

Austar Coal Mine Pty Ltd

Austar Coal Mine Project - Stage 3 Preliminary Environmental Assessment

June 2007



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Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Austar Coal Mine Pty Ltd

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1.0 Introduction

1.1 Overview

Austar Coal Mine (Austar) is an existing underground coal mine operating under approval not due to expire until 2016. The mine is located approximately 10 kilometres south west of Cessnock (refer to **Figure 1.1**). The mine has worked the same leases under various names since 1916 including Pelton, Ellalong and Southland Collieries. It is a longwall mining operation that utilises an advanced form of conventional retreat longwall called Longwall Top Coal Caving (LTCC). The technology will allow resource recovery from the Greta Coal Seam to be maximised.

The Minister for Urban Affairs and Planning granted development approval in 1996 subject to certain conditions. 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. The approved extraction height ranged from 3.5 to 4.5 metres. The consent also allows for the handling, processing and transport of coal to the Port of Newcastle via road and rail.

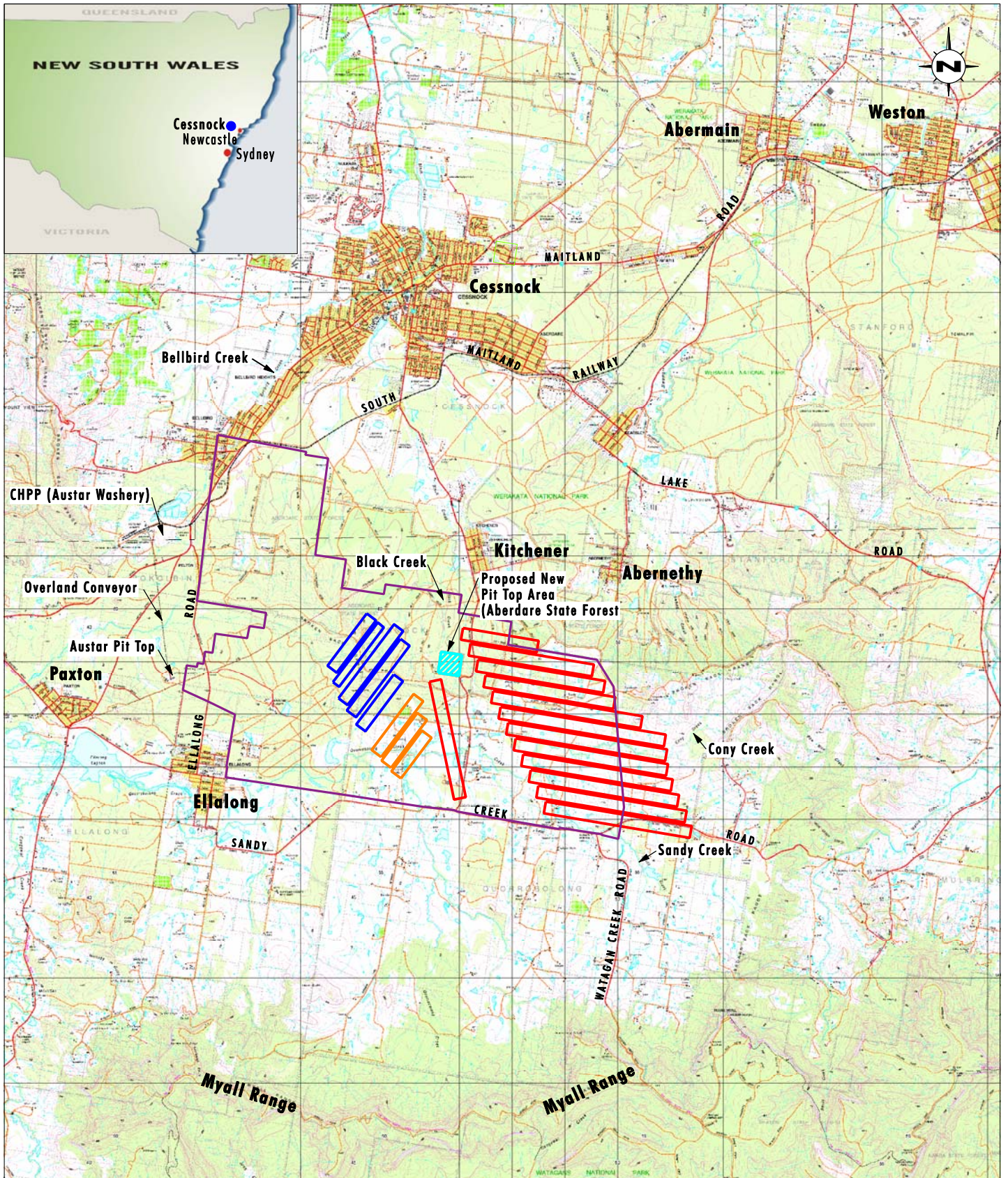
To allow for the introduction of LTCC technology to panels A1 and A2, a modification under section 96(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) was sought in 2006. LTCC is an enhanced form of conventional retreat longwall extraction that enables an increase in the height of coal extraction (up to 6.5 metres rather than the 4.5 metres approved in 1996). The Minister for Planning approved the modification that allows the extraction of up to 6.5 metres of coal in panels A1 and A2, subject to a number of conditions. The Notice of Modification was issued 27 September 2006 and is provided in **Appendix 1**.

Stage 2 of the project covers panels A3 to A5, using LTCC to extract up to 6.5 metres of coal. A modification under section 96(2) of the EP&A Act to the 1996 consent to facilitate the use of LTCC technology will be sought from the Department of Planning (DoP).

Stage 3 of the project (and the subject of this document) covers mining of panels A6 to A18. It is proposed to extract up to 7 metres of coal using LTCC technology and utilising the existing approved coal handling, preparation and transport facilities. As shown in **Figure 1.2**, a large proportion of the area to be mined in Stage 3 is covered by the existing approval and the majority is covered by CML2. A new pit top facility will be constructed to support the ongoing operation of the mine including additional ventilation systems and access for workers. Consultation with the DoP has indicated that an approval under Part 3A of the EP&A Act should be sought to cover Stage 3 of the project.

A summary of the key features of Stage 3 include:

- longwall extraction of coal in panels A6 to A18 using LTCC technology to enable extraction of up to 7 metres of coal from the Greta seam;
- new pit top facilities to be constructed south west of Kitchener, including the main mine ventilation fan, bath house, workshop, electricity sub station, store and offices on land that is owned by Austar and is bordered by Aberdare State Forest;
- continued use of existing coal handling, preparation and transport systems; and
- continued employment opportunities for approximately 200 people initially and ultimately up to 275 people when the mine reaches full production capacity.



Base Source: LPI NSW 1:25 000 Topographic Maps
Source: Austar Coal Mine

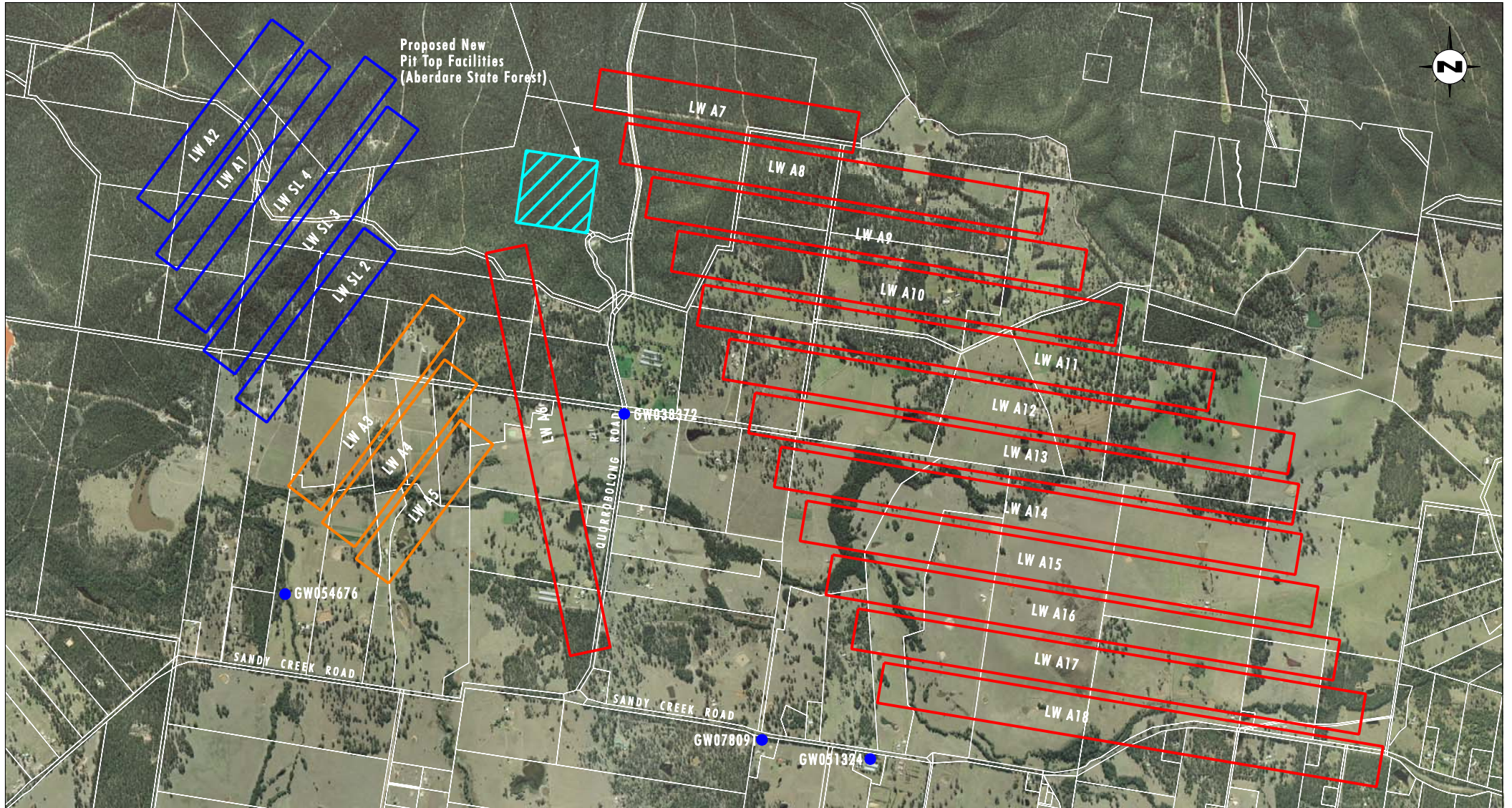
0 1.0 2.0 4km
1:100 000

Legend

- ▬ Stage 1 Longwalls Panels
- ▬ Stage 2 Longwalls Panels
- ▬ Stage 3 Longwalls Panels
- ▬ CML2 Boundary

FIGURE 1.1

Locality Plan



Source: AAM Hatch Aerial Photography (August 2006), Austar Coal Mine

0 0.5 1 1.5 km
1:30 000

Legend

- ▭ Stage 1 Longwall Panels
- ▭ Stage 2 Longwall Panels
- ▭ Stage 3 Longwall Panels

FIGURE 1.2

Site Layout

The layout of the site is presented in **Figures 1.2** and **1.3**.

Stage 3 of the project is classed as a 'Major Project' under Part 3A of the EP&A Act and therefore requires the approval of the NSW Minister for Planning. It is planned to lodge the Environmental Assessment report with the DoP in the last quarter of 2007.

1.2 Site History

Austar Coal Mine (Austar) is an aggregate of the former Ellalong, Pelton, Cessnock No.1 (Kalingo) and Bellbird South Collieries near Cessnock (refer to **Figure 1.1**). The mine was originally developed from the old Pelton Colliery. Longwall production commenced in 1983 and continued until the mine, then known as Ellalong Colliery, was closed in May 1998 by Oakbridge. Southland Coal then acquired the assets of Ellalong and Pelton Collieries and amalgamated those with Bellbird South, which was also owned by Southland Coal.

Southland Coal developed a longwall operation that mined the substantial Bellbird South coal reserves utilising the existing Ellalong facilities and infrastructure. Equipment was upgraded and replaced as required. In December 2003 a fire broke out in the underground workings. Actions were taken to extinguish the fire, however, the mine was ultimately placed on care and maintenance and the company went into receivership.

Yancoal purchased the mine in December 2004 and changed the name to Austar Coal Mine. In June 2005, Austar recommenced mining in accordance with DA 29/95, which was granted as a result of the Ellalong Colliery Extension into Bellbird South EIS (HLA 1995). The Minister for Planning approved a modification to DA 29/95 in September 2006 which allowed the introduction of LTCC technology into Austar Coal Mine.

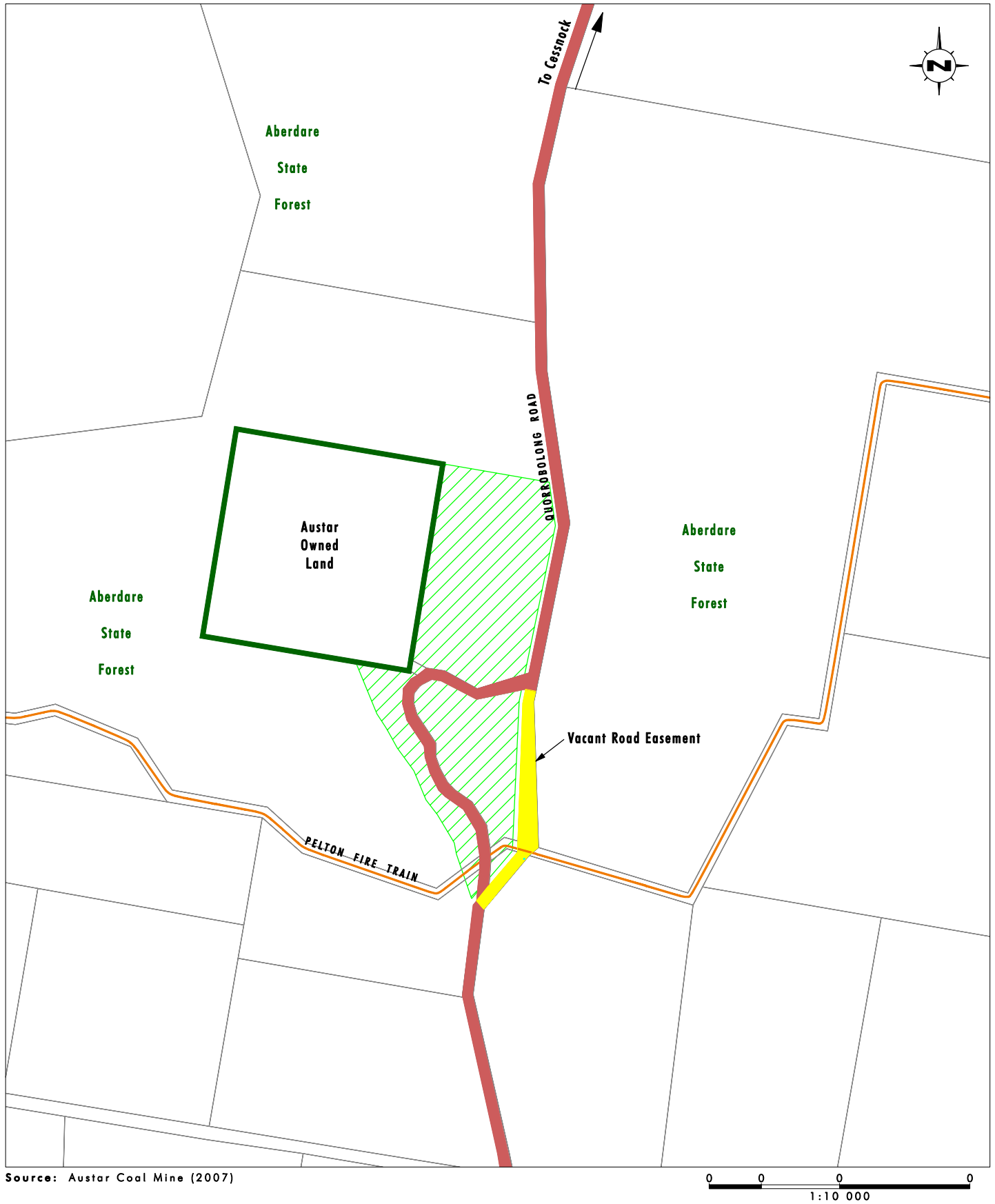
1.3 Purpose of the Document

This Preliminary Environmental Assessment has been prepared by Umwelt (Australia) Pty Limited (Umwelt), on behalf of Austar. It provides an overview of the project and the key environmental issues and will assist in the preparation of the Director-General's requirements (DGR's) for the Environmental Assessment.

Project planning, environmental impact assessment and community consultation are ongoing. Information presented in this document is therefore preliminary and may change to reflect outcomes of the environmental assessment and mine planning processes.

1.4 The Proponent

Austar owns and operates the mine which was formerly known as Southland Colliery. Austar is owned by Yancoal Australia Pty Ltd, which is a subsidiary of Yanzhou Coal Mining Company Limited. Yanzhou is one of China's largest coal producers. It was established in September 1997 and owns and operates six mines in China.



Legend

Land Proposed to be Excised from Aberdare State Forest

FIGURE 1.3

**Proposed Location of
Pit Top Facilities**

2.0 Project Description

2.1 Existing and Approved Operation

The Minister for Urban Affairs and Planning granted development approval in 1996 subject to certain conditions. 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.

The key activities approved under the 1996 consent include:

- mining of up to 3 million tonnes of coal per annum;
- transfer of the coal by underground conveyor to the surface;
- washing and preparation of coal;
- stockpiling of raw and washed coal;
- reject emplacement; and
- transport of product coal by rail (98%) and road (up to 60,000 tonnes) to the Port of Newcastle.

To allow for the introduction of LTCC technology to be introduced, DA No. 29/95 was modified under Section 96 (2) of the EP&A Act by the Minister of Planning dated 27 September 2006. A new Schedule 2 and set of Administrative Conditions replaced the 1996 Schedule 2 set of conditions. Relevant extracts are reproduced below.

The Applicant shall carry out the development generally in accordance with the:

- a) DA 29/95 and accompanying Environmental Impact Statement prepared by HLA Enviroscience Pty Limited, dated August 1995.*
- b) Modification application MOD-49-4-2006 and accompanying Statement of Environmental Effects, titled Austar Coal Mine Section 96 Modification, prepared by Environmental Resources Management Australia Pty Ltd (ERM) and dated April 2006.*
- c) Information from ERM clarifying the modification application MOD-49-5-2006, dated 13th July 2006.*
- d) Conditions of this consent.*

If there is an inconsistency between the above documents, the latter document shall prevail over the former to the extent of the inconsistency. However, the conditions of this consent shall prevail over all other documents to the extent of any inconsistency.

2.2 Exploration History and Resource Description

Given the history of exploration and mining in the area, the geology and resources are generally well understood.

Exploration in the area was originally conducted by Bellbird and Cessnock No. 1 Collieries. In 1986, Southland Coal drilled three cored holes and 44 kilometres of seismic survey reflection. In 1990-1991 an additional 16 cored holes were drilled and a further 30 kilometres of seismic survey undertaken. In 1994, Newcastle Wallsend Coal Company conducted a seismic survey along a suspected fault structure. Two non-cored holes were also drilled to confirm the results of the survey (HLA 1995).

During 2006, Austar Coal Mine completed 4 exploration holes totalling 2116 metres within Stage 2 area. Three monitoring holes (1307 metres) were drilled and surface extensometers and vibrating wire piezometers installed. The extensometers were installed over Longwall A1 and the adjacent chain pillar to monitor the height of vertical cracking or softening as a result of longwall goafing. The hole, equipped with a suite of piezometers, was located immediately west of the proposed Longwall A2 and designed to monitor the aquifers above the Greta Seam.

Drilling recommenced in January 2007 with a new exploration program of non-cored holes with core tails over the Stage 3 area. To date four holes have been completed totalling 2021 metres. Exploration drilling is scheduled to be ongoing throughout the rest of 2007 to fully evaluate the Stage 3 area. Austar is located in the South Maitland Coalfield. The seam to be mined is the Greta seam, a stratigraphic unit of the Greta Coal Measures, occurring at depths of approximately 400 to 680 metres, with marine sandstones and siltstones of the Maitland Group extending from coal measures to the surface (HLA 1995). The Greta Seam is part of the south-eastern flank of the Lochinvar Anticline, the crest of which lies to the west of Cessnock and plunges to the south-west.

The Greta Seam generally dips to the south-east at about 1 in 15. Within CML2, the seam dips at 1 in 13 to 1 in 16 to the east and south-east, with local dips in the south-eastern corner of 1 in 6.5 to the east and 1 in 8 to the north.

The seam ranges in thickness from 3 metres to 5 metres in the previous Ellalong lease and 5 metres to 8 metres in the Bellbird South lease. This thickness range is suited to support high productivity from LTCC operations and allows management of coal quality and mining conditions.

Sulphur content, as in the old neighbouring mines, is generally higher in the top sections of the seam. Both organic and pyritic sulphur are present. Total sulphur in the product coal is maintained at 1.5% by controlling the working section and by screening and washing of the raw coal delivered to the Preparation Plant.

2.3 Coal Reserves

Within Stage 3, the latest Resource Assessment has shown that there exists an Indicated Resource of 71.4 Mt within the entire Greta Seam. The Indicated Resource is reduced to 66.3 Mt, as extraction is limited to coal with less than 1.5% sulphur.

To the south and south-east of Stage 3, an additional Inferred Resource of 17 Mt exists.

The use of the LTCC method provides Austar with the opportunity to maximise the recovery of the *in situ* coal resources.

2.4 Mining Operations

2.4.1 Mine Plan

The conceptual mine plan for Stage 3 reflects a 21 year life with extraction of up to 3 Mt of coal annually. The annual production rate will vary depending on the seam, mining conditions and the timing of longwall panel changeovers. The conceptual mine plan is shown in **Figure 1.2**.

2.4.2 Longwall Top Coal Caving

Any seams that have been usually 5 metres in thickness or greater have not been able to be fully extracted by conventional methods of coal mining. LTCC is a method of mining that has been in practice in one form or another for over 130 years and is designed to extract thicker coal seams by recovering coal that would otherwise be lost in traditional forms of longwall mining.

LTCC was introduced to China approximately 15 years ago and to Austar (Stage 1) in October 2006. Recent modifications to the technique at a number of underground coal mines in China have resulted in impressive coal recovery rates and performances (Xu 2001).

LTCC has provided enormous interest to both the regulators and operators within Australia. It allows for significant improvements in the safe and reliable extraction of thick coal seams, optimising resource recovery and affording a lower operating cost per tonne of coal extracted.

LTCC combines a conventional retreat longwall face with a second armoured face conveyor (AFC) towed behind the shield to recover coal that falls into the goaf. 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 continues until all of the coal is recovered and waste rock appears. Once waste rock appears, the tail canopies are lowered and the AFC pulled forward to stop the recovery of rock from the goaf (ERM 2006).

As described in 2006 Modification for Stage 1 operations (ERM 2006), LTCC consists of the following operational steps:

- 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.

A schematic outlining the LTCC process is shown in **Figure 2.1**.

The introduction of LTCC into the Australian coal mining industry was a collaborative achievement between Australian, Chinese and German engineers. The equipment was customised to meet the design requirements for operating within the New South Wales regulatory framework. Both the mining unions and the Department of Primary Industries

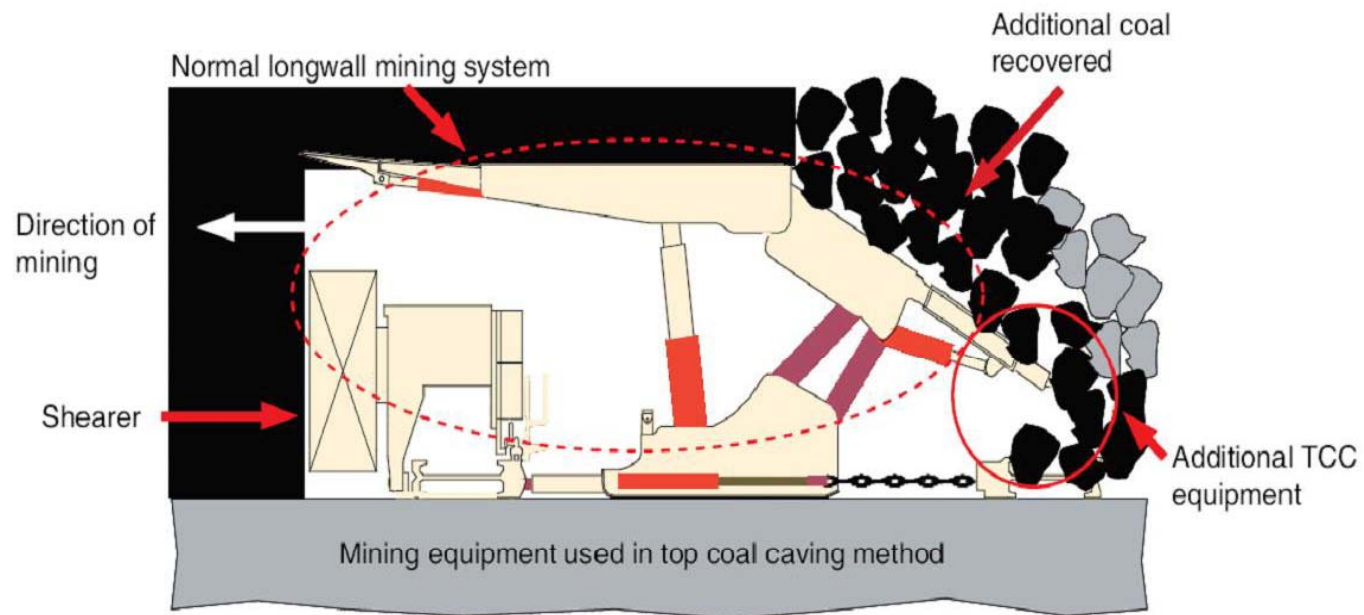


FIGURE 2.1
LTCC Schematic

safety division were integral in the process and were involved from the early stages of the project's inception.

As at 20 May 2007 in Longwall A1, the first panel extracted using LTCC, the system has extracted 0.477 Mt of top coal and 1.055 Mt total tonnes at a recovery rate of 88%. This compares with 49% recovery had the conventional longwall equipment previously in use at the mine been utilised.

There has been a noticeable improvement in strata control with the introduction of the LTCC equipment and zero lost time injuries. A maximum 0.069 metres of surface subsidence has been recorded to date. This is in line with the 0.1 – 0.2 metres of subsidence predicted for the extraction of Longwall A1.

Productivity of the LTCC equipment has been in line with business plan and is infrastructure constrained.

2.5 Mine Infrastructure

The project has been designed to maximise the use of approved existing Austar infrastructure, including rail facilities and the coal handling and preparation plant (CHPP). The existing CHPP is approved to handle up to 3 Mtpa of coal and will not require any modifications or changes to support the continued operation of the mine in Stage 3. A new pit top facility is needed to support mine ventilation systems, in addition to access for personnel. The existing and proposed infrastructure is shown in **Figures 1.1** and **1.2**, with further detail regarding project infrastructure included below.

2.5.1 Pit-Top Facilities

The location of the existing pit top facility is shown on **Figures 1.2** and **1.3**. This facility will be retained and continue to function as the main access point for equipment and maintenance of the mine. Coal will continue to be brought to the surface at this location via the Ellalong Drift.

It is proposed to construct an additional pit top facility on a 16 hectare parcel of land to the south-west of Kitchener (refer to **Figure 1.3**). This land is owned by Austar and was originally purchased with the sole intent of developing it as a pit top facility. The new pit top facility will include upcast and downcast shafts, access to the mine for personnel, bathhouse, offices, car parking and services such as an electricity sub-station. Further details on the configuration of the pit-top facilities will be provided as part of the environmental assessment.

The site of the new pit top facility is surrounded by Aberdare State Forest, which will soon be dedicated as a State Conservation Area. To allow time to complete detailed planning of the pit top facility, a request has been made to the Minister for the Department of Environment and Climate Change (DECC) to temporarily excise a small area of the proposed conservation reserve adjacent to Quorrobolong Road (refer to **Figure 1.3**). Closer consideration of the site and adjoining areas has identified alternative development options that offer environmental and community benefits. However, to facilitate these options it will require the swap of land between Austar and the State Government. This has been raised with the key stakeholders and is expected to be resolved prior to the submission of the environmental assessment in late 2007.

2.5.2 ROM Coal Clearance System

Coal from the underground workings will be delivered to the existing underground conveyor system. The underground conveyor network delivers coal to a 2000 tonne surface storage bin at the Ellalong Drift site. From the surface bin it is transported by an existing overland conveyor to the CHPP.

2.5.3 Coal Handling Preparation Plant

The CHPP has approval and the capacity to process up to 3 Mtpa of coal. It is not proposed to make any modifications or changes to the existing CHPP.

All ROM coal is delivered to the CHPP via an overland conveyor from the existing pit top facility (refer to **Figure 1.1**). Prior to entering the CHPP, the raw coal is passed through a sizer, which breaks the coal down to approximately 150 mm. Depending on the operational requirements of the CHPP, coal is then sent either directly to the CHPP, or temporarily stored in the raw coal surge bin or the ROM stockpile.

2.5.4 Product Coal Transportation

The existing coal loading facility will not require any changes or modifications and is approved to handle up to 3 Mtpa. The majority (98%) of coal will be transported from the site via Austar's existing rail facility and delivered to the Port of Newcastle for export. Up to 60,000 tonnes of specialty sized coal will continue to be delivered to the port by road.

It is expected that the current restrictions and lack of capacity at the Port of Newcastle will be resolved by 2009 and the mine will be able to move into full production, and transport up to 3 Mtpa.

2.5.5 Site Access

There are no changes proposed to the existing pit top facility or CHPP. Access to the new pit-top facility will be off Quorrobolong Road. It is proposed to construct a new intersection on Quorrobolong Road to allow for the safe entry and exit of all mine vehicles.

Sections of Quorrobolong Road may also require upgrade works following subsidence throughout the life of the project, however, these works will be primarily pavement repair and minor upgrade works.

2.5.6 Site Services

Site services required for the project include:

- power including a small sub-station;
- potable water and reticulated sewerage to be provided by Hunter Water Corporation;
- telecommunications to be provided by Telstra; and
- minor access roads and other such minor infrastructure within the project mining leases.

2.6 Workforce and Hours of Operation

Once at full production, the project will employ approximately 275 people in addition to a range of contractors.

The mine including the CHPP will continue to operate 24 hours per day, 7 days per week.

2.7 Alternatives and Justification

2.7.1 Project Alternatives

Austar has undertaken a range of studies into the proposed mining operation. As part of this process, a range of alternative mine plans and infrastructure servicing options have been developed.

Detailed assessments of flooding, subsidence and ecology impacts have been undertaken as part of the assessment of current operations and management plans developed for Stage 1 and 2 operations. These assessments have identified a number of potential environmental constraints and recommended a number of mitigation measures. These potential constraints and current mitigation measures will be taken into account during the preparation of the EA.

The alternative of not proceeding has also been considered. However, it is expected that the environmental and social impacts of the project can be effectively managed and not proceeding would result in the loss of the substantial economic benefits of the project.

Minimising environmental and community impacts and maximising economic resource recovery will be the major considerations in the evaluating alternative options as part of the EA for the project. Alternatives to be considered will include location of surface facilities and mine configuration.

2.7.2 Project Justification

The project is situated within a known coal reserve and is a logical continuation of an existing mine. Existing approved infrastructure will be utilised, which will ensure that coal production is achieved in an economic manner, providing for project viability. It will also minimise the potential environmental and community impacts associated with construction of substantial new infrastructure.

The project will provide a number of significant economic benefits to the state of NSW and Australia, including:

- continued employment of approximately 200 people and contractors. When the mine reaches full production up to 275 people will be employed with many more indirect jobs created through flow-on effects;
- economic recovery of approximately 3 Mtpa of export quality coal;
- payment of significant royalties to the State of NSW;
- significant export earnings for Australia; and

- significant economic benefits to the local community through local employment, purchase of goods and services, and local expenditure, both directly and through employee wages.

The EA for the project will demonstrate that the above economic benefits of the project can be achieved, whilst impacts on the environment and local community managed. A preliminary assessment of the potential environmental and social impacts associated with the project is provided in **Section 4**. The proposed methodology that will be used to assess the potential impacts in the EA is also provided in **Section 4**.

3.0 Planning Considerations and Consultation

3.1 Planning Considerations

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

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

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

Table 3.1 - Other Potentially Relevant Acts and State Planning Policies

Planning Provision	Comments	Relevant Licences/ Approvals/Assessments
Commonwealth Legislation		
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Threatened species and a number of migratory species listed in the EPBC Act have been recorded in the general vicinity of the project area and an assessment of the impacts of the project on these species is required. This assessment will be completed as part of the ecological assessment.	A preliminary Referral will be made to the Department of Environment and Water Resources (DEWR) to confirm whether the approval of the Commonwealth Minister is required. Based on the recent Bilateral agreement between the DoP and the DEWR, DoP can now assess issues previously assessed by DEWR.
NSW Legislation – State Environmental Planning Policies		
State Environmental Planning Policy 11	<i>SEPP No. 11</i> requires that the RTA is made aware of and given the opportunity to make representations in respect of, developments listed in Schedule 1 of the SEPP.	As mining is listed in Schedule 1 the RTA will be consulted regarding the project.
State Environmental Planning Policy 33	<i>SEPP No. 33</i> requires the consent authority to consider whether an industrial proposal is a potentially hazardous industry or a potentially offensive industry. A hazard assessment is completed for potentially hazardous development to assist the consent authority to determine acceptability.	The existing Austar operations are not considered as hazardous or offensive, and as this project is essentially a continuation of an existing use; a hazard assessment is not considered necessary.

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

Planning Provision	Comments	Relevant Licences/ Approvals/Assessments
State Environmental Planning Policy 44	<i>SEPP No. 44</i> restricts a Council from granting development consent for proposals on land identified as core koala habitat without preparation of a plan of management.	A koala habitat assessment will be completed as part of the ecological assessment. However, no core koala habitat is expected in this area.
State Environmental Planning Policy (Major Projects) 2005	As discussed above, this project is of a class of development listed in the SEPP. The project therefore requires approval under Part 3A of the EP&A Act and the Minister for Planning will be the consent authority.	Assessment under Part 3A of the EP&A Act.
NSW Legislation – Acts		
<i>Mining Act 1992</i>	Under this Act, a ML is required before any mining can take place.	Austar currently hold CML2 which covers the majority of the project area. CML2 is due to expire in May 2009 and a renewal will soon be sought including the area of Stage 3 that is currently outside of the CML2.
	A Mining Operations Plan (MOP) is required to be submitted to the Department of Primary Industries for their approval prior to the commencement of mining.	Approval of a Mining Operations Plan by the DPI.
	A Subsidence Management Plan (SMP) required to be submitted to the DPI.	Approval of a Subsidence Management Plan by the DPI.
<i>Coal Mine Health and Safety Act 2002</i>	The <i>Coal Mine Health and Safety Act 2002</i> and associated regulations 2006 are the principal legislation governing coal mining operations. To undertake longwall mining, Clause 88 of the regulations requires the approval of the Minister.	A Clause 88 of the Coal Mines Health and Safety Regulation 2006 approval is required prior to longwall extraction.
	Approval is also required under section 100 of the Act for the establishment of reject emplacement areas.	A section 100 approval may be required for emplacement areas.
<i>Mine Subsidence Compensation Act 1961</i>	Approval of the Mine Subsidence Board (MSB) is likely to be required for the construction of surface infrastructure associated with the project, except where exemptions apply.	Approval of the MSB is likely to be required for the construction of surface infrastructure.

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

Planning Provision	Comments	Relevant Licences/ Approvals/Assessments
NSW Legislation – Acts		
<i>Environmentally Hazardous Chemicals Act 1985</i>	The Department of Environment and Climate Change (DECC) is granted power under the <i>Environmentally Hazardous Chemicals Act 1985</i> to assess and control chemicals and declare substances to be chemical wastes. A licence is required for any storage, transport or use of prescribed chemicals.	A licence will be required under this Act if any prescribed chemicals are proposed to be stored or used as part of the project. Further details will be provided in the Environmental Assessment report.
<i>Protection of the Environment Operations Act 1997</i>	The PoEO Act is administered by DECC and requires licences for environmental protection including waste, air, water and noise pollution control.	A new licence or licence variation will be required for the project.
<i>Roads Act 1993</i>	The <i>Roads Act 1993</i> is administered by the Roads and Traffic Authority (RTA), local council or the Department of Lands; the RTA has jurisdiction over major roads, the local council over minor roads, and the Department of Lands over road reserves. The Act requires that applications for the closure of Crown roads be made to the Minister. A consent under Section 138 of the Roads Act is required in order to undertake works within a road reserve.	The project has the potential to impact on Crown Roads and road reserves and Council Roads and road reserves. Approval under this Act will be required.
<i>Crown Lands Act 1989</i>	The Act provides for the administration and management of Crown land in the eastern and central divisions of the State. Crown land may not be occupied, used, sold, leased, dedicated, reserved or otherwise dealt with unless authorised by this Act or the <i>Crown Lands (Continued Tenures) Act 1989</i> .	The approval of the Department of Lands will be required for any works within Crown road reserves, should they not be closed prior to these works as discussed above.

3.2 Authority Consultation

The authority consultation process for the project has commenced with initial briefing meetings held with the DoP and the DECC.

Initial discussions have also been held with a number of other agencies, particularly in relation to obtaining relevant baseline information.

DoP has advised that this Preliminary EA will be provided to all relevant agencies prior to the conduct of a Planning Focus Meeting to further discuss the project and identify and assess key environmental issues to be addressed as part of the EA.

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

- Department of Water and Energy;
- Department of Environment and Climate Change;

- Cessnock City Council;
- Department of Primary Industries (Mineral Resources);
- Department of Lands;
- NSW Heritage Office;
- Commonwealth Department of Environment and Water Resources;
- NSW Premier's Department; and
- Hunter-Central Rivers Catchment Management Authority.

The Commonwealth DEWR will be consulted regarding the project, and a Preliminary Referral made under the EPBC Act, to confirm whether the project is a controlled action under the EPBC Act. Based on the recent Bilateral agreement between the DoP and the DEWR, should DEWR have any assessment requirements, the DGR's may be expanded to include these requirements (refer **Section 3.1**).

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

Consultation with relevant agencies, community and stakeholders will be undertaken throughout the course of preparing the EA.

3.3 Community Consultation and Social Impact Assessment

Austar has had ongoing consultation with the local community and landholders since the mine recommenced operation in 2005. The mine has developed relationships with neighbouring properties, as well as nearby communities.

A series of information sheets detailing Austar's planned operations were distributed to landholders and residents in Ellalong, Kitchener, Abernethy, Paxton, Pelton and Quorrobolong in 2006.

In July 2006 and in 2007, landholders potentially affected by Stage 1 and Stage 2 operations were consulted during the preparation of the various approval applications. Austar is preparing individual Property Subsidence Management Plans with each landholder, as part of the mines overall Subsidence Management Plan for mining. Austar has also held meetings with a number of community groups during 2006 and 2007, such as:

- Cessnock Landcare;
- Cessnock Tidy Town;
- Minewatch NSW Inc;
- Coalfields Heritage Group;
- Kurri Kurri Chamber of Commerce; and
- Wollombi Chamber of Commerce.

In February 2007, the Austar Coalmine Community Consultative Committee commenced under the guidance of an Independent Chair, approved by the Director-General of the DoP. The committee has one representative from Council and four representatives from the local community.

It is acknowledged that this proposal involves considerable stakeholder interest at all levels. As part of the EA for the project, a detailed Social Impact Assessment (SIA) and community consultation program will be developed to build upon the previous work undertaken for the earlier stages of the project.

The objectives of the community consultation program will be to:

- initiate and maintain open communication with the community on all aspects of the project, particularly landholders and key stakeholder groups;
- identify community issues and concerns in relation to the project;
- proactively respond to, and work with the community to develop appropriate solutions and strategies to minimise negative impacts and maximise the positive impacts associated with the project; and
- satisfy any EA requirements for the socio-economic aspects of the project.

The community consultation program will involve extensive consultation with members of the local community (e.g. employees, local landholders, community groups and other interested stakeholders), to ensure that the social and economic impacts associated with the project are documented and where possible, addressed through appropriate development. A SIA developed from the community consultation program will document:

- the effect of the proposal on nearby communities;
- the compatibility of the proposal with local community values and existing land uses;
- the identification of the socio-economic benefits and costs of the proposal; and
- the identification of social impacts on local infrastructure, services and facilities.

The engagement process will be ongoing throughout the project and will include discussions and initial feedback from a broad cross-section of the community, followed by a more detailed process to inform and engage a wide range of stakeholders who may be interested in the project.

The detailed engagement component of the community consultation program will draw on Austar's existing community links and networks across a number of local groups and associations.

The community consultation program will use a range of methods to ensure consultation in regard to the project reaches a wide range of people. To support the engagement process, public information about the project will be accessible on a project website, distributed in newsletters to local residents, and be contained in regular briefings in the media. Relevant Austar personnel will be available to respond to enquiries in relation to the proposed development.

It is expected that during consultation, other groups or individuals of interest will be identified and be included in the consultation process. All findings will be recorded, summarised and presented for inclusion in the EA.

4.0 Preliminary Environmental Assessment

4.1 Environmental and Community Context

4.1.1 Nature of Site and Surrounds

The project area is located in the lower Hunter Valley, approximately 12 kilometres south of Cessnock and approximately 5 kilometres north-east of the village of Ellalong (refer to **Figure 1.1**). Other nearby villages include Kitchener, Aberdare, Pelton, Paxton and Bellbird.

The topography of the project area comprises three main morphological units (Epps and Associates 1988). These include:

- the Broken Back Range;
- alluvial flats and associated creeks; and
- the intervening, undulating lands.

The Broken Back Range is a major landform extending from west of Pokolbin to Mulbring. It is characterised by steeply sloping land reaching a height of RL 228 metres.

The project area is located immediately to the south of Broken Back Range. The area encompasses the gentle south facing lower slopes of the Broken Back Range and the extensive creek flat of the Quorrobolong Creek system.

The climate of the Lower Hunter Valley is described as warm temperate, characterised by seasonal variations from hot wet summers to mild dry winters. Rainfall is summer dominant, often occurring as short duration high intensity storms. The area receives an average of approximately 780 mm of rainfall per annum over an average of 109 rain days per year.

The soil types occurring within the project area are mapped on the 1:25,000 Quorrobolong and Cessnock Soil Landscapes Map Sheet. Four soil units were identified in the Bellbird South EIS (HLA 1995). These being:

- Wallaby Gully brown podzolic;
- Kutting yellow podzolic;
- Quorrobolong yellow podzolic; and
- Millfield red podzolic soil.

Preliminary analysis based on soil landscape mapping undertaken by the Soil Conservation Service (1991), indicates that a section of the project area is located within the Quorrobolong Soil Landscape. The yellow podzolic soils of this landscape occur across the floodplains of Cony Creek, Sandy Creek and their tributaries. The A horizon consists of dark brown loamy sand, overlying a bleached yellow/orange A₂ horizon. The B horizon is characterised by brown sandy clay (HLA 1995:4.6 and Kovac & Lawrie 1991:316). These soils are highly dispersive and erodible.

The lower slopes of Broken Back Range are located within the Aberdare Soil Landscape. This brown podzolic soil is characterised by poorly structured dark brown loamy sand to clayey sand A horizons, overlying a dark brown light clay B horizon (HLA 1995:4.6). The

topsoil and subsoil of brown podzolic soils is also highly erodible. The ramifications of these soil characteristics will be assessed during preliminary studies.

Much of the soil within the Cessnock City Council LGA is of low fertility and highly erodible (Cessnock City Council 2003).

The project area is surrounded by rural residences, forests and abandoned mine workings. Aberdare State Forest is located to the north and east of the mine plan and surrounds the proposed new surface infrastructure site. Farms and forested areas are situated to the south of the site.

4.1.2 Land Ownership

Land ownership groups within the project area and surrounds is shown on **Figure 4.1**. As indicated on **Figure 4.1**, Austar owns all the land where surface facilities are proposed, with proposed mining areas including Austar owned land and privately owned land. The northern portion of the mine plan extends underneath the Aberdare State Forest and Crown land. As shown on **Figure 4.1**, much of the land surrounding the project area is currently State Forest and rural land holdings.

Each landholder within the Project Application area will be consulted regarding the project and will be provided with baseline data specific to their property. The potential interaction of each property with the conceptual mine plan will be discussed with each landholder.

During the EA preparation, extensive consultation will be undertaken to ensure that issues raised by residents and nearby landholders are addressed in the environmental assessment and mine planning process.

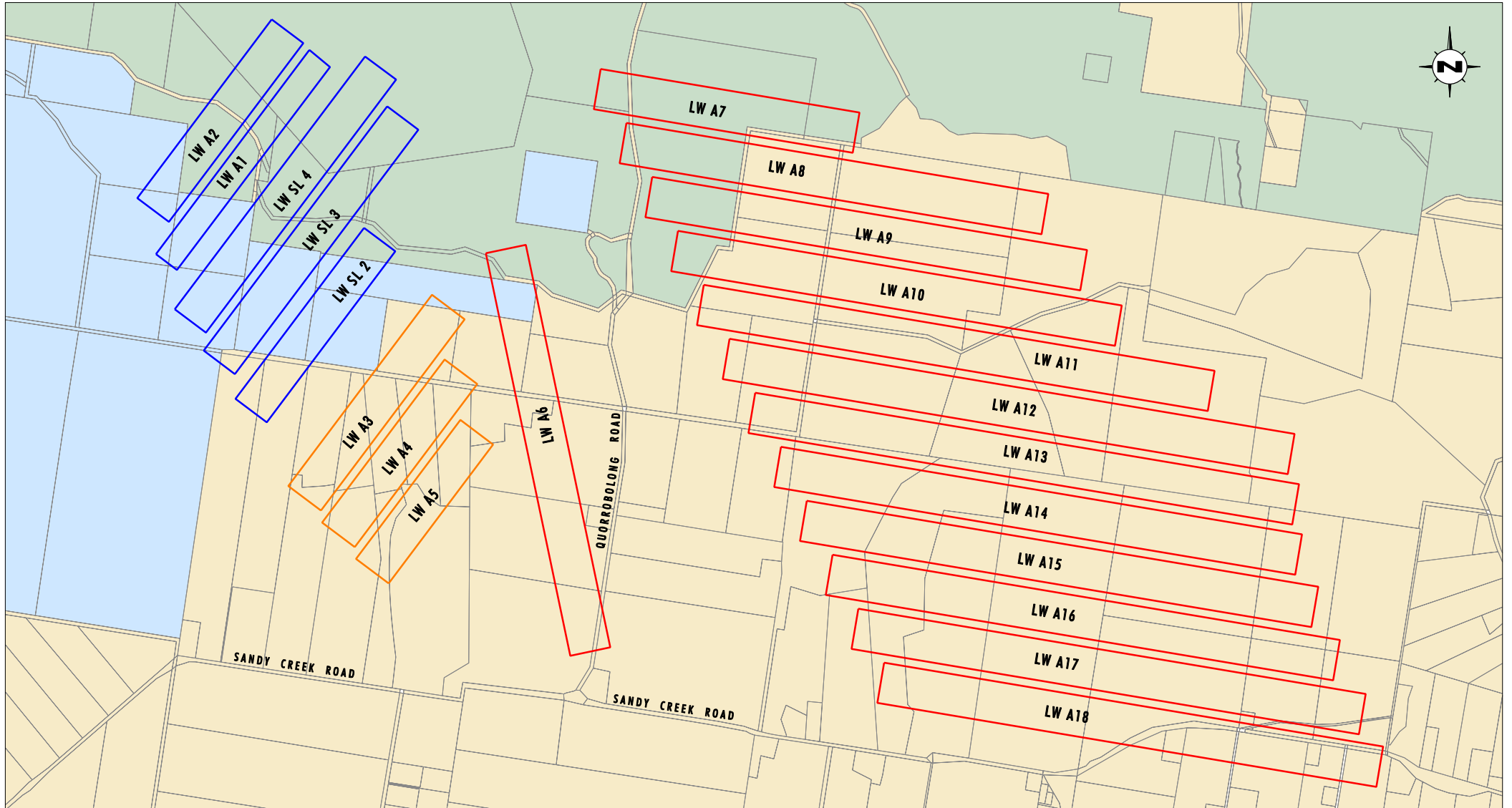
Prior to any property being subsided greater than 20 mm, a Property Subsidence Management Plan will be developed in consultation with each affected landholder. This plan will detail the mining subsidence development specific to each property and the management processes that will be employed during the mining. This will include detailed pre-mining condition of surface and natural features and a pre-damage report for each house by a structural engineer. It will provide impact predictions for each identified feature requiring management and a summary of the management measures to be adopted.

4.1.3 Land Use

An underground coal mine has existed at Pelton/Ellalong since 1916. Deep mining commenced in the late 1970s, but has been intermittently discontinuous since 1992, due to localised high seam gas levels and an underground spontaneous combustion incident.

The dominant land uses within and adjacent to the project area include grazing, forestry and mining. Much of the underground mining area and the majority of surface infrastructure will be located within an existing mining lease held by Austar. Land to the north of the mining lease is currently part of the Aberdare State Forest. Land to the south of the mining lease consists of rural cattle grazing and poultry production.

Beef cattle grazing and horse grazing are undertaken on undulating land surrounding the project area to the east and south. Residential development is present at Kitchener, Abernethy, Bellbird, Paxton, Pelton and Ellalong.



Source: AAM Hatch Arial Photography (August 2006), Austar Coal Mine

0 0.5 1 1.5 km
1:30 000

Legend

- ▭ Stage 1 Longwall Panels
- ▭ Stage 2 Longwall Panels
- ▭ Stage 3 Longwall Panels
- ▭ Austar Owned Land
- ▭ Aberdare State Forest / Crown Land
- ▭ Privately Owned Land

FIGURE 4.1
Land Ownership

4.2 Preliminary Environmental Risk Analysis

To assist in identifying the key environmental and community issues that require further assessment, a preliminary environmental risk analysis has been completed for the project and is included in **Appendix 2**. The risk analysis was completed using the risk assessment process described in *AS/NZS 4360:2004 Risk Management*. The risk matrix, consequence table and likelihood table used for the assessment is included in **Appendix 2**.

Consistent with AS/NZS 4360, environmental risks have been categorised as low, medium, high or extreme. As shown in **Appendix 2**, the majority of activities are rated as low or medium level risks, with few high risks and no extreme risks. It is expected that with the completion of further studies and assessment as outlined in **Section 5.0**, most of these high risks will be able to be reduced to medium level risks, due to better definition of potential impacts and effective implementation of management and mitigation measures.

The preliminary environmental risk analysis included in **Appendix 2** also identifies those issues considered to require further assessment. The scope of further assessment required for these issues as part of the Environmental Assessment report is discussed in further detail in **Section 5.0**. Where appropriate, the proposed controls contained in the preliminary environmental risk analysis will be included in the draft Statement of Commitments in the Environmental Assessment report. No further assessment is considered necessary for some potential environmental issues as indicated in **Appendix 2**.

5.0 Key Environment and Community Issues

The key environment and community issues for this project have been determined through the preliminary environmental risk analysis discussed in **Section 4.2** and through the community consultation program. These issues are discussed in **Sections 5.1 to 5.10**, including a description of the proposed assessment methodology. The assessment of these issues will form the impact assessment section of the Environmental Assessment report prepared for the project.

5.1 Subsidence

Due to the project involving longwall extraction, subsidence impacts are likely to be one of the key issues for the project. A detailed subsidence assessment will be prepared for the Environmental Assessment by Mine Subsidence Engineering Consultants Pty Ltd (MSEC).

The key issues relating to subsidence impacts are likely to be potential:

- landholder concern about subsidence impact on their house and land, including the potential loss of agriculturally productive land;
- impact on creeks and drainage lines above the extraction area, including post-mining changes to flood hazard;
- impact on Aboriginal cultural heritage sites;
- impact on historic heritage sites;
- ecological impact, including impacts on aquatic ecology in affected drainage lines;
- impacts on infrastructure (e.g. Sandy Creek Road, Quorrobolong Road, access tracks, powerlines and farm dams); and
- impact of subsidence remediation works.

Preliminary subsidence predictions have been developed by MSEC for Stage 3 of the project. A summary of the preliminary subsidence assessment findings for Stage 3 and the assessment methodology to be used for the project is provided in **Sections 5.1.1** and **5.1.2**.

5.1.1 Preliminary Subsidence Assessment

Detailed assessments of subsidence impacts have been undertaken for Stage 1 and Stage 2 operations and Subsidence Management Plans (SMP) developed to manage potential impacts. The topography and stratigraphy in the Stage 3 area is similar to Stage 1 and Stage 2. Therefore, it is expected that any subsidence impacts associated with Stage 3 can be readily managed through similar practices to those employed or identified for use in Stages 1 and 2.

MSEC (2007) has undertaken a preliminary assessment of the subsidence levels for the conceptual mine plan proposed for the Stage 3. The analysis explores the likely systematic subsidence and valley related movements (based on the maximum expected subsidence level of 2.0 metres) and the upperbound systematic subsidence and valley related movements (based on the worst case scenario of 2.9 metres). The preliminary findings are summarised below:

- The maximum predicted systematic tensile and compressive strains across the area (during or after the extraction of longwalls) are of the order of 0.7 mm/m and 1.5 mm/m respectively. Maximum predicted tilts are assessed to be of the order of 6 mm/m. The maximum upperbound tensile and compressive strains are of the order of 1.0 mm/m and 2.5 mm/m respectively, with upperbound tilt assessed at 9 mm/m.
- It is expected that all residential dwellings will remain within the Safe, Serviceable and Repairable (SSR) limits, even if the upperbound subsidence levels were realised. Each house has had a preliminary assessment specifically conducted. Impacts to services and public infrastructure are likely to be low.
- It is expected that impacts to flora and fauna are also likely to be negligible.
- In relation to surface hydrology, it is likely that:
 - there will be no significant change to catchment boundaries;
 - there will be no significant change to channel alignment or bank stability;
 - there will be no significant change to in channel or out of channel ponding; and
 - groundwater availability to riparian vegetation is not likely to substantially change as a result of mining.

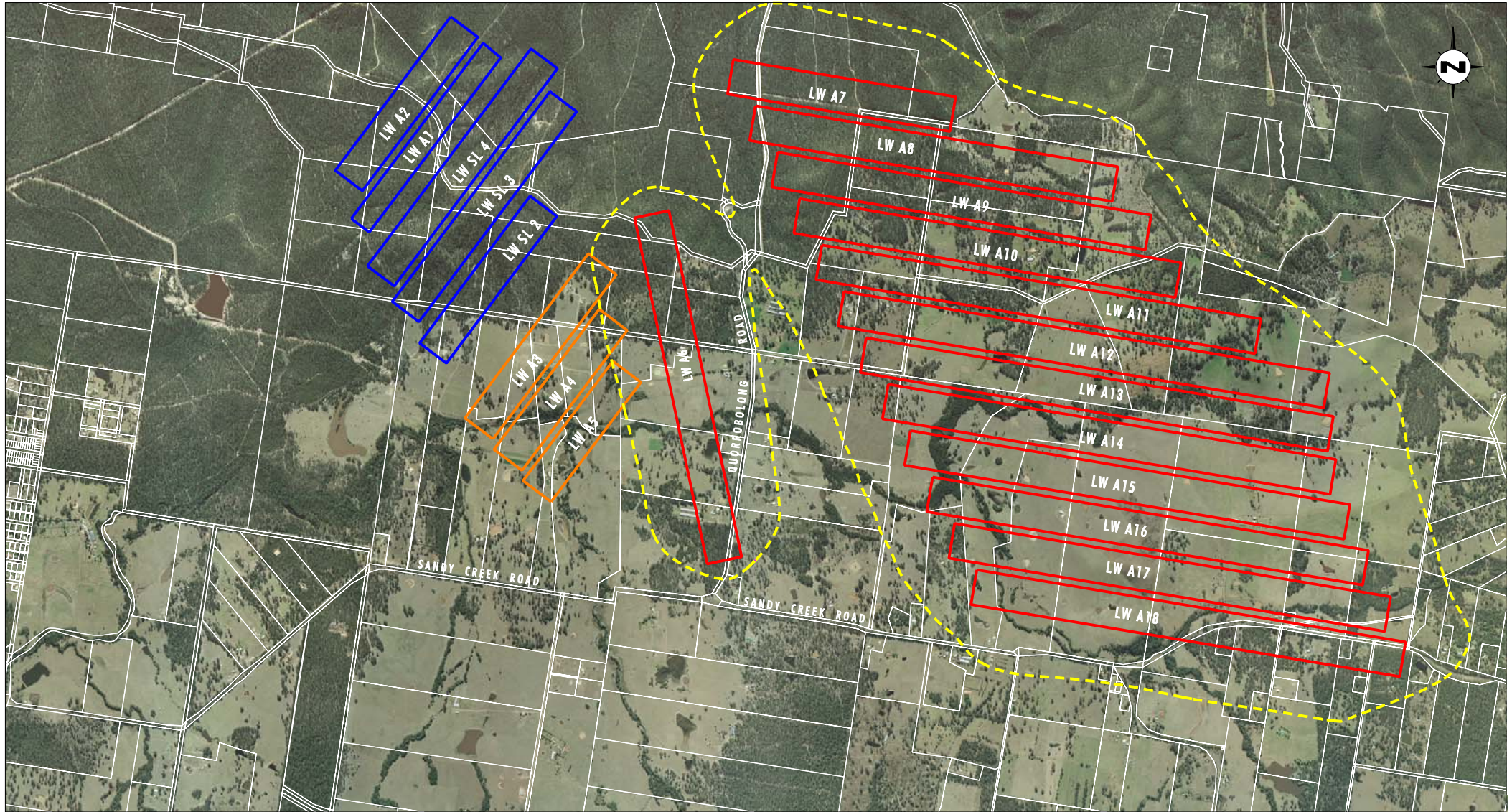
5.1.2 Environmental Assessment Methodology

There are a number of natural features and items of surface infrastructure in the vicinity of the proposed mining area that may be affected by subsidence from the proposed longwall mining. The findings above will be expanded on as part of a detailed Subsidence Assessment for the project, which will include assessment of the subsidence impacts of the thirteen longwall panels associated with Stage 3.

The potential 'Affected Area' is the surface area that is likely to be affected by subsidence from the conceptual mine plan. This area is defined as the surface area bounded by the predicted 20 mm subsidence contour, which by definition, is the 30 degree angle of draw line from the goaf edges of the proposed longwall panels to the surface. A preliminary estimate of the potential 'Affected Area' is shown on **Figure 5.1**.

The subsidence impact assessment completed for the Environmental Assessment will consider all the major natural features and items of surface infrastructure within the Affected Area. In addition to this, all other natural features and items of surface infrastructure outside of this area, which may be subjected to far field movements and are sensitive to these movements, will be considered in the assessment.

The Calibrated Incremental Profile Method developed by MSEC will be used to predict the systematic subsidence, tilt and strain profiles for the proposed longwalls and has been used for the preliminary assessment completed to date. Predictions will be made at points on regular grids across the Affected Area, orientated parallel and perpendicular to the proposed longwalls. A grid spacing varying between 15 metres to 25 metres in each direction will be used, providing sufficient resolution for the generation of subsidence, tilt and strain contours.



Source: AAM Hatch Aerial Photography (August 2006), Austar Coal Mine

0 0.5 1 1.5km
1:35 000

Legend

- ▭ Stage 1 Longwall Panels
- ▭ Stage 2 Longwall Panels
- ▭ Stage 3 Longwall Panels
- Subsidence Affectation Area

FIGURE 5.1

**Preliminary Subsidence
Affectation Area**

5.2 Water Management

The key aspects of the project relating to surface water flows and surface water quality that require further assessment were identified in the preliminary environmental risk analysis and include:

- potential impacts on flooding due to mine subsidence;
- project water balance;
- subsidence impacts on surface water flows and shallow groundwater flows and loss of shallow groundwater, including management of remediation works; and
- surface water management requirements for the new infrastructure site.

A description of the existing surface water environment, potential impacts associated with subsidence and the proposed assessment methodology is included below.

5.2.1 Catchment Description

Physical Setting

The mining area is located with the Sandy Creek/Cony Creek drainage system, which forms part of the Quorrobolong Valley (refer to **Figure 5.2**). The Quorrobolong Valley upstream of Ellalong Lagoon (including Quorrobolong, Sandy Creek and Cony Creeks) is approximately 87 km² and mainly comprises state forest and cleared agricultural land. The drainage system through the valley conveys runoff from the Broken Back and Myall Ranges to the west, past the township of Ellalong and into Ellalong Lagoon (approximately 7 kilometres downstream of the mining area). Overflows from Ellalong Lagoon flow into Congewai Creek, which flows in a westerly direction until the confluence with Wollombi Brook. Wollombi Brook flows in a northerly direction into the Hunter River, 10 kilometres upstream of Singleton.

Topography and Drainage

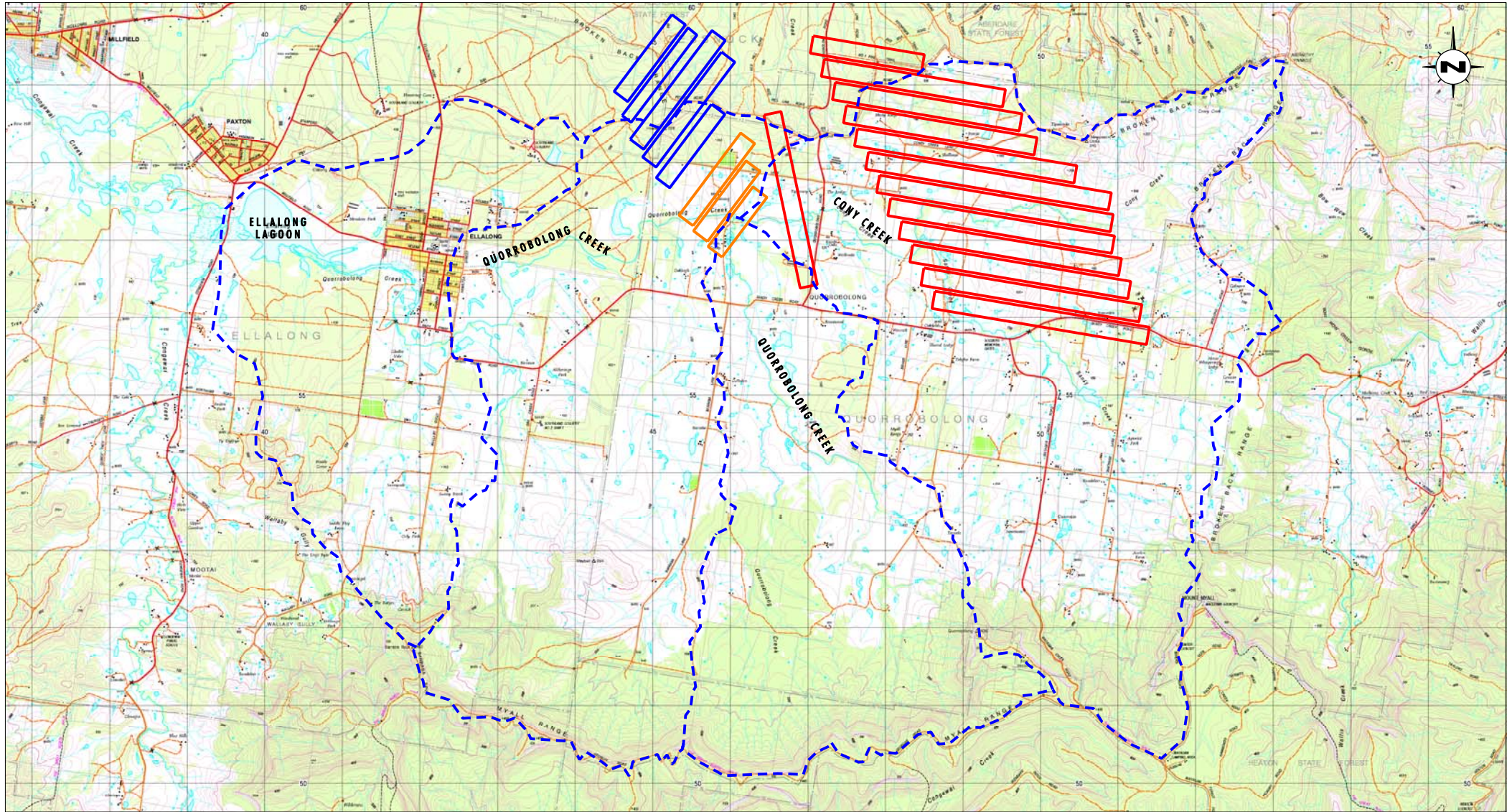
The mining area is located immediately to the south of Broken Back Range, and to the north of the Myall Range (refer to **Figure 5.2**).

The highest elevation in the catchment area is 445 metres AHD and forms part of the Myall Range on the southern catchment boundary. The catchment area of the valley upstream of Ellalong Bridge is approximately 78 km² (refer to **Figure 5.2**).

The north-westerly portion of the mining area is characterised by gentle to moderate slopes of a spur, which extends from the Broken Back Range. This area has also been cleared for grazing and vineyards.

Quorrobolong Creek has an extensive floodplain associated with it, except where it hugs the base of the spur. The proposed mining area is characterised by alluvial flats that support riparian vegetation, transitioning into cleared footslopes approximately 500 metres wide. These cleared areas are used for cattle grazing and vineyards and contain a number of dams.

Quorrobolong and Cony Creeks are joined from the north and the south by a number of smaller order drainage lines that originate from the southern slopes of Broken Back Range



Base Source: LPI NSW 1:25 000 Topographic Map
Source: Austar Coal Mine

0 1 2 3 km
1:70 000

Legend

- ▭ Stage 1 Longwall Panels
- ▭ Stage 2 Longwall Panels
- ▭ Stage 3 Longwall Panels
- Catchment Boundary

FIGURE 5.2
Catchment Plan

and the northern slopes of the Myall Range. Many sections of these creeks have been dammed, both within the mining area and higher in the catchment.

5.2.2 Preliminary Assessment and Planned Assessment Approach

Subsidence

A preliminary assessment of the potential impacts of subsidence on surface drainage has been undertaken based on the conceptual mine plan and digital topographic data. The assessment has indicated that subsidence has the potential to impact surface water flows in the following ways:

- changes to grade and morphology of streams disturbing flow regimes, water quality and aquatic ecology;
- general changes to landforms changing drainage patterns and flow paths, including increased potential for surface ponding;
- promote surface cracking and capture of surface water runoff, including in drainage lines. It is considered likely, however, due to the nature of the creeks in the project area, that any cracks that develop in creek beds will be filled by alluvial deposits during subsequent flow events, preventing ongoing water loss; and
- damage to surface water controls and storage structures, e.g. contour banks and farm dams.

Flooding

A full assessment of subsidence impacts on surface drainage and the extent of stream remediation required will be undertaken as part of the Environmental Assessment.

Stage 2 has previously been assessed using the XP-Storm one dimensional (1D) hydrodynamic model and the RMA-2 two dimensional (2D) hydrodynamic model to produce a description of flood behaviour and potential impacts from subsidence associated with underground mining.

The XP-Storm model has been specifically developed to gain an initial understanding of flood behaviour in the upper reaches of the valley and to provide inputs and boundary conditions to the 2D model. The RMA-2 model has been developed to model the floodplain area using inputs and boundary conditions derived using the XP-Storm model.

The flooding assessment of Stage 2 indicated that there will be no significant changes to flood inundation of access roads to dwellings, or their associated flood hazards. In addition, the flooding assessment indicates that the subsidence associated with mining will not result in the inundation of any dwellings during the 100 year ARI storm event that were not previously inundated. Modelling also indicates that there will be no significant increases in instream or out of channel velocities as a result of predicted subsidence.

These storm water models will be used to assess potential flooding impacts associated with Stage 3. Modelling will likely consist of the following four stages:

1. define the landform and drainage features;
2. define the inflows into the floodplain region for historical storm events, and other ARI storm events such as the 1 year ARI and 100 year ARI events;

3. define the existing flood extents, depths and velocities in the valley for historical storm events (when data is available), and other ARI storm events; and
4. determine potential impacts of subsidence associated with underground mining on various ARI storm events and the 1 year ARI storm event flood extents, depths and velocities.

5.3 Groundwater

5.3.1 Background

Under Section 113A of the *Water Act 1912*, there is currently an embargo on any further applications for sub-surface water licences within the Wollombi Brook Alluvium Water Shortage Zone GWMA 041 (refer to **Figure 5.3**). This zone of shallow alluvium is limited to Cony and Quorrobolong creek channels within the project area and has been declared by the Water Administration Ministerial Corporation as unlikely to have more water available than is sufficient to meet requirements of the licencees of bores situated within the zone.

In addition to the shallow alluvial aquifers associated with Cony and Quorrobolong Creek, there is also potential groundwater resources associated with the deeper fractured rock aquifer that is associated predominantly with the underlying coal measures.

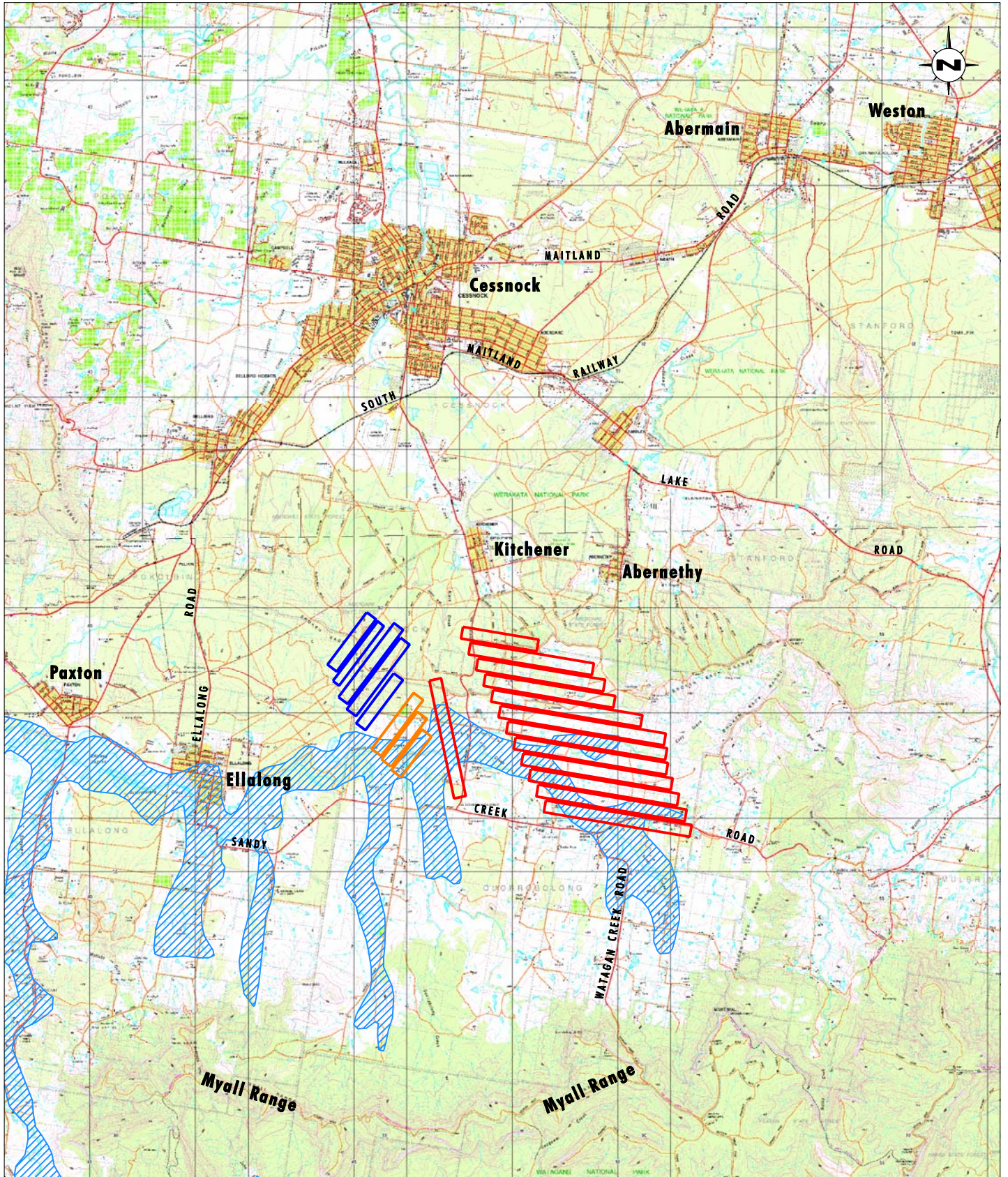
5.3.2 Preliminary Assessment and Planned Assessment Approach

There are four registered groundwater extraction bores in the general area (refer to **Figure 1.2**) but none located within the Stage 3 area. There are three low yielding (<1 L/sec), high salinity bores that are into the underlying coal measures and one shallow alluvial bore (GW054676), which is located to the west of Longwall A3 (GeoTerra 2006:7). The alluvial bore is approximately 13 metres deep, is low yielding (~1 L/s) and has high electrical conductivity (14,000 $\mu\text{S}/\text{cm}$ to 16,000 $\mu\text{S}/\text{cm}$). It is understood that this bore is only used to provide baseline monitoring information for Department of Natural Resources. The coal measures aquifers containing saline water which is unsuitable for domestic or agricultural purposes.

Longwall mining has the potential to also impact on shallow aquifers and any groundwater dependent ecosystems that may exist above or adjacent to the mining area. Current modelling of groundwater in Stages 1 and 2 indicates that the hydraulically interconnected cracking depth does not presently extend up to the alluvium zone. Since the Stage 3 conceptual mine plan has similar geometry and greater depths, the potential for such impact to occur in Stage 3 is likely to be low, as the depth of cover in the Stage 3 area is greater than in Stage 2. This will be reviewed on an ongoing basis as the results of further exploration drilling and field survey work undertaken for the EA become available.

Groundwater management in fractured rock is governed by water stored in old workings at Bellbird, Aberdare and Kalingo. A study of groundwater inflows into the Southland Colliery was undertaken by Pacific Power International in 2002 and a detailed groundwater balance has been prepared for existing operations. Further studies will be undertaken as part of the EA and ongoing measures proposed to manage groundwater flows as part of the operation of Stage 3.

The extension of the groundwater monitoring plan is currently being reviewed in consultation with DWE, with additional extensometers and piezometers planned to monitor any aquifer



Base Source: LPI NSW 1:25 000 Topographic Maps
Source: Austar Coal Mine

0 1.0 2.0 4km
1:100 000

Legend

- ▬ Stage 1 Longwalls Panels
- ▬ Stage 2 Longwalls Panels
- ▬ Stage 3 Longwalls Panels
- ▨ Wollombi Brook Alluvium GWMA 041

FIGURE 5.3

Wollombi Alluvium GWMA 041

interference. The groundwater assessment and monitoring program will be presented in the EA.

5.4 Noise

It is expected that noise will be an important issue for the EA and detailed assessment will be required.

Noise is not expected to be a significant issue for the proposed new pit top area, as it is relatively distant from surrounding residential receivers and will be positioned to mitigate the potential impacts. A detailed noise study of proposed operations at the site, including construction, will be undertaken as part of the EA. A preliminary acoustic assessment indicates that appropriate amelioration can be employed to mitigate potential impacts.

Recommendations for the project with regard to noise monitoring and management will build on the requirements outlined in the development consent condition 20 and the subsequent monitoring program, Austar's existing Environment Protection Licence, and the commitments set out in the 1995 EIS and 2006 SEE.

The noise impact assessment will include:

- analysis and discussion of the existing noise environment in the relevant project areas;
- a prediction of the project specific noise emissions for the proposed development;
- an assessment of the impact of the proposed development on the nearest residences in accordance with the EPA's Industrial Noise Policy;
- an assessment of the cumulative impacts associated with nearby operations; and
- an outline of recommendations relating to noise monitoring and management.

5.5 Air Quality

5.5.1 Dust

Dust emissions from underground mining operations are negligible, however, construction and operation of the proposed new surface infrastructure site has potential to generate some dust. An air quality assessment will be completed to determine the potential impact of the project on existing air quality.

The assessment will be completed in accordance with current DECC guidelines and will include the following components:

- assessment of existing air quality in the project area including a review of air quality monitoring data;
- development of an emissions inventory;
- assessment of impact on air quality and nearby receptors; and
- recommendations relating to the management and minimisation of dust.

5.5.2 Greenhouse Gas Emissions

Underground coal mining results in the emission of greenhouse gases through gas drainage, emission of ventilation air, during the combustion of diesel fuel used in diesel powered equipment, indirectly through the use of electricity to power mining equipment and through losses from mined coal. In addition, carbon dioxide is added to the atmosphere when customers burn the coal.

The Greta seam at Austar mine has exceptionally low inherent gas levels, typically of the order of 0.5 m³/t at greater than 95% carbon dioxide. The gas is essentially in equilibrium at 1 atmosphere pressure and as such, is not liberated into the mine ventilation air stream upon mining. Consequently, the Greenhouse Gas Emissions of mining of Greta seam coal is exceptionally low compared against other coal mines.

Greenhouse gas emissions from energy production, mining operations and combustion of product coal, is a growing issue of concern for the wider community and it is expected that stakeholder focus on this issue will continue to grow with time. Given the current high focus on greenhouse gas emissions and energy efficiency by community, government and Austar corporate stakeholders, greenhouse gas management and energy efficiency will be a key issue for the project.

As part of the EA, a detailed assessment of predicted emissions will be undertaken and opportunities identified to reduce or mitigate these emissions. This assessment will be undertaken in accordance with assessment processes in NSW and general best practice.

5.6 Ecology

The proposed longwall mining area is predicted to have minimal surface impacts in ecological terms, while the development of the proposed surface facilities may require the clearing of up to approximately 16 hectares of native vegetation, which occurs within Aberdare State Forest. A detailed assessment of potential flora and fauna impacts will be undertaken during preparation of the EA.

5.6.1 Stage 3 Mining Area

Disturbance impacts of the proposed longwall mining from an ecological perspective are likely to be those associated with subsidence and any required subsidence remediation works. It is anticipated that the potential impacts of subsidence will be greatest in riparian areas, and as such, the scope of works proposed for ecological investigations will be strongly focused on identifying the key ecological issues present in riparian areas.

The threatened flora and fauna species and endangered ecological communities (EECs), which could potentially occur or rely on habitat within the riparian habitats of the proposed mining area, and therefore will be targeted by specific surveys, are:

Flora

- *Callistemon linearifolius*;
- *Grevillea parviflora* subsp. *parviflora*; and
- *Tetratheca juncea*.

Fauna

- giant barred frog (*Mixophyes iteratus*);
- green and golden bell frog (*Litoria aurea*);
- green-thighed frog (*Litoria brevipalmata*);
- Littlejohns tree frog (*Litoria littlejohni*); and
- large-footed myotis (*Myotis adversus*).

Bird species mentioned in the details about the Conservation Reserve proposal.

Endangered Ecological Communities

- *River Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions* EEC;
- *Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions* EEC; and
- *Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions* EEC.

There are two additional EECs which could potentially occur in non-riparian habitats of the proposed longwall mining area. The vegetation on the slopes and ridges in the north of the proposed longwall mining area may potentially comprise the *Lower Hunter Spotted Gum – Ironbark Forest* EEC, while the *Quorrobolong Scribbly Gum Woodland* EEC has a high potential to occur in the extreme south of the proposed longwall mining area. These EECs will be targeted during flora surveys undertaken as part of the preparation of the EA.

5.6.2 Proposed Pit Top Site

There are a number of threatened flora and fauna species which could potentially occur within the proposed surface facilities site. The *Lower Hunter Spotted Gum – Ironbark Forest* EEC is considered to potentially occur within this area. The proposed field survey methodology will aim to target these species, as well as to obtain information on the general fauna and floristic diversity of the entire site.

Ephemeral streams that drain towards Black Creek pass through the site of the proposed surface facility.

5.6.3 Environmental Assessment Methodology

Ecological surveys for the proposed mining development and surface facilities sites will be undertaken over several seasons. The proposed methodology is outlined below:

Literature Review

A review of all relevant and available literature will be undertaken in order to gain information regarding important ecological features that have been previously recorded within the proposed longwall mining area, proposed surface facilities site or locality.

Reconnaissance Survey

An initial reconnaissance survey of the vegetation and fauna habitats of the proposed longwall mining area and proposed surface facilities site will be undertaken. The subsequent requirement for flora, fauna and aquatic surveys (proposed for 2007) will be based on the outcomes of the reconnaissance survey.

Flora Surveys

Following the reconnaissance survey, detailed surveys will be undertaken to:

- identify, map and describe vegetation communities (including EECs) occurring within both the proposed longwall mining area and proposed surface facilities site. Within the proposed longwall mining area, surveys will focus on riparian areas, and include a reconnaissance of adjoining areas for ecological context. In the proposed surface facilities site, surveys will cover the entire site;
- undertake targeted searches for threatened flora species and endangered populations; and
- establish a flora species list to obtain information on the general floristics of the proposed longwall mining area and proposed surface facilities site.

Fauna Surveys

A detailed investigation of the vertebrate fauna species assemblage of both the proposed longwall mining area and proposed surface facility site will be undertaken using standard systematic sampling methods. The results of the fauna habitat assessment undertaken during the reconnaissance survey will assist in refining the methodology of the subsequent fauna surveys.

Indicative Aquatic Survey

Aquatic surveys assessing macro-invertebrates and fish (where appropriate) in suitable aquatic habitats are proposed to be undertaken.

5.6.4 Reporting

On completion of the reconnaissance survey and the vegetation mapping, and the subsequent field surveys, the data will be compiled and analysed, and a short briefing document prepared. On completion of all survey components, a detailed Flora and Fauna Assessment report will then be prepared which will include:

- details of flora and fauna survey methods;
- provision of all relevant results;
- a discussion of any significant results, such as threatened species, populations or EECs, or any other ecological matters that may present constraints to the proposed longwall mining or surface facilities areas;
- Impacts under the EP&A Act and the EPBC Act for any threatened species, populations or EECs that were recorded or are likely to occur within the study areas; and

- presentation of agreed impact mitigation measures that may be required to minimise the adverse impacts of the proposed developments on the significant ecological values of the study areas.

5.7 Cultural Heritage

5.7.1 Existing Environment

An archaeological survey was undertaken as part of the EIS for Ellalong Colliery – Extension into Bellbird South (HLA 1995a and HLA 1995b). The results of Brayshaw's (1987) investigations undertaken for the Bellbird South Coal Project were incorporated into this report (HLA 1995:6.10).

A small artefact scatter (Quorrobolong 1, NPWS No. 37-6-0422) was recorded on the knoll on the current Stage 2 study area. The site is located approximately 300 metres to the north of Quorrobolong Creek and 45 metres above it.

Aboriginal heritage was also addressed in the Statement of Environmental Effects (SEE) undertaken for the Modification of Consent (Section 96(2) of the EP&A Act 1979) for Stage 1 of the Austar Mine. The SEE reviewed HLA (1995a and 1995b) and Brayshaw (1987). IF-1, the isolated find recorded by Brayshaw (1987), was found to be located above one of the Stage 1 longwalls, however, it was concluded that the associated subsidence would not have a significant impact on the site. Consequently, no mitigation measures were recommended.

There is potential that both surface and subsurface Aboriginal heritage sites are located within the Stage 3 study area. Areas adjacent to creeklines (reliable fresh water), and slightly elevated areas such as gently sloping lower slopes, benches, and spur crests have high archaeological sensitivity in this region. Additionally, the local Aboriginal community may consider the area to be of particular cultural significance.

5.7.2 Environmental Assessment Methodology

The Aboriginal archaeology and cultural heritage assessment process is comprised of two key components; a scientific survey and an assessment of cultural heritage values in consultation with local Aboriginal community. These two components are interrelated. DECC guidelines require that the Aboriginal community participates in the scientific survey. This does not necessarily mean that all interested parties need to be involved. Any interested groups or individuals are required to be consulted regarding cultural heritage issues.

A detailed assessment of the potential impacts of the project on Aboriginal heritage values will be undertaken as part of the EA for the project. This assessment will build on previous detailed investigations and assessments undertaken and involve the following:

- prepare a review of relevant archaeological and cultural heritage literature, including a search of the DEC/AHIMS (Aboriginal) Site Register and Archaeological Reports Register, the Australian Heritage Database (which includes Commonwealth and National Heritage lists) and the Register of the National Estate for listed sites within or adjacent to the proposed development area;
- undertake a Native Title search;

- develop an Indigenous community participation strategy to be implemented throughout the remainder of the project;
- undertake Aboriginal consultation to DECC standards;
- prepare a discussion of past environmental factors which may influence the likelihood of sites being present within the project area;
- prepare a predictive model for site location within the project area;
- undertake a field inspection of the project area with identified Aboriginal stakeholders to identify sites/potential archaeological deposits (PADs), which may be of archaeological significance/cultural heritage value;
- record any new sites located, on DECC (NPWS) standard recording forms and submit to the DECC AHIMS site register;
- record any artefacts located within the sites to DECC standards;
- prepare an assessment of the archaeological significance of the sites/PADs found, according to established significance assessment criteria outlined by DECC (NSW NPWS Guidelines 1997);
- obtain comment on the Aboriginal significance (provided by the Aboriginal stakeholder groups) of the sites/PADs for inclusion within the report;
- prepare a statement of the likely effect of the proposed development on any sites/PADs discovered, known or predicted within the project area and whether further investigation is warranted;
- prepare a draft report in relation to the findings of the survey and assessment process that provides clear guidance in relation to the significance of the sites/PADs (if any) and identifies requirements related to their preservation, further investigation and/or destruction. The report will include relevant plans and diagrams. The report will clearly identify the best management options from an Aboriginal and archaeological perspective;
- following incorporation of client comment, provide the draft report to the Aboriginal stakeholder groups for their written comment;
- incorporate the comments of the Aboriginal stakeholder groups into the report; and
- finalise the report for inclusion in the EA.

5.7.3 Consultation with the Aboriginal Community

The project area falls within the boundary of the Mindaribba Local Aboriginal Land Council. There are five other known Aboriginal stakeholder groups in the area including the Barkuma Neighbourhood Centre, Black Creek Aboriginal Corporation, Wonnarua Nation Aboriginal Corporation, Lower Wonnarua Tribal Consultancy Pty Ltd and the Lower Hunter Wonnarua Council Inc. Under the current DECC *Interim Community Consultation Requirements for Applicants* (2004: 2-3), the consultation process will include the following:

- Notification of the project to various bodies (as listed below) so that they can provide details of relevant Aboriginal stakeholders who may wish to register an interest in the project:

- the Local Aboriginal Land Councils;
 - Registrar of Aboriginal Owners;
 - Native Title Services;
 - the local Council(s); and
 - DECC.
- Notification of the development in the local print media.

Following notification, a period of 10 working days must be provided for the registration of interested Aboriginal stakeholder groups/individuals.

All of the registered stakeholder groups/individuals are then provided with information about the project and the proposed survey strategy and are given a further 21 days to make comment. Following receipt of comments and the modifications of the survey methodology (if necessary), the survey will be undertaken.

DECC requires that the opportunity is afforded to all the registered Aboriginal stakeholder groups/individuals to comment on the draft report. The comment period currently accepted by DECC is 21 days. After that time, the report will be finalised and incorporated into the EA.

5.8 Historic Heritage

5.8.1 Existing Environment

HLA (1995a and 1995b) summarised the European history of the Ellalong/Cessnock area. The following information was extracted from HLA (1995b:5).

The small settlers who occupied the Cessnock region from the 1820s were involved in grazing sheep and cattle, growing wheat and maize and timber getting. Vineyards developed after the 1840s and formed an important part of the farming economy.

With the development of mines at East Greta in 1891, exploitation of the South Maitland Coalfields began and mines began to open as the Greta coal measures were followed south. Mines were established in the Cessnock area by 1906 and were linked to what later became the South Maitland Railway. Collieries to the south of Cessnock (in the vicinity of the current study area) were established in the 1920s.

The effect of coal mining was to increase the regional population and improve the transport links to Maitland and Newcastle. Maze (1933) notes two opposing effects of coal mining on the agriculture of the area. Firstly, people gave up farming and became miners. Secondly, the growing demand for fresh food increased the production of vegetable, fruit and dairy products. Maze (1933) paints a picture of changing land use patterns from small farms growing grain or grazing sheep and cattle, to a mining landscape. This landscape consisted of mines, transport networks to take the coal out to Newcastle, and a network of residential towns (such as Ellalong and Paxton) for miners. The agricultural landscape changed to dairying and vegetable production on the richer soils, with the marginal farms being abandoned (Maze 1933:37-38).

5.8.2 Environmental Assessment Methodology

The potential impacts of the project on historic heritage items will be considered as part of the EA. Based on existing knowledge of the area and the current layout of the project, it is unlikely that any substantial historic heritage items will be found and/or affected by the proposal. As such, the scope of works will consist of a desktop analysis and opportunistic field observations by archaeologists while undertaking field investigations for associated environmental assessment studies.

The desktop analysis will include:

- a review of previous surveys of the site and its surrounds, including a search of relevant databases;
- a discussion with landholders and residents of past factors which may influence the likelihood of sites being present within the project area;
- the preparation of a predictive model for site location within the project area;
- in the event that an item is discovered, the following tasks will be undertaken;
- record any artefacts located within the sites to the NSW Heritage Office standard;
- identify and define the historical archaeological sensitivity and values of the study area in order to qualify the assessment of its significance; and
- prepare an archaeological assessment documenting the investigation of the precinct, supported by plans, photography and surface inventory.

All investigations and assessments will be conducted and documents prepared in accordance with the published standards and guidelines of the NSW Heritage Office, in particular the *NSW Heritage Manual* and the Local Government Heritage Guidelines. The heritage assessment report will be included in the EA.

5.9 Visual Amenity

Due to the nature of underground mining operations, visual impacts associated with the project are expected to be minimal. The preliminary environmental risk analysis, included as **Appendix 2**, identified potential visual impacts associated with mining surface infrastructure as the only aspect of the project requiring further visual assessment.

The visual assessment will discuss the general scenic amenity of the area and identify potential views of surface infrastructure from surrounding residences or public viewing locations (e.g. roads). The assessment will be undertaken using a three dimensional terrain model of the project area and surrounds, developed using digital topographic data. Where appropriate, measures will be proposed to mitigate the visual impacts associated with new surface mining infrastructure.

5.10 Traffic

As identified in the preliminary environmental risk analysis, included as **Appendix 2**, the project will result in an increase in local traffic flows to and from the proposed new surface

infrastructure site, during both the construction and operational phases. This will be due to both increased light vehicle movements associated with employees and contractors, and increased heavy vehicle movements associated with delivery of materials to the site.

The project also has the potential to impact on traffic movements on Quorrobolong Road and Sandy Creek Road, due to subsidence and subsidence remediation works.

A traffic impact assessment will be completed as part of the Environmental Assessment to assess the impact of traffic associated with the project on the local road network. It will also assess the impacts of the project on traffic movements along Quorrobolong and Sandy Creek Roads. The assessment will focus on the ability of the local road network to accommodate the projected traffic flows and will also assess measures required to appropriately manage subsidence impacts on Quorrobolong Road and Sandy Creek Road.

6.0 Project Schedule

It is envisaged that the Planning Focus Meeting for this project will take place in July 2007, with the Project Application planned to be lodged shortly after this meeting, with a request for DoP to issue the Environmental Assessment Requirements for the project.

Based on current project timing, Austar intends to lodge the draft Environmental Assessment for the Underground Project in the final quarter of 2007. Approval for the project is sought by mid-2008, allowing the construction of the new ventilation upcast shaft to commence supporting longwall mining beyond 2010.

7.0 References

- Brayshaw, H 1987, *Bellbird South Coal Project Near Cessnock, NSW. Archaeological Survey*. Report to Southland Coal Pty Limited.
- Cessnock City Council 2003, *Comprehensive State of the Environment Report 2003-04*
- ERM 2006, *Longwall Panels A1 and A2 Section 96 Modification Statement of Environmental Effects*. Report to Austar Coal Mine Pty Ltd.
- Epps and Associates 1988, Camberwell Coal Project, Glennies Creek, NSW / [prepared on behalf of] Camberwell Coal Pty. Limited [by] Epps & Associates Pty. Ltd
- GeoTerra 2006, *Austar Coal Mine Pty Ltd Longwall Panels A1 and A2 Surface Water and Groundwater Assessment*. Report to Austar Coal Mine Pty Ltd.
- HLA-Envirosciences Pty Limited 1995a, *Environmental Impact Statement. Ellalong Colliery. Extension into Bellbird South*. Report to Newcastle Wallsend Coal Company Pty Limited.
- HLA-Envirosciences Pty Limited 1995b, *An Archaeological Survey of the Proposed Ellalong Colliery Extension near Cessnock, NSW. Appendix 6 of HLA-Envirosciences Pty Limited 1995a Environmental Impact Statement. Ellalong Colliery. Extension into Bellbird South*. Report to Newcastle Wallsend Coal Company Pty Limited.
- Kovac, M and Lawrie, J W 1991. *Soil Landscapes of the Singleton 1:250 000 Sheet*. Soil Conservation Service of NSW, Sydney.
- Maze, W H 1933. *Land Utilisation in the Lower Hunter Valley, New South Wales, Australia*. Australian Geographer 2(2):39-51.
- Mine Subsidence Engineering Consultants Pty Ltd 2007, *The Prediction of Subsidence Parameters and the Assessment of Mine Subsidence Impacts on the Natural Features and Surface Infrastructure Resulting from the Extraction of Proposed Austar Longwalls A3 to A5 in Support of a SMP Application*. Report to Austar Coal Mine Pty Ltd.
- Pacific Power International 2002, *Southland Colliery: Groundwater Inflow Study*. Report to Southland Colliery.
- Xu B 2001, The longwall top coal caving method for maximizing recovery at Dongtan Mine. 3rd Intl Underground Coal Conf., UNSW, Sydney, Australia, 12 - 15 June, 2001.

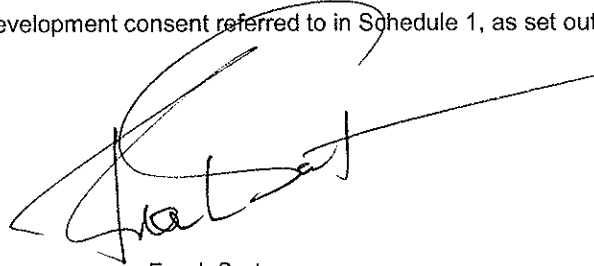
APPENDIX 1

Notice of Modification

Notice of Modification

Section 96(2) of the *Environmental Planning and Assessment Act 1979*

I, the Minister for Planning, modify the development consent referred to in Schedule 1, as set out in Schedule 2.



Frank Sartor
Minister for Planning

Sydney

27th SEP

2006

SCHEDULE 1

The development consent (DA No. 29/95) for the underground mine extensions now known as the Austar Coal Mine, which was granted by the Minister for Urban Affairs and Planning on 14 February 1996.

SCHEDULE 2

1. Delete Schedule 2 and replace with:

SCHEDULE 2

DEFINITIONS

AEMR	Annual Environmental Management Report
Applicant	Austar Coal Mine Pty Ltd, or its successors
CCC	Community Consultative Committee
Council	Cessnock City Council
DA	Development Application
Day	Day is defined as the period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays
DEC	Department of Environment and Conservation
Department	Department of Planning
Director-General	Director-General of the Department of Planning, or delegate
DNR	Department of Natural Resources
DPI	Department of Primary Industries
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
Evening	Evening is defined as the period from 6pm to 10pm
Land	Land means the whole of a lot in a current plan registered at the Land Titles Office at the date of this consent
MOP	Mining Operations Plan
MSB	Mine Subsidence Board
Night	Night is defined as the period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and Public Holidays
Privately-owned land	Land excluding land owned by a mining company, where: • a private agreement does not exist between the Applicant and the land owner; and • there are no land acquisition provisions requiring the Applicant to purchase the land upon request from the land owner
RTA	Roads and Traffic Authority
SEE	Statement of Environmental Effects
Site	Land to which the DA applies

ADMINISTRATIVE CONDITIONS

Obligation to Minimise Harm to the Environment

1. The Applicant shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the development.

Terms of Consent

2. The Applicant shall carry out the development generally in accordance with the:
 - (a) DA 29/95 and accompanying Environmental Impact Statement prepared by HLA Envirosciences Pty Limited, dated August 1995;
 - (b) modification application MOD-49-4-2006 and accompanying Statement of Environmental Effects, titled *Austar Coal Mine Section 96 Modification*, prepared by Environmental Resources Management Australia Pty Ltd (ERM) and dated April 2006;
 - (c) information from ERM clarifying the modification application MOD-49-4-2006, dated 13 July 2006; and
 - (d) conditions of this consent.

If there is any inconsistency between the above documents, the latter document shall prevail over the former to the extent of the inconsistency. However, the conditions of this consent shall prevail over all other documents to the extent of any inconsistency.

3. The Applicant shall comply with any reasonable requirement/s of the Director-General arising from the Department's assessment of:
 - (a) any reports, plans, strategies, programs or correspondence that are submitted in accordance with this consent; and
 - (b) the implementation of any actions or measures contained in these reports, plans, strategies, programs or correspondence.
4. The Applicant shall ensure that all plant and equipment used at the site is:
 - (a) maintained in a proper and efficient condition; and
 - (b) operated in a proper and efficient manner.

Limits on Approval

5. This consent lapses 21 years after the date it commences.

Note: this condition does not affect the operation of section 95 of the EP&A Act.

Management Plans/Monitoring Programs

6. With the approval of the Director-General, the Applicant may prepare and submit any management plan or monitoring program required by this consent on a progressive basis. Where a management plan and monitoring program is required before carrying out any development, or stage of development, the plans/programs may be prepared and submitted in relation to either discrete components of the project or for a specified time period.

SPECIFIC ENVIRONMENTAL CONDITIONS

SUBSIDENCE

General

7. The Applicant shall before carrying out any underground mining operations (except for longwall panels A1 and A2) that will potentially lead to subsidence of the land surface:
- (a) prepare a Subsidence Management Plan (SMP) for those operations in accordance with the following DPI documents (or their latest versions or replacements):
 - *New Approval Process for Management of Coal Mining Subsidence - Policy*; and
 - *Guideline for Applications for Subsidence Management Approvals*,
 - (b) inform all landowners whose land is proposed to be undermined as a result of the development about the procedures for rectification and compensation for subsidence effects on residences, farm buildings and structures; and
 - (c) inform all landowners within the site, which are not undermined, about current and future longwall mining at the development,

to the satisfaction of the DPI.

Note: The Applicant has an existing approval from the DPI under section 138 of the Coal Mines Regulation Act 1982 for longwall panels A1 and A2. An application has been made to modify this approval to allow an increase in the height of coal extraction from 4.5 to 6.5 metres. All future longwall panels will be regulated under the SMP approval process for managing the impacts of coal mining subsidence under the Mining Act 1992.

8. Before carrying out any underground mining that will potentially lead to subsidence within the Aberdare State Forest, the Applicant shall prepare (and following approval implement) a Public Safety Management Plan for the Aberdare State Forest to the satisfaction of the DPI.

Property No 15

9. The Applicant shall:
- (a) conduct detailed monitoring of subsidence over the western longwall areas (longwalls 13 to 19) in accordance with the requirements of the DPI and to the satisfaction of the Principal Subsidence Engineer;
 - (b) in conjunction with the MSB, prior to commencement of longwall extraction, inform the owner/s of Property No. 15 of the:
 - predicted subsidence effects on the two operating broiler sheds, residence and farm buildings; dams and structures on Property 15;
 - procedures for rectification and compensation available under the *Mine Subsidence Compensation Act 1961* for damage to all surface improvements caused by subsidence;
 - procedures for rectification and compensation available under the *Mining Act 1992* for consequential losses to stock caused by subsidence; and
 - arrangements made in respect of a "pre-mining inspection" to be completed by the MSB.
 - (c) monitor the storage capacity of all dams on the property immediately before, during, and after mining and, in the event of loss of water to the dams caused by subsidence, provide an alternative supply equal to, both in quality and quantity, the water supply that existed immediately prior to subsidence commencing, in accordance with the Applicant's Subsidence Management Plan.

Note: Property No 15 is shown on Figure 6.2 of the 1995 EIS for the development.

WATER QUALITY

Discharge Limits

10. Except as may be expressly provided by a DEC Environmental Protection Licence, or in accordance with section 120 of the *Protection of the Environment Operations Act 1997*, the Applicant shall not discharge any water from the site.

Site Water Management Plan

11. Prior to 31 March 2007, or other date agreed by the Director-General, the Applicant shall prepare a Site Water Management Plan for the mine, in consultation with the DNR and the DEC, and to the satisfaction of the Director-General. This plan shall be implemented to the satisfaction of the Director-General, and must include:
- (a) a Site Water Balance;
 - (b) an Erosion and Sediment Control Plan;
 - (c) a Surface Water Monitoring Program;
 - (d) a Ground Water Monitoring Program; and
 - (e) a Surface and Ground Water Response Plan.

Site Water Balance

12. The Site Water Balance must:
- (a) include details of:
 - sources of water;
 - water use on site;
 - water management on site;
 - off-site water transfers or discharges;
 - reporting procedures; and
 - (b) describe measures to minimise water use by the development.

Erosion and Sediment Control

13. The Erosion and Sediment Control Plan must:
- (a) be consistent with the requirements of Landcom's *Managing Urban Stormwater: Soils and Construction* manual;
 - (b) identify activities that could cause soil erosion and generate sediment;
 - (c) describe measures to minimise soil erosion and the potential for transport of sediment downstream;
 - (d) describe the location, function and capacity of erosion and sediment control structures; and
 - (e) describe what measures would be implemented to maintain the structures over time.

Surface Water Monitoring

14. The Surface Water Monitoring Program must include:
- (a) surface water assessment criteria;
 - (b) a program to monitor surface water flows and quality (particularly in Black and Quorrobolong Creeks);
 - (c) reporting procedures; and
 - (d) a protocol for the investigation, notification and mitigation of identified exceedances of the surface water criteria that are related to the development (particularly in respect of acid mine drainage and acid leachate).

Groundwater Monitoring

15. The Groundwater Monitoring Program must include:
- (a) ground water impact assessment criteria;
 - (b) a program to monitor the volume and quality of ground water seeping into the underground mine workings;
 - (c) a program to monitor ground water levels and quality; and
 - (d) a protocol for the investigation, notification and mitigation of identified exceedances of the ground water impact assessment criteria.

Surface and Ground Water Response Plan

16. The Surface and Ground Water Response Plan must include:
- (a) the procedures that would be followed in the event of any exceedance of the surface or groundwater impact assessment criteria, or other identified impact on surface or groundwater;
 - (b) measures to mitigate, remediate and/or compensate any identified impacts; and
 - (c) disposal/neutralisation contingencies in the event that acid leachate problems emerge after the mine closes.

Groundwater Study

17. The Applicant shall, in the event it selects the Cessnock No. 1 Shaft at Kalingo as the ventilation shaft site for the mine, submit a report to the Director-General and the DPI which includes a groundwater study and mine water disposal plan prepared in accordance with the requirements of the DPI and DEC.

NOISE AND VIBRATION

Impact Assessment Criteria

18. The Applicant shall ensure that the noise generated by the Infrastructure Upgrade Area identified in Figure 1.3 of the SEE referenced in condition 2 (c) does not exceed the noise impact assessment criteria in Table 1.

Table 1: Noise impact assessment criteria dB(A)

Day/Evening/Night <i>L_{Aeq(15 minute)}</i>	Land
35	All privately owned land

Notes:

a) Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary, to determine compliance with the *L_{Aeq(15 minute)}* noise limits in the above table. Where it can be demonstrated that direct measurement of noise from the development is impractical, the Department and the DEC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.

b) The noise emission limits identified in the above table apply under meteorological conditions of:

- wind speeds of up to 3 m/s at 10 metres above ground level; or
- temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.

However, if the Applicant has a written negotiated noise agreement with any landowner of the land listed in Table 1, and a copy of this agreement has been forwarded to the Department and the DEC, then the Applicant may exceed the noise limits in Table 1 in accordance with the negotiated noise agreement.

Continuous Improvement

19. The Applicant shall:
- implement all reasonable and feasible noise mitigation measures;
 - investigate ways to reduce the noise generated by the development, and
 - report on these investigations and the implementation and effectiveness of these measures in the AEMR
- to the satisfaction of the Director-General.

Noise Monitoring

20. Prior to 31 December 2006, the Applicant shall prepare a Noise Monitoring Program for the development to the satisfaction of the Director-General. This program must be implemented to the satisfaction of the Director-General and shall include quarterly attended noise monitoring, and a noise monitoring protocol for evaluating compliance with the noise impact assessment criteria in this consent.

Vibration Monitoring

21. Prior to longwall mining operations in Panel A1 retreating 150 metres, the Applicant shall install and maintain a Vibration Monitoring Program for the development to the satisfaction of the Director-General. This program must be capable of recording ground vibrations on the surface emanating from underground mining activities.

AIR QUALITY

Impact Assessment Criteria

22. The Applicant shall ensure that the dust emissions generated by the development do not cause additional exceedances of the air quality impact assessment criteria listed in Tables 2, 3, and 4 at any residence on, or on more than 25 percent of, any privately owned land.

Table 2: Long term impact assessment criteria for particulate matter

Pollutant	Averaging period	Criterion
Total suspended particulate (TSP) matter	Annual	90 $\mu\text{g}/\text{m}^3$
Particulate matter < 10 μm (PM_{10})	Annual	30 $\mu\text{g}/\text{m}^3$

Table 3: Short term impact assessment criterion for particulate matter

Pollutant	Averaging period	Criterion
Particulate matter < 10 μm (PM_{10})	24 hour	50 $\mu\text{g}/\text{m}^3$

Table 4: Long term impact assessment criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 $\text{g}/\text{m}^2/\text{month}$	4 $\text{g}/\text{m}^2/\text{month}$

Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 2003, AS 3580.10.1-2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.

Operating Conditions

23. The Applicant shall:
- (a) ensure any visible air pollution generated by the development is assessed regularly, and measures taken to minimise air quality impacts on privately owned land; and
 - (b) implement all practicable measures to minimise the off-site odour and fume emissions generated by the mine's ventilation system or any spontaneous combustion at the development,
- to the satisfaction of the Director-General.

Monitoring

24. Prior to 31 December 2006, the Applicant shall prepare a detailed Air Quality Monitoring Program to the satisfaction of the Director-General. This program must be implemented to the satisfaction of the Director-General and must include an air quality monitoring protocol for evaluating compliance with the air quality impact assessment criteria in this consent.

METEOROLOGICAL MONITORING

25. The Applicant shall ensure that there is a suitable meteorological station operating in the vicinity of the development in accordance with the requirements in *Approved Methods for Sampling of Air Pollutants in New South Wales* and to the satisfaction of the Director-General.

REJECT EMPLACEMENT

26. The Applicant shall:
- (a) investigate and report to the DPI on the possibility of disposing all reject into one emplacement area, at least 12 months before reject emplacement into the disturbed mining areas is complete;
 - (b) provide a report on the geotechnical investigations and engineering specifications for emplacement areas 1, 3 and 4 to the DPI, and the Director-General at least 6 months prior to commencement of reject emplacement in these areas; and
 - (c) commence use of emplacement areas 1, 3 and 4 only after consultation with the Council and approval by the DPI.

FLORA AND FAUNA

27. The Applicant shall:
- (a) take all reasonable measures to protect native vegetation from damage during construction except where trees, shrubs and other vegetation are removed for approved works; and
 - (b) salvage all useable trees and shrubs for reuse in controlling erosion and/or site rehabilitation.
28. The Applicant shall:
- (a) undertake fauna surveys for bat species at undisturbed sites proposed for reject emplacement as may be required by the DEC;
 - (b) report results of any fauna surveys to the DEC; and
 - (c) carry out any necessary ameliorative measures requested by the DEC in relation to the findings of the fauna surveys.

HERITAGE

Aboriginal Heritage

29. Six months prior to commencing activities in undisturbed reject emplacement areas or the Cessnock No. 1 Colliery surface facilities, the Applicant shall undertake additional Aboriginal heritage surveys to the satisfaction of the DEC.

European Heritage

30. The Applicant shall:
- (a) undertake a Heritage Impact Assessment of the site and prepare a Heritage Management Plan, in consultation with the Council, for the approval of the Heritage Council of NSW prior to re-commencing any mining activities at the Cessnock No 1 Colliery surface facilities at Kalingo;
 - (b) make application under section 132 of the *Heritage Act 1977* for any works proposed to be undertaken on or under Lot 1, DP 87087 and Part Lot 1, DP 69968 County Northumberland, Parish Heddon; and
 - (c) take all reasonable measures to protect the ring-barked tree referenced in the 2006 modification application,
- to the satisfaction of the Director-General.

Note: The land referred to in condition 30(b) is currently subject to a section 130 order under the Heritage Act 1977 to prevent harm to buildings, works, relics etc of the South Maitland Railway, gazetted 16 September, 1983.

TRAFFIC AND TRANSPORT

31. The Applicant shall:
- (a) provide to the satisfaction of the Council and the RTA and at its own cost, a crossing over Wollombi Road (Main Road 218) in the vicinity of the coal waste emplacement areas 3 and 4 with respect to type and sight distance in accordance with AS2890-1. Such crossing shall consist of pavement and bitumen seal extending at least 30 metres either side of Main Road 218. All crossing works are to be completed prior to the commencement of operations in emplacement areas 3 and 4;
 - (b) provide a Type B intersection at the nominated entry to the Cessnock No 1 Colliery site. Such facility and location shall be determined in conjunction with Council and constructed prior to commencement of operations at the Cessnock No 1 Colliery site;
 - (c) prior to 31 December 2006, prepare a Construction Traffic Management Plan for the development to the satisfaction of Council.

- (d) prior to 31 March 2007, prepare a safety audit report for the following road level crossings of the South Maitland Railway:
- Vincent Street, Kitchener;
 - Cessnock Road, Kearsley;
 - off Cessnock Road, Neath; and
 - Mitchell Avenue, Weston
- to the satisfaction of the RTA.

ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING AND REPORTING

Environmental Management Strategy

32. Prior to 31 March 2007, or other date agreed by the Director-General, the Applicant shall prepare an Environmental Management Strategy for the development to the satisfaction of the Director-General. This Strategy is to be implemented to the satisfaction of the Director-General and must:
- (a) provide the strategic context for environmental management of the development;
 - (b) identify the statutory requirements that apply to the development;
 - (c) describe in general how the environmental performance of the development would be monitored and managed during the development;
 - (d) describe the procedures that would be implemented to:
 - keep the local community and relevant agencies informed about the operation and environmental performance of the development;
 - receive, handle, respond to, and record complaints;
 - resolve any disputes that may arise during the course of the development;
 - respond to any non-compliance;
 - manage any cumulative impacts;
 - respond to emergencies; and
 - (e) describe the role, responsibility, authority, and accountability of all the key personnel involved in environmental management of the development.

Environmental Monitoring Program

33. Prior to 31 March 2007, or other date agreed by the Director-General, the Applicant shall prepare an Environmental Monitoring Program for the development, to the satisfaction of the Director-General. This program must consolidate the various monitoring requirements of this consent into a single document.

Environmental Manager

34. Prior to carrying out any development, the Applicant shall employ a suitably qualified and experienced Environmental Manager, whose appointment has been endorsed by the Director-General, for the duration of the development to oversee the environmental performance of the project and compliance with the conditions of this approval.

Incident Reporting

35. Within 7 days of detecting an exceedance of the limits/performance criteria in this consent, the Applicant shall report the exceedance/incident to the Department (and any relevant agency). The report must:
- (a) describe the date, time, and nature of the exceedance/incident;
 - (b) identify the cause (or likely cause) of the exceedance/incident;
 - (c) describe what action has been taken to date; and
 - (d) describe the proposed measures to address the exceedance/incident.

Annual Reporting

36. Each year, the Applicant shall submit an Annual Environmental Management Report (AEMR) to the Director-General and the relevant agencies. This report must:
- (a) identify the standards and performance measures that apply to the development;
 - (b) describe the works carried out in the last 12 months;
 - (c) describe the works that will be carried out in the next 12 months;
 - (d) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years;
 - (e) include a summary of the monitoring results for the development during the past year;
 - (f) include an analysis of these monitoring results against the relevant:
 - impact assessment criteria/limits;
 - monitoring results from previous years; and
 - predictions in the EIS and/or SEE;
 - (g) identify any trends in the monitoring results over the life of the development;
 - (h) identify any non-compliance during the previous year; and
 - (i) describe what actions were, or are being, taken to ensure compliance.

Independent Environmental Audit

37. Prior to 31 December 2008, and every 3 years thereafter, unless the Director-General directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:
- (a) be conducted by suitably qualified, experienced, and independent expert/s whose appointment has been endorsed by the Director-General;
 - (b) assess the various aspects of the environmental performance of the development, and its effects on the surrounding environment;
 - (c) assