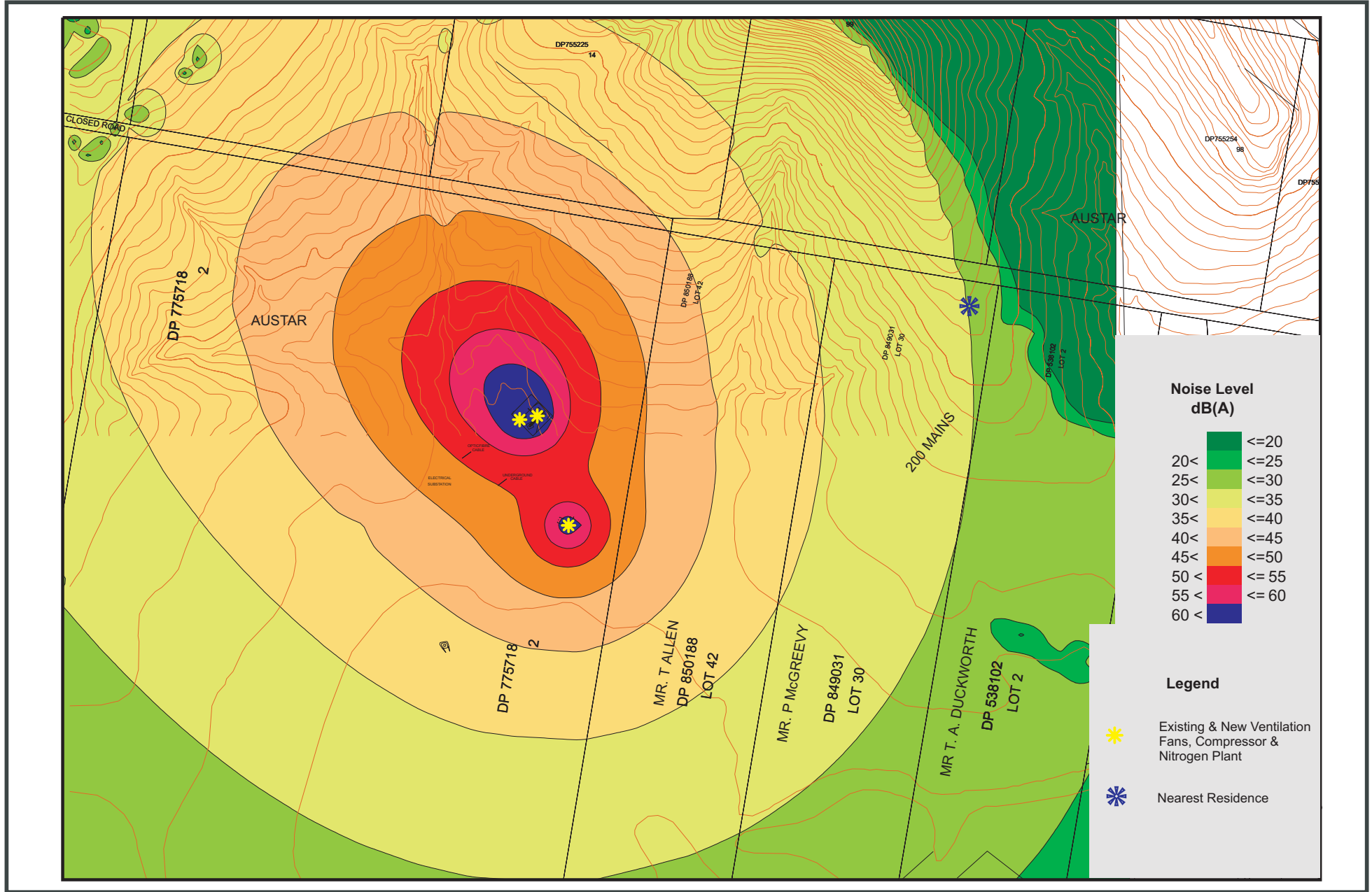


Figure 4.1 Noise Prediction - Worst Case Wind Scenario



**Table 4.4 Climatic Data from Nulkaba (1966-2004)**

| Month          | Temperature (0C) |           | Relative Humidity (%) |      | Rainfall (mm) |                 |
|----------------|------------------|-----------|-----------------------|------|---------------|-----------------|
|                | Mean Max.        | Mean Min. | 9 am                  | 3 pm | Mean          | No. of raindays |
| Jan            | 30.3             | 17.6      | 70                    | 49   | 91            | 11              |
| Feb            | 29.4             | 17.6      | 75                    | 53   | 101           | 10              |
| Mar            | 27.4             | 15.4      | 75                    | 55   | 89            | 11              |
| Apr            | 24.5             | 11.7      | 75                    | 52   | 57            | 9               |
| May            | 20.9             | 8.7       | 80                    | 56   | 56            | 9               |
| Jun            | 17.6             | 5.9       | 81                    | 56   | 49            | 9               |
| Jul            | 19.6             | 4.5       | 79                    | 51   | 33            | 7               |
| Aug            | 19.6             | 4.8       | 71                    | 45   | 38            | 8               |
| Sep            | 22.5             | 7.7       | 63                    | 43   | 40            | 8               |
| Oct            | 25.2             | 10.8      | 60                    | 45   | 59            | 9               |
| Nov            | 27.2             | 13.6      | 65                    | 47   | 69            | 11              |
| Dec            | 29.4             | 16        | 64                    | 46   | 69            | 9               |
| Annual Average | 24.3             | 11.2      | 71                    | 50   | 750.8         | 109             |

Source: Cessnock Bureau of Meteorology Station 061242

There is generally higher evaporation than rainfall at Cessnock, and there have been drought conditions for some years although have eased slightly in the past few months.

Prevailing winds are from the south-east in summer and the north-west in winter for both morning and afternoon. The winds are predominantly less than 20 km/hr but may exceed 30 km/hr in summer and winter.

#### 4.5.2 Air Quality Assessment

An air quality assessment was carried out for the Bellbird South Extension (HLA Envirosciences, 1995) and this information has provided the basis of this assessment as the coal stockpiles (as approved in the 1996 consent) are the only long term source of dust.

The Colliery had a dust monitoring program in place since 1991 with three dust deposition gauges collected and analysed monthly while the mine was fully operational. A high volume air sampler was established in October 1993 at the Pyne residence and monitored total suspended particulates (TSP) over 24 hours every six days. This collection of information ceased since the mine has been on the 'care and maintenance' program.

Static dust gauges were located at Pelton village, the Pyne residence (west of the Pelton Washery) and O'Hearn residence (north-west corner of the Pelton/Ellalong Colliery Holding).

Based on previous dust monitoring results (for the period 1991 to 1994) when the mine was fully operational, long term average depositional dust levels were low, ranging from 0.2 to 2.7 grams per square metre per month (g/m<sup>2</sup>/mth) for all three monitoring sites which is well within the EPA's

criteria of 4.0 g/m<sup>2</sup>/mth. One high reading of 6.4 g/m<sup>2</sup>/mth was recorded at the Pyne residence in October 1992, possibly due to bushfires in the area.

The 24-hour TSP concentrations were between 6 µg/m<sup>3</sup> to 31 µg/m<sup>3</sup>, well below the National Health and Medical Research Council annual average goal of 90 µg/m<sup>3</sup>. The USEPA 24 hour maximum TSP level of 260 µg/m<sup>3</sup> was never exceeded during the monitoring period.

There would be no additional sources of dust associated with Stage One above those already approved in the 1996 consent, apart from possible temporary dust impacts from construction works such as drilling and excavating. These would be of a short term nature and mitigation measures would be taken to minimise any dust emissions.

#### 4.5.3 *Mitigation Measures*

Various mitigation measures were implemented during previous operations of the mine (as approved in the 1996 consent) and they proved to be effective in minimising dust emissions from the site. While these measures have continued to a lesser degree during the 'care and maintenance' and development period, commencement of longwall mining and other works would see these measures fully implemented.

These measures as approved in the 1996 consent include:

- water sprays on both sides of the raw coal conveyor head pulley dampen the stockpile for a 30 m radius from each spray head;
- the washed coal area has a similar system, with sprays having a 30 m radius and delivering water at a rate of 1.2 mm/m<sup>2</sup>/hr over the area. Both these sprays are manually activated when necessary;
- all trafficable areas around the Pelton Washery, workshops and access roads are dampened by a water cart during periods of use;
- during construction works, measures such as surface spraying and minimising traffic movements on unsealed areas would minimise any dust emissions; and
- any disturbed areas in the vicinity of the infrastructure works would be remediated at the conclusion of the works.

#### 4.6.1 *Aboriginal Heritage Review*

##### **Review of Previous Reports**

###### *HLA Envirosiences Pty Ltd (1995)*

The Environmental Impact Statement for the proposed Bellbird South Extension covered the current study area and incorporated the results of an archaeological survey carried out by HLA Envirosiences Pty Ltd (1995) (refer to *Figure 4.2*). The survey was undertaken in December 2004 and March 2005 and involved the examination of the proposed infrastructure sites associated with washery reject replacement and the Cessnock No.1 Colliery. The survey sites were located approximately 2.5 kilometres west of the current study area. Despite relatively high ground surface visibility due to a recent bushfire, the effective visibility was relatively low, between 10 to 20 %. One isolated find was recorded (EL-1) on the western side of Middle Road, approximately four kilometres west of the current study area. HLA (1995) state that '*...this result is typical of other surveys in the area reflecting a combination of low effective coverage and an Aboriginal settlement pattern that may have produced a small number of low density sites away from major streams and wetland area.*'

The topography within the HLA (1995) study area is described as being composed of three main morphological units:

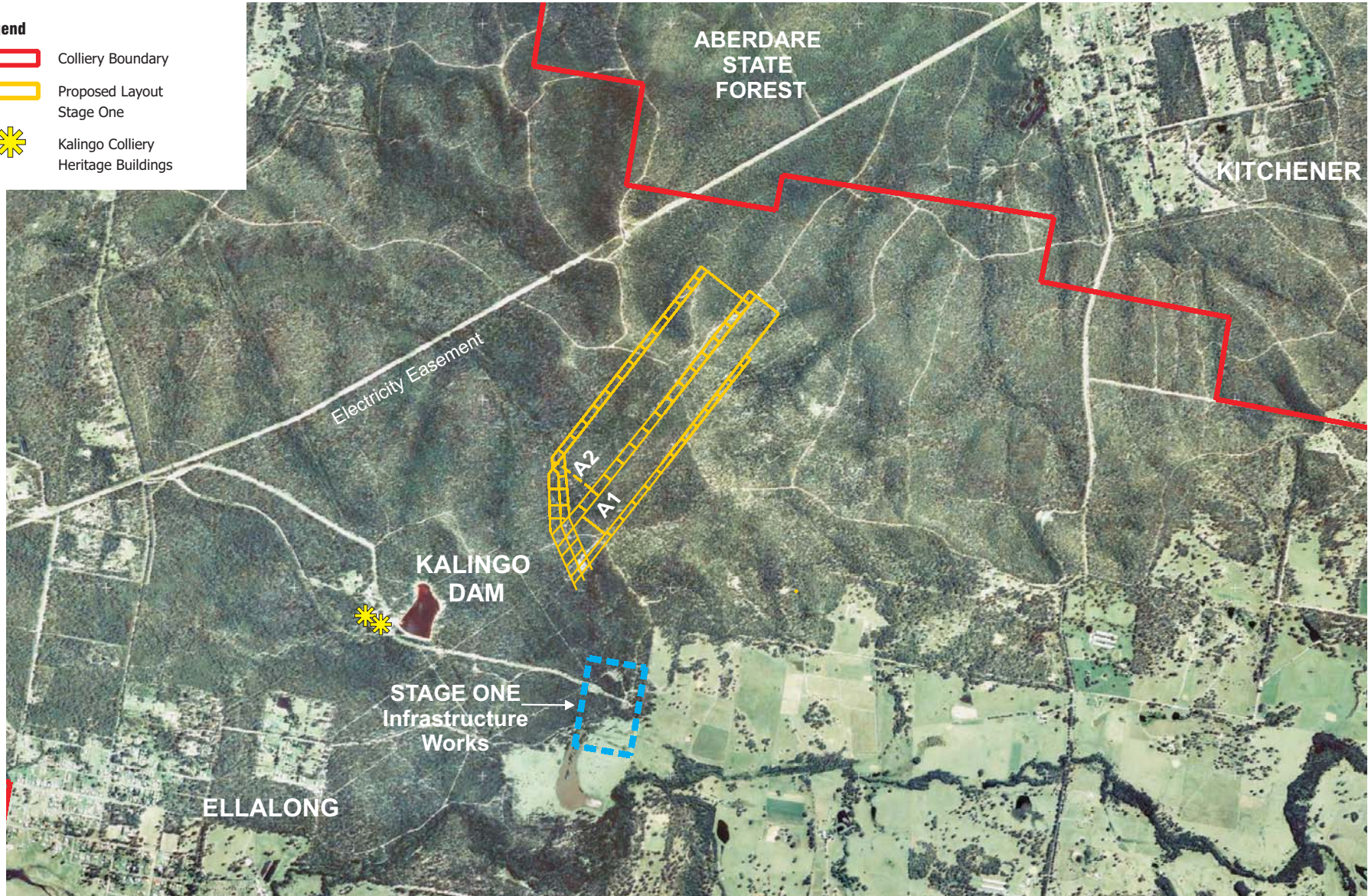
- the Broken Back Range is characterised by steeply sloping land traversing the northern part of the study area running from west to east;
- alluvial flats are located adjacent to the major creeks, notably along Quorrobolong Creek which runs through the southern portion of the study area; and
- undulating land located between the alluvial flats and the Broken Back Range, with less pronounced slopes.

The general predictive model was based on the observation made of Hunter Valley archaeology that site density and complexity increases close to water and wetlands, suggesting that sites would be located close to Quorrobolong Creek and Ellalong Creek (HLA, 1995).



**Legend**

-  Colliery Boundary
-  Proposed Layout Stage One
-  Kalingo Colliery Heritage Buildings



Source: Austar Mine

Figure 4.2 Heritage Buildings



### Brayshaw (1987)

Brayshaw (1987) undertook an archaeological survey of a large area associated with a proposed underground mine for Shortland Coal Pty Ltd. The survey, which was undertaken by two archaeologists in two days, covered an area of 150 hectares and 2800 metres of road and rail line, and also involved sampling an area of 7.5 square kilometres. This survey incorporated the current Stage One area as shown in *Figure 4.2*. Brayshaw recorded two archaeological sites: Quorrobolong 1, a small open site (stone artefact scatter), and IF-1, an isolated find (a single stone artefact). IF-1 is located above longwall A1 within the Stage One area. Brayshaw considered it unlikely that either site would be significantly affected by subsidence.

### **Assessment of Proposal**

Based on the results of previous surveys and the general predictive model described in HLA (1995), sites within the proposed subsidence impact zone are likely to be isolated artefacts or artefact scatters of low density and complexity due to the distance to Quorrobolong Creek. Furthermore, subsidence in this zone is unlikely to have a significant impact on these sites. The overall impact of underground mining on Aboriginal heritage is therefore expected to be minimal.

## **4.6.2 European Heritage Review**

### *Review of Previous Reports*

#### HLA Envirosiences Pty Ltd (1995)

The Environmental Impact Statement for the proposed Bellbird South Extension covered the current study area and incorporated the results of an archaeological survey carried out by HLA Envirosiences Pty Ltd (1995) (refer to *Figure 4.2*).

The early European settlers that occupied the Cessnock region from the 1820 s were involved in grazing, wheat production and timber getting. Vineyards developed in the 1840 s. With the development of the mines at East Greta in 1891, exploitation of the South Maitland coalfields began. Mines were established in the Cessnock Region by 1906 and were linked to the South Maitland Railway. Collieries within and adjacent to the study area were established in the 1920 s (HLA, 1995).

Within the study area it was predicted by HLA (1995) that two types of post contact sites would be located: agriculture and mining. Agricultural sites are likely to be small farms dating from the 1820 s and potentially contain evidence of change in land use. Mining sites are likely to contain head



frames, winding gear, coal screens, changing rooms and rail connections. Associated sites are railways and dormitory townships (HLA, 1995).

HLA (1995) investigations identified a number of historical sites within the study area as summarised below and indicated in *Figure 4.2*:

- site EL-2 consisted of a ring-barked tree and was seen as regionally significant for its association with the history of the Cessnock area representing a pattern of land clearance, settlement and then abandonment of some agricultural land. HLA (1995) concluded that the site was of low cultural significance;
- the Kalingo Junction to Millfield, Cessnock No. 1 Colliery and Paxton branch line (track formations and remains of railway infrastructure) was seen to be significant for its association as part of the South Maitland Railway. The lines were however, not considered a major technical feat and the technologies used were not unique. However, the integrity of the site is compromised by the removal of all track signalling and other railway facilities leaving only the track formation which is cut by the Ellalong to Pelton coal conveyor. HLA (1995) concluded that the line formation was representative in nature; and
- the Cessnock No. 1 Colliery has important historical associations, however the long development period and high operating costs resulted in the delayed opening in 1938 and early closing in 1959. The existing fabric on the surface demonstrates the process of site development and utilisation. HLA (1995) concluded that the site is rare as few of the mines in the area retained any fabric once production stopped.

None of these sites recorded by HLA (1995) are located within the current study area and no direct impact is expected as a result of the proposal.

#### Hunter Regional Environmental Plan 1989 (Heritage)

The following items within the locality were listed as being of regional environmental heritage significance under Schedule 2 of the Hunter Region Environmental Plan 1989 (Heritage):

##### Cessnock

- South Maitland Railway.

##### Millfield

- Former Rising Sun Inn, Wollombi Road;
- Maitland Main Colliery; and
- Millfield Greta Colliery.

## Paxton

- Stanford Main No. 2 Colliery (includes cottages/equipment); and
- Paxton Hotel.

## Bellbird

- Bellbird Colliery.

## Ellalong

- Kalingo Colliery. There are several heritage buildings that were part of the former Kalingo Colliery as shown in *Photographs 5 and 6*.

### *Assessment of Proposal*

The heritage buildings associated with the former Kalingo Colliery will not be undermined and infrastructure works would not have a direct impact on the buildings. The Kalingo dam is nearby and minor bank stabilisation works are planned on the western embankment, however these works are approximately 150 m from the buildings. A temporary fence would be constructed along the access road in front of the buildings to prevent any construction vehicles inadvertently passing closer to the buildings than is necessary.

## 4.7

### *ECOLOGY*

The full ecological assessment report is provided in *Annex C*. The Stage One area contains three vegetation communities being, lower Hunter spotted gum-ironbark forest, Hunter lowlands redgum forest and mainly cleared. The area has been substantially disturbed by logging for mine supports, grazing and a relatively high frequency of fires.

Lower Hunter spotted gum-ironbark forest and Hunter lowlands redgum forest have been identified as endangered ecological communities. The lower Hunter spotted gum-ironbark forest was recorded overlying the proposed longwall panels A1 and A2. This community also dominates the surrounding ridges and slopes. On the lower slopes the spotted gum-ironbark forest mixes with the Hunter lowlands redgum forest, which occurs adjacent to the proposed infrastructure sites. The redgum forest is also consistent with the central Hunter riparian forest as described by House (2003). This community has been assessed as the endangered ecological community.

The assessment of significance concluded that the mining of longwall panels A1 and A2 would not additionally impact on these vegetation communities. The proposed dam wall stabilisation and bushfire asset protection zone around the electricity substation would result in the removal of less than 0.001 hectares of open forest. The installation of the new freshwater pipeline would

not require any clearing of vegetation. Given the large extent of these communities within the remainder of the study area and surrounding lands, the proposal is unlikely to place these communities at risk of extinction.

No threatened flora species were recorded on site during the recent survey. *Macrozamia flexuosa* and *Grevillea montana* were recorded within the spotted gum-ironbark vegetation community and are recognised as being rare in accordance with the Briggs and Leigh criteria. These species were recorded within the subsidence impact zone and would not be further impacted by the proposed modification.

No threatened fauna species were recorded within the study area although likely potential habitat is available for 19 threatened fauna species. Although none were located, should any be present, they would be unlikely to be significantly impacted directly or indirectly.

## 4.8

### VISUAL AMENITY

A full visual assessment of subsidence from mining longwalls SL5 and SL6 and coarse reject emplacement was conducted for the Bellbird South Extension (HLA Envirosiences, 1995). Consequently this current visual assessment briefly considers subsidence and emplacement impacts, then focuses on visual impacts from the new infrastructure works for the proposed modifications.

The proposed modifications would result in minor and not material alterations to the visual landscape within the mine. Changes in the visual landscape would include:

- subsidence in bushland within the Colliery holding and Aberdare State Forest;
- new infrastructure including the electricity substation, ventilation fan, downcast shaft; nitrogen plant, water treatment plant and various tanks; and
- the coarse reject emplacement

The area of the mine to be subsided is not generally accessible or visible to residents or the general public. The bush tracks in the Aberdare State Forest in the vicinity of the subsidence are occasionally used by the public in four-wheel drives and motorbikes. The undulating landscape and vegetation cover would mean any change in topography due to subsidence is not likely to be detectable to a casual observer and would not have any appreciable effect on the visual amenity of this area.

Coarse rejects would continue to be disposed of to Aberdare Extended Open Cut area and open cut pits at the Pelton Washery as approved in the 1996 consent. These activities are also detailed in the Mine Operations Plan (MOP)



and approved by the Environmental Officer of Department of Primary Industries. Some activities associated with the Pelton Washery such as coarse reject emplacement and night lighting may be viewed from sections of Wollombi Road and Mountview Road although no modification is sought to these activities.

The view from the lookout on Mountview Road is shown in *Photograph 8*. No Stage One modifications would be visible from any viewpoints along Mountview Road. The construction of the duplicate water treatment plant would comprise several shipping containers of similar size and appearance to the existing plant. Given the surrounding mature vegetation, the new water treatment plant would not be visible from Mountview Road.

Views of Pelton Washery would be shielded by vegetation and be of low impact to passing motorists on Wollombi Road (see *Photograph 9*). Reject emplacement would be staged to minimise visual impacts to passing motorists, primarily by maximising the use of low lying areas where possible and rehabilitating shaped emplacements once they reach their final landform. The existing vegetation buffer surrounding the Pelton Washery would be retained and in some areas, supplemented by additional tree planting to further screen the area. Mitigation measures for reducing impacts from night lighting as approved in the 1996 consent include:

- the main flood lights are directed away from the nearest residences;
- any portable lights would also be directed away from residences;
- floodlights attached to towers are adjustable to allow fine tuning; and
- if necessary, the location of portable lights area are varied to ensure that the extraneous light spread is minimised.

All infrastructure works are within the Colliery holding and some distance from public roads and residences. The ventilation fan would be approximately six metres high and located next to the existing fan. The existing fan is not visible from the nearest residence approximately 600 metres to the west as it is shielded by topography and mature vegetation. The new fan will also be shielded from public view. Similarly, the substation, nitrogen plant, downcast shaft and storage tanks would be a considerable distance from the nearest residences and public roads and shielded from view by topography and vegetation.

Generally, the proposed modifications would result in minor visual impacts, primarily from the coarse reject emplacement and night lighting at the Pelton Washery which already have approval under the 1996 consent. The change in topography from subsidence would be undetectable to the casual observer and all infrastructure works within the Colliery Holding would be shielded from residents and motorists by topography and vegetation.

The mine will continue to operate 24 hours per day, seven days per week in accordance with the 1996 consent. The proposed modifications would result in an increase in workforce traffic movements above current levels but less than was authorised by the 1996 consent. There are currently 189 staff, and this is anticipated to increase to 270, which is less than the staffing level of 360 reported in the 1996 EIS and approved in the 1996 Consent.

Rail movements ceased December 2003, however these would recommence to transport up to 98% of 3 Mt (2.94 Mt) per annum as approved in the 1996 consent.

There are currently no plans to transport coal by coal truck, however the 1996 consent allows for up to 30 truck loads of coal to be hauled from the Colliery each week.

In addition, there would be instances where construction traffic would be entering the mine as shown in *Table 4.5*. Construction traffic would be intermittent for six to eight months.

#### 4.9.1 Workforce Traffic

The mine currently works a five panel roster covering 24 hours, seven days per week as shown in *Table 4.5*.

**Table 4.5 Austar Mine Workforce**

|         | Period             | Shift                  |
|---------|--------------------|------------------------|
| Panel A | Monday to Thursday | Midnight to 8.30am     |
| Panel B | Monday to Thursday | 7am to 5pm             |
| Panel C | Monday to Thursday | 3.30pm to 1.30am       |
| Panel D | Friday to Sunday   | 12 noon to 12 midnight |
| Panel E | Friday to Sunday   | 12 midnight to 12 noon |

1. Source: Austar Coal Mine.

Labour would be fairly evenly distributed across the shifts with the exception of Dayshift (Panel B) which could have up to 40 additional people above the even split. They would be white collared staff and contractors.

Based on current staff, 48% live in the Cessnock local government area (LGA), followed by Lake Macquarie LGA (19%) and Newcastle (15%), with the remainder travelling from (in descending order), Maitland, Port Stephens, Singleton, Wyong and Great Lakes.

Local roads in the area include Wollombi, Middle, Sandy Creek, Ellalong and Pelton Roads. Wollombi Road (Main Road 218) is a sealed two lane road running south-west from Cessnock to Wollombi via Bellbird and Pelton. The majority of Austar Mine traffic (65%) would travel along this road and enter the Pelton Washery or turn on to Middle Road and enter the main mine entrance.

Sandy Creek Road is a sealed two lane road along the southern boundary of the Colliery Holding. Approximately 35% of mine staff would travel along this road if they have travelled along the F3 freeway or the Toronto area.

Ellalong Road is a sealed two lane road that mainly carries local traffic, and it provides access to the existing No.2 Shaft.

Pelton Road traverses the Broken Back Range and is a rough unsealed road and is predominantly used by local residents. This road would be used by mine traffic to check on subsidence.

#### 4.9.2 Construction Traffic

Construction works for the various infrastructure upgrades and the delivery of the LTCC machinery would be of short duration from six to eight months. Table 4.6 provides a summary of the expected construction traffic.

Table 4.6 Expected Construction Traffic for Stage One

| Works                                           | Duration | Truck Movements <sup>1</sup>                                                                                                                                                                      |
|-------------------------------------------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mine Entrance off Pelton Road</b>            |          |                                                                                                                                                                                                   |
| Ventilation Fan                                 | 6 months | 32 - semi- trailers carrying fan components and drill rig<br>24 - cranes<br>20 - concrete trucks                                                                                                  |
| Downcast Shaft                                  | 3 months | 2 - semi- trailers carrying shaft components<br>4 - excavators<br>4 - concrete trucks<br>6 - drill rigs                                                                                           |
| Substation                                      | 6 months | 24 - semi- trailers carrying substation components, cranes, fencing and EnergyAustralia trucks with cable drums                                                                                   |
| Nitrogen Plant                                  | 1 month  | 2 - semi-trailers carrying nitrogen plant components and fencing, drill rig<br>2 - crane<br>2 - concrete truck                                                                                    |
| Solcenic and diesel tanks                       | 1 month  | 14 - tanks would be delivered on semi-trailers. Agitator trucks would deliver concrete for the bunding. Trucks with pipe drums would deliver the tubing to carry the oil to the various boreholes |
| Three boreholes                                 | 3 months | 48 - drill rigs and trucks carrying pumps and pipelines.                                                                                                                                          |
| Kalingo Dam wall stabilisation                  | 2 weeks  | 6 - excavators and/or dozer delivered on a truck                                                                                                                                                  |
| <b>Main Mine Entrance off Middle Road</b>       |          |                                                                                                                                                                                                   |
| LTCC machinery                                  | 2 weeks  | 140 - semi-trailers would deliver the partially assembled LTCC equipment<br>160 - semi-trailers with supports and cranes                                                                          |
| <b>Pelton Washery - entry off Wollombi Road</b> |          |                                                                                                                                                                                                   |
| Water Treatment Plant                           | 2 months | 10 - semi-trailers carrying treatment plant components and piping                                                                                                                                 |

1. Truck movements are an estimate only. Each truck has two movements - one for delivery and one for leaving the mine, therefore one truck delivery equals two movements.

### 4.9.3 *Rail Movements*

The rail system consists of a section of rail line now owned and maintained by Austar (closest to the Washery), a section owned and maintained by South Maitland Railways which joins the State owned Main Northern Line at East Greta Junction, which then leads to the Port of Newcastle.

The Pelton rail system was upgraded in 1988 and allows the use of train units of four 48 Class diesel locomotives and 38 wagons, making a train unit of 2200 tonnes. Most coal from the Austar mine would be transported by rail up to the approved 2.94 Mt per annum.

## 4.10 *SOCIO-ECONOMIC ASSESSMENT*

### 4.10.1 *Introduction and Overview*

The potential socio-economic effects associated with the Austar Mine as approved in the 1996 Consent were reported on in the socio-economic assessment undertaken for the Bellbird South Extension (HLA Envirosiences, 1995). Many of the findings remain relevant and are referred to in this assessment along with additional information now available.

The principal socio-economic effect of the proposed modification and adoption of LTCC mining is that it will enable the continuation of mining at the Austar Mine which has been on care and maintenance since the fire in 2004 thus providing a resumption of employment at the mine and the consequential already identified socio-economic contributions. This proposal relates only to Stage 1 but it will lay the basis for a continuation of mining at Austar Mine (subject to further approvals) for a further 21 years.

### 4.10.2 *Demographics and Employment*

Cessnock is the nearest major regional centre with a population of 17,831 (including Bellbird) at the 2001 Census (ABS, 2001). Other nearby towns and their population include Paxton (554), Ellalong (575), Millfield (483) and Kitchener (303). The entire Greater Cessnock LGA had an estimated population of 47 143 in 2004 (Cessnock City Council 2004). Located in the Lower Hunter region along with the Newcastle, Lake Macquarie, Port Stephens and Maitland LGA's, this area has been the subject of rapid population growth in the last 10 years (Department of Planning, 2005).

Traditionally the major areas of employment for Cessnock residents were mining and manufacturing. More recently however, there has been an increase in wine, tourism, and the commercial and retail sectors. There has been a steady decline in employment in mines in the South Maitland Coalfields (which includes Cessnock) largely due to depleted reserves.

Austar Mine is the only operational mine in the Cessnock area. The potential 270 jobs at the mine represent a valuable sector of employment.

The demographic break-up of the full workforce for the Austar mine is not possible as some staff are yet to be employed, however, current staff demographics are shown in *Table 4.7*.

**Table 4.7** *Austar Mine Demographics*

| LGA            | Total Staff | % Breakdown |
|----------------|-------------|-------------|
| Cessnock       | 91          | 48          |
| Lake Macquarie | 37          | 19          |
| Newcastle      | 28          | 15          |
| Maitland       | 21          | 11          |
| Port Stephens  | 6           | 3           |
| Singleton      | 5           | 2           |
| Wyong          | 1           | 1           |
| Great Lakes    | 1           | 1           |
| <b>Total</b>   | <b>190</b>  | <b>100</b>  |

Source: Austar Coal Mine

#### 4.10.3 *Economic Effects*

The mine is currently undergoing a \$250 million refurbishment ready to recommence longwall operations in 2006. The recommencement of mining would allow significant economic benefits to flow on to the Cessnock LGA and the Hunter Region by creating approximately 80 new jobs and maintaining the existing 190 jobs. The mine is currently recruiting and training new employees. This Stage One modification is the precursor to Stage Two and Three works, which would allow in the longer term, for employment of between 250 and 270 staff.

Operating cash flow for the mine will be in the order of \$230 million per annum with total recoverable resource contained within the existing mine lease CML2 valued at \$5.2 billion.

Beneficial economic activities resulting from the recommencement of mining includes employment during construction and mining and the purchase of goods and services from businesses in the region. Other economic and employment benefits arise indirectly through the provision of ancillary services such as supplies and coal transport. In addition, there is an estimated additional flow on effect multiplier in the order of 4:1 to the local community.

Recommencement of full mining operations would also have significant beneficial effects on public sector revenue. These benefits would flow from increased employment and from increased production and transport of coal. Benefits would accrue to the Federal Government through increased revenue from company tax, excise on imported equipment and goods and other taxes such as sales tax, income tax and fuel excises.

The State Government would receive additional revenue from various taxes, royalties and payments for services by statutory bodies. These include rail



freight for transporting coal to the Port of Newcastle and port charges. Payroll tax is also levied on the wages of mine employees and on those jobs created through the flow-on effect of the mine.

A breakdown of the economic beneficiaries is provided in *Tables 4.8 and 4.9*.

**Table 4.8** *Wages Breakdown for the Duration of Longwalls A1 and A2*

| <b>Employee Wages</b> | <b>Direct (\$M)</b> | <b>Indirect (\$M)</b> |
|-----------------------|---------------------|-----------------------|
| Cessnock              | 30.86               | 13.39                 |
| Maitland              | 7.07                | 3.07                  |
| Singleton             | 1.93                | 0.84                  |
| Newcastle             | 9.65                | 4.19                  |
| Lake Macquarie        | 11.57               | 5.02                  |
| Other                 | 3.21                | 1.36                  |
| <b>Total</b>          | <b>64.3</b>         | <b>27.9</b>           |

**Source :** Austar Coal Mine

**Table 4.9** *Operating expenditure breakdown the duration of Longwall A1 and A2*

| <b>Expenditure Area</b>                        | <b>(\$M)</b> |
|------------------------------------------------|--------------|
| Repairs and maintenance                        | 22.9         |
| Electricity                                    | 7.9          |
| Consumables                                    | 26.3         |
| Government charges (shire rates, land tax etc) | 0.7          |
| Contractors / consultants                      | 16.0         |
| Plant hire                                     | 7.3          |
| Other                                          | 8.3          |
| Government Royalties                           | 18.0         |

**Source :** Austar Coal Mine

## 5.1 *MITIGATION MEASURES*

### 5.1.1 *Flora and Fauna*

The proposed modification would have no serious impacts on flora and fauna. Only small areas would be underscrubbed with all mature trees retained, during stabilisation works on the Kalingo dam wall and the installation of the new substation. The access track along the western and southern boundary fence of the ventilation fan would require removal of some vegetation however all mature ironbarks, red gums and spotted gums would be retained. The laying of the water pipeline would not disturb any mature vegetation as the pipeline would be laid in an existing trench that was dug approximately three years ago and is adjacent to access roads.

During construction works all machinery would be stored in cleared areas.

### 5.1.2 *Rehabilitation*

The rehabilitation program for the Bellbird South Extension was wound down when the mine was placed on 'care and maintenance'. These works would recommence as approved under the 1996 consent once Stage One is approved.

Subsidence impacts from longwalls A1 and A2 are assessed at a maximum possible level of 4.2 m but are expected to be less. Any subsidence damage is expected to be minimal and that which there is will be repaired. Conditions on monitoring and repair will be in the s138 approval required from the DPI before conducting second workings of 1.6 m, although subsidence could reach 4.2 m, however this is unlikely.

Disturbance from infrastructure works are expected to be minimal. Disturbed areas on pasture land would be graded and seeded with native grasses and a protective mulch cover applied to exposed areas to minimise the likelihood of erosion.

### 5.1.3 *Noise*

Modelling of the additional noise sources (ventilation fan and nitrogen plant) showed that, under a 'worst case' scenario, noise levels at the nearest residence would not exceed the criterion of 40 dB(A) and would be below the minimum intrusiveness criterion of 35 dB(A) provided for in the Industrial Noise Policy (with an RBL of 30 dB(A)). Consequently, no noise mitigation measures are required.

#### 5.1.4 *Dust*

The Stage One modifications would not result in any additional long term dust sources as approved in the 1996 consent. Mitigation measures approved in the 1996 consent that would continue to be implemented during Stage One include:

- clean water from the water treatment plant would be used for dust control on internal access roads and other exposed areas; and
- sprays on the coal stockpiles would be activated as required to ensure dust emissions are minimal.

Disturbed areas from infrastructure works would be promptly graded and seeded to encourage rapid vegetation regrowth.

#### 5.1.5 *Surface and Groundwater*

Even though no observable adverse effects are anticipated on the surface water or groundwater systems in the Longwall A1 and A2 20mm subsidence zone (SCT Operations, 2006), any adverse effects that require rehabilitation of stream bed and bank stability, stream flow, groundwater levels or groundwater quality will be achieved through producing and implementing a specific post mining rehabilitation plan that addresses the affected issue.

#### 5.1.6 *Spontaneous Combustion*

Spontaneous combustion caused the evacuation and sealing of the Southland Mine in December 2003. As a result, spontaneous combustion is regarded as a core risk and managed accordingly.

The ventilation strategy for the next five years has been designed and modelled by Dr Roy Moreby, an internationally renowned ventilation engineer. Additional improvements in the management of a spontaneous combustion include:

- a detailed appraisal of seal design and performance in the panel that spontaneously combusted has been commissioned through Dr Winton Gale of SCT. The study will consider the dilation of strata around the seal and estimate flow rates across seals due to ventilation and atmospheric pressures;
- a dedicated 150mm diameter nitrogen inertisation pipeline maintained with connection through each seal;
- an on-site nitrogen inertisation plant with an upgraded capacity of 2000 m<sup>3</sup>/hr would make the goaf atmosphere inert and provide pressure balance;

- positive ventilation of the heading inbye of the active longwall face so that seals and roadways can be inspected and maintained;
- emergency seals would be constructed in all roadways at the entrance to each longwall panel so that rapid isolation and sealing would be possible;
- staff would be retrained in the detection of spontaneous combustion, targeting the early stages of the oxidation process;
- significant upgrades to the environmental monitoring system including an on-site gas chromatograph;
- an external consultant to monitor gas trends would be retained;
- the limits for early warning are set well below typical industry figures to identify the earliest stages of accelerated oxidation. Air free analysis and 21 different trends are monitored for the oxygen deficient areas;
- there has been extensive training for the on-site gas chromatograph operators and all personnel required to take bag samples to ensure quality and integrity of the sample and results; and
- the previously fire-affected area of the mine has been completely sealed and isolated. A 30 m solid coal barrier designed by Dr Winton Gale separates longwalls A1 and A2 from the SL2 - SL4 goafs.

If the surface stockpiles begin to self-heat, they would be dug out and fed into the washery for quenching, or if it is too hot, spread on the ROM pad and drenched with water prior to processing. To reduce the potential for spontaneous combustion at coal handling sites, all coal work areas would be kept clean and tidy to prevent accumulation of coal. ROM and product stockpile volumes would be minimised to reduce residence time and therefore the potential for oxidation.

### 5.1.7

#### *Visual*

Visual impacts of subsidence would be low due to the poor access along four wheel drive tracks, undulating and steep topography and vegetation cover. It is likely that even if subsidence approaches the maximum prediction of 4.2 m, the change in topography will remain undetected by a casual observer. Should any remediation works due to cracking be required, care would be taken to ensure vegetation cover is rapidly re-established.

Visual impacts to motorists along Wollombi Road are low as the existing vegetation around the Pelton Washery would be retained and supplemented with further planting. This vegetation also shields lighting of the washery area.

All new infrastructure works are shielded from view from surrounding residences by topography and vegetation and no visual mitigation measures are proposed.

### 5.1.8 *Heritage*

The continuation of the Austar Mine would maintain the history of mining in this area, and indeed, would allow various European heritage items, in particular, the Kalingo Colliery buildings, to remain in context.

A temporary fence would be erected along the side of the access road adjacent to the Kalingo Dam to prevent construction vehicles inadvertently travelling unnecessarily close to the Kalingo heritage buildings nearby.

There would be no significant impacts due to subsidence on the known site IF-1 on longwall A1 as detailed in the Brayshaw report (1987). Similarly, other isolated finds or artefact scatters that may occur in this area are not expected to be significantly impacted by subsidence therefore no mitigation measures are required.

Should any Aboriginal heritage items be located during any surface remediation works, then work would cease in that area and the mine environmental officer would be informed and the Department of Environment and Conservation consulted.

### 5.1.9 *Socio-Economic Effects*

The recommencement of full production at Austar Mine, which entails large capital expenditure, has many positive socio-economic benefits for the local community and Hunter Region. If the initial approval of Stage One, and subsequent approvals for Stage Two and Three are obtained, the mine would provide stable, continuing employment for up to 270 staff. This has direct flow-on benefits through expenditure on goods and services from local businesses and indirectly, through the provision of ancillary services. Public sector revenue generated by the mine would be substantial and is a positive outcome of the proposed modifications.

Consultation with local residents leading up to and during the operation of the mine would ensure any perceived negative impacts can be immediately addressed. In addition, the existing complaints handling procedure would be maintained to ensure that any complaints are adequately dealt with.

## 5.2 *MONITORING*

Various monitoring programs were established and maintained during the full operation of the mine. These monitoring programs were reported in the Bellbird South Extension EIS (HLA Envirosiences) and are summarised in



Table 5.1 below. Additional monitoring of subsidence ephemeral stream flows for Stage One have also been included.

**Table 5.1**      **Stage One Monitoring Program**

| <b>Aspect</b>             | <b>Monitoring</b>                                                                                                                                                                                                                                                                                                                           |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Meteorological Conditions | Weather data will continue to be sourced from Nulkaba weather station.                                                                                                                                                                                                                                                                      |
| Acoustic impacts          | A noise logger will be established at the nearest residence (McGreevy) before mining commences and will continue to operate during mining.                                                                                                                                                                                                  |
| Water Quality             | Six sites around the mine sampled and analysed for iron, pH, total suspended solids and conductivity at frequencies specified in EP Licence 416.<br><br>Ephemeral streams above longwalls A1 and A2 - observational, non-quantitative monitoring recording of stream flow and duration, field assessment of pH and electrical conductivity. |
| Subsidence and Vibration  | Carried out by the mine surveyors. Grids above longwall panels measure subsidence, strain and tilt as detailed in SCT, 2006. Vibration was monitored at the Ellalong No.2 Shaft, however it is now more appropriate to commence vibration monitoring at the No. 3 shaft.                                                                    |

Source: Austar Mine.

All monitoring results would be provided in the Annual Environmental Management Report.

### 5.3      **JUSTIFICATION FOR THE PROPOSAL**

#### 5.3.1      **Project Benefits**

##### *Economic and Social*

The purchase of the former Southland Mine by Austar represents a significant capital investment in an operation that has the potential to provide ongoing employment for the current 'care and maintenance' staff and an additional 80 personnel.

This proposed s96 modification, if approved, would provide an economic basis for access to 3.45 Mt of product coal for export and affords the opportunity to recommence coal extraction in an area that already has consent to mine. Without the sought modifications and the resultant financial

viability of the mine the reopening for the mine and indefinite closure of the mine would be likely.

#### *Resource Recovery*

The introduction of LTCC technology provides the opportunity to implement a mining system that is more efficient than other longwall systems currently in use in Australia. This would result in up to 80 % of the Greta seam in longwalls A1 and A2 being mined and significantly less coal being sterilised in the goaf. The proposal will be a pilot for use of LTCC Mining in other rich coal seams in Australia with consequent resource recovery benefits for Australian coal mining.

#### *Infrastructure*

Surface infrastructure works are necessary to allow the mine to become fully and efficiently operational. The surface development is required to support LTCC mining. The ventilation fan and downcast shaft will provide adequate air flow for workings as they progress to the north. The new substation would supplement the existing substation and ensure adequate power is available for three continuous miners and the new LTCC machinery. The larger capacity nitrogen plant would increase the volume of nitrogen entering the sealed workings preventing reheating of this area and act as a defence against any further spontaneous combustion. The water treatment plant upgrade would allow greater efficiency in treating mine water, increasing the volume of clean water produced and reducing the volume of saline water that is then pumped into old workings. The dam stabilisation works are necessary to ensure the embankment remains adequate. The installation of several tanks, pipelines and boreholes is necessary to provide additional supplies to the continuous miners and new LTCC machinery in the most effective manner.

#### *Environmental Effects*

Environmental and amenity impacts are expected to be very similar to those predicted for the Bellbird South Extension.

Rehabilitation would be carried out as outlined for the Bellbird South extension and would be in accordance with the Mine Operations Plan. The rehabilitation strategy would gradually improve the visual amenity of the mine and aim for a stable final landform. The final landuse is likely to be either grazing or forestry.

Subsidence will be monitored and managed as proposed in this statement as well as in accordance with s138 approval by the DPI.

### 5.3.2

#### *Conclusion – Substantially the Same Development*

The changed impacts that would arise from the proposed modification of the approved mining method and infrastructure have been assessed in this SoEE generally by prediction, and in some cases, actual measurement during mining. These impacts have been described throughout this SoEE and demonstrate that the proposed modification is substantially the same as the approved development. The likely impacts to existing groundwater and surface water resources, air quality, noise and vibration, visual character and heritage have been assessed and the proposed modification would not significantly increase the impacts to these characteristics compared to the approved development.

The Austar Stage 1 is proposed to be conducted in substantially the same manner as it was originally approved in the 1996 Consent. Coal production, coal handling, beneficiation and transport as well as manning and surface and subsurface operations will be generally as approved. Changes to the surface and surface infrastructure are minor. The mining method of longwall operation remains the same. The experience of LTCC mining and subsidence will lay a foundation for the further approvals to be sought by Austar for the planned further mining at Austar Mine.

## **REFERENCES**

Australian Bureau of Statistics (2001) **Census 2001**.

Australian Standard AS 1940B1993: *The Storage and Handling of Flammable and Combustible Liquids*.

Cessnock City Council (2004) **Comprehensive State of the Environment Report 2003 - 2004**.

Department of Planning (2005) **Draft Hunter Regional Strategy**.

Geoterra Pty Ltd (2006) **Longwall Panels A1 and A2 Surface Water and Groundwater Assessment**. For Austar Coal Mine, Ellalong NSW.

HLA Envirosiences Pty Limited (1995) **Environmental Impact Statement Ellalong Colliery. Extension into Bellbird South**.

SCT (2006) **Subsidence Assessment for Austar Coal Mine - Longwalls A1 and A2**.

Annex A

Department of Planning  
Letter and Checklist





Department of  
**Infrastructure, Planning and Natural Resources**

Mining & Extractive Industries  
Major Development Assessment

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Mr Greig Duncan  
Site Senior Executive  
Austar Coal Mine  
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Dear Mr Duncan

**Austar Coal Mine – Reopening  
Development Consent (DA 29/95)**


I refer to your letter, dated 2 December 2005, seeking advice concerning the appropriate development approval pathway for reopening the Austar Coal Mine (previously known as Southland Colliery and Ellalong Colliery). Your letter encloses legal advice from Sparke Helmore concerning the application of section 96(2) of the *Environmental Planning and Assessment Act 1979* (the Act). I am pleased to confirm that both the proposed Stage 1 and Stage 2 developments outlined in that advice (see paras 2.1 and 2.2 of that advice) can be considered by the Minister for Planning under s. 96(2) of the Act as modifications to the existing Ellalong Colliery development consent (DA 29/95) and accordingly a Statement of Environmental Effects (SEE), rather than an Environmental Impact Statement, is required in support of the modification application.

Your letter indicates that there are significant surface alterations proposed for the existing development. However, some of the larger environmental impacts are likely to be associated with the increased subsidence effects associated with the mine's proposed Longwall Top Coal Caving (LTCC) mining method. Following recent changes to the *Mining Act 1992*, conditions concerning mining methods can now be included within development consents. The Department's requirements for the SEE for the Stage 1 modification therefore have a substantial focus on the changed subsidence impacts associated with the intended use of the LTCC mining method. The other focus of the Department's requirements is potential impacts of both surface works and subsidence on the Lower Hunter Spotted Gum – Ironbark Forest.

The requirements for the SEE to accompany the modification application for the Stage 1 development are set out in the attachment to this letter.

If you have any enquiries about the above, please contact Howard Reed on 9228 6308.

Yours sincerely

 22/12/05

David Kitto  
A/Director  
Major Development Assessment

# Austar Coal Mine – Reopening Development Consent (DA 29/95) Stage 1 SEE Requirements

## Description of the Proposal

Describe the existing approved development generally. Describe the proposed alterations or additions in detail. Clearly identify the coal resource, the existing and proposed site, the existing and proposed works (including rehabilitation works), the existing and proposed intensity of operations, the proposed management responsibilities for the proposed site, and the likely inter-relationships between the proposed operations and the existing approved mining operations.

## Justification for the Proposal

The SEE should:

- describe the benefits of the proposal (including operational, social and economic benefits); and
- demonstrate (for the purposes of section 96(2)(a) EP&A Act) that the proposed modification is substantially the same development as the development for which consent was originally granted.

## Statutory Instruments

Assess the proposal against all relevant statutory provisions, including those found in section 98(3) EP&A Act and (where relevant) section 79C(1) EP&A Act.

## Subsidence Impacts

Of particular interest to the Department are the changed potential subsidence impacts associated with the intended use of the Longwall Top Coal Caving (LTCC) mining method. The SEE must give detailed consideration to the projected changes in subsidence parameters (eg subsidence, upsubsidence, subsidence footprint, strains and tilts) and the projected changes in surface impacts associated with these changed parameters. All potential benefits and risks of the use of the LTCC mining method (including to the transmission line and any other surface infrastructure, other improvements and the environment) must be clearly identified and discussed.

## Lower Hunter Spotted Gum – Ironbark Forest

Also of particular interest to the Department are the potential impacts of the modification on overlying Lower Hunter Spotted Gum – Ironbark Forest. This forest type was listed in February 2005 under the *Threatened Species Conservation Act 1995* as an endangered ecological community within the Sydney Basin Bioregion. More information is available at: [http://www.nationalparks.nsw.gov.au/npws.nsf/Content/hunter\\_gum\\_ironbark\\_endangered\\_factsheet](http://www.nationalparks.nsw.gov.au/npws.nsf/Content/hunter_gum_ironbark_endangered_factsheet). The potential impacts of all elements of the proposed modification (including increased subsidence and any changes to surface layout or additional facilities) on this forest type must be fully addressed within the SEE.

## Environmental Monitoring & Management

Describe how the environmental performance of the modified operations would be monitored and managed over time, including consideration of how the changes to operations associated with the proposed modification would be integrated into the environmental monitoring and management of the existing and approved operations. Describe proposed rehabilitation strategies, methods and timing.

## Other Key Issues

Assess the following potential impacts of the proposal during construction and operation, and describe what measures would be implemented to manage, mitigate, or off-set these potential impacts:

- flora and fauna (including critical habitats, threatened species, populations or ecological communities);
- noise;
- air quality;
- surface and groundwater;
- heritage, both Aboriginal and European; and
- visual amenity.

## Consultation

During the preparation of the SEE, you should consult with the relevant local and State government agencies (including the Department of Primary Industries (Forests and Mineral Resources), Department of Environment and Conservation, and Cessnock Shire Council), and surrounding landowners/occupiers that are likely to be affected by the proposal.

The SEE should include a report indicating who was consulted, what consultation occurred, and what issues were raised in this consultation.

## Administration

When you lodge the application, you must include:

- at least 15 hard copies of the SEE, and 10 copies of the SEE on CD-ROM; and
- a cheque for the modification fee (see clause 258 of the EP&A Regulation), made payable to the Department.

**Table A.1 Department of Planning Checklist**

| Issue                                | As Approved                                                                                                                                                                                   | Proposed Stage One Modification                                               | Addressed in SoEE       |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------|
| Targeted coal seam                   | Greta seam                                                                                                                                                                                    | No modification                                                               | Chapter 2               |
| Location of longwalls A1 and A2      | Longwalls LW23 and LW24 as part of the Bellbird South Extension                                                                                                                               | Same location - no modification                                               | Figure 1.2<br>Chapter 2 |
| Configuration of longwalls A1 and A2 | LW23 and LW24:<br>Mining height of 3.4 to 4.5m<br>Panel width of 255<br>Panel length LW23 1235m and LW24 1481m                                                                                | A1 and A2:<br>Mining height 5.0 to 6.5m<br>Panel width A1 - 158m and A2 -227m | Chapter 2               |
| Mining Technique                     | Standard longwall                                                                                                                                                                             | No Modification                                                               | Chapter 2               |
| Mining Rate                          | 3 million tonnes per annum (Mtpa)                                                                                                                                                             | Longwall Top Coal Caving<br>3 Mtpa - no modification                          | Chapter 2               |
| Coal Handling                        | Extracted coal removed via conveyor system in roadways through NW Mains, Bellbird Mains, 1 East Headings, along Drift to overland conveyor then Pelton Washery.                               | No modification                                                               | Chapter 2               |
| Rejects Handling                     | Coarse rejects to refuse bin then trucked along private haul roads to Aberdare Extended Open Cut pits.<br>Fines blended with product coal or pumped into disused workings of Pelton Colliery. | No modification.                                                              | Section 2.2.1           |
| Coal Transport                       | Up to 2.94 Mt (98% of 3 Mt) transported by Rail along South Maitland Railway to Port of Newcastle.<br>2% hauled by truck to local domestic markets.                                           | Up to 2.94 Mt by rail - No modification.                                      | Section 4.9             |
| Infrastructure:                      |                                                                                                                                                                                               |                                                                               | Chapter 2               |
| Ventilation Fan                      | Ventilation fan (No.3 upcast shaft)                                                                                                                                                           | Duplication of ventilation fan                                                |                         |
| Downcast Shaft                       | No.1 shaft                                                                                                                                                                                    | New downcast shaft                                                            |                         |
| Substation                           | Existing substation                                                                                                                                                                           | Duplication of substation                                                     |                         |
| Water Treatment Plant                | Existing Water Treatment Plant                                                                                                                                                                | Duplicate Water Treatment Plant                                               |                         |
| Nitrogen Inertisation Plant          | -                                                                                                                                                                                             | New 2000 m <sup>3</sup> /hr capacity plant                                    |                         |
| Diesel and Emulsion Tanks            | -                                                                                                                                                                                             | Two solcenic and one diesel tank and pipeline to underground boreholes        |                         |
| Tube Bundle Shed                     | -                                                                                                                                                                                             | New shed to house gas monitoring equipment                                    |                         |
| Water Reticulation Upgrade           | -                                                                                                                                                                                             | New water tanks, underground pumps and pipelines.                             |                         |

| Issue                 | As Approved                                                                                                                                                                                                                    | Proposed Stage One Modification                                                                                                                                                                                                       | Addressed in SoEE |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| Subsidence Impacts    | Predicted subsidence up to 1.58 m. Some ground creep may occur on steeper slopes. Surface cracking unlikely. Mt Howard Trig Station would require reinstatement after subsidence has ceased.                                   | Predictions - empirical up to 1.6 m, numerical up to 3 metres absolute maximum of 4.2 m. some tensile cracking on bare surfaces such as access tracks. Mt Howard Trig Station would require reinstatement after subsidence has ceased | Section 4.2       |
| Surface Water         | Increased ponding along Quorrobolong Creek.                                                                                                                                                                                    | Quorrobolong Creek outside Stage One area. Ephemeral creeks only in Stage One and no ponding, significant erosion or loss of surface flows due to cracking is expected.                                                               | Section 4.3       |
| Groundwater           | No impact expected on single water bore in area.                                                                                                                                                                               | No significant depletion of groundwater levels.                                                                                                                                                                                       | Section 4.3       |
| Noise Impacts         | Noise sources - two ventilation fans and reject emplacement activities                                                                                                                                                         | Additional noise sources - ventilation fan and nitrogen plant. Noise impacts at nearest receptor is below the criterion level of 40dB(A).                                                                                             | Section 4.4       |
| Air Quality           | Dust source - coal stockpiles                                                                                                                                                                                                  | Temporary dust sources during construction period. No additional long term sources of dust.                                                                                                                                           | Section 4.5       |
| Aboriginal Heritage   | One artefact located above LW24. No impact expected.                                                                                                                                                                           | No modification.                                                                                                                                                                                                                      | Section 4.6       |
| European Heritage     | No sites recorded in Stage One area.                                                                                                                                                                                           | No modification.                                                                                                                                                                                                                      | Section 4.6       |
| Ecology               | No rare or endangered flora or fauna observed. Mining would have no adverse impact on flora and fauna.                                                                                                                         | No modification. Lower Hunter spotted gum - ironbark forest and Hunter lowlands redgum forest now identified as endangered communities. Assessment found no additional impact on these vegetation communities.                        | Section 4.7       |
| Visual Impacts        | Subsidence up to 1.58 m, Pelton Washery and emplacement activities                                                                                                                                                             | Subsidence up to 4.2 m not likely to be visible due to limited access (4WD only), variable topography and moderate vegetation cover. New infrastructure on Austar land, not visible to nearby residents or local motorists.           | Section 4.8       |
| Traffic and Transport | Traffic movements were predicted to be: <ul style="list-style-type: none"> <li>• up to 360 staff; and</li> <li>• up to 30 truck loads of coal to local markets.</li> </ul> All other coal (98% of 3 Mtpa) transported by rail. | Up to 270 staff anticipated.<br>Up to 2.94 Mtpa of coal (98% of 3 Mt) transported by rail.<br>Intermittent construction traffic for six to eight months duration.                                                                     | Section 4.9       |
| Socio-economics       | Majority of staff from Cessnock, Lake Macquarie and Newcastle LGA's.<br>Significant flow-on benefits to local community.<br>Generation of significant State revenue through taxes, royalties and other payments.               | No modification.                                                                                                                                                                                                                      | Section 4.10      |

| Issue                                                                     | As Approved                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Proposed Stage One Modification                                      | Addressed in<br>SoEE |
|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------------|
| Environmental Management and Monitoring                                   | <p>For LW23 and LW24:</p> <p>Topography - monitor and minor earthworks as required to repair ground creep, erosion or cracking.</p> <p>Flora - none specified.</p> <p>Fauna - none specified.</p> <p>Air Quality - monitoring and various mitigation measures.</p> <p>Noise - various mitigation measures such as orientation of fan outlets, reject management, maintain equipment.</p> <p>Archaeology - monitoring of cracking or other areas that may need surface works.</p> <p>Traffic - safety measures such as stop signs and speed limits on private roads.</p> <p>Visual - staging construction and rehabilitation of rejects emplacement, bunding, screening. Lighting - screening and restriction to necessary levels only.</p> | No air quality monitoring proposed. No other modifications proposed. | Chapter 5            |
| 1. 'As Approved' information derived from EIS (HLA Envirosciences, 1995). |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                      |                      |



Annex B

## Property Descriptions

**B.1**            **PROPERTY DESCRIPTIONS**

The property descriptions in *Table B.1* are the subject of this Section 96 modification application.

**Table B.2**        **Property Descriptions**

| <b>Property Description</b> | <b>Parish</b> |
|-----------------------------|---------------|
| 2/755225                    | Ellalong      |
| Lot 1& 2 DP775718           | Ellalong      |
| 19/755225                   | Ellalong      |
| 4/755225                    | Ellalong      |
| 12/755225                   | Ellalong      |
| 13/755225                   | Ellalong      |
| 249/755225                  | Ellalong      |
| Areas 3 & 4 8/69968         | Ellalong      |
| 1/ 69968                    | Ellalong      |
| 10/69968                    | Ellalong      |
| 11/69968                    | Ellalong      |
| 13/69968                    | Ellalong      |
| Pt 2/755215                 | Cessnock      |
| 1/65829                     | Cessnock      |
| Area 1 1/87087              | Pokolbin      |
| Pt 1/699668                 | Pokolbin      |

Source: Consent N91/00241/004 (DA29/95).

Annex C

## Flora and Fauna Assessment

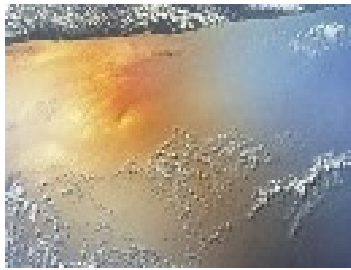
Annex D

## Subsidence Report

Annex E

## Surface Water and Groundwater Report

ERM consulting services worldwide [www.erm.com](http://www.erm.com)



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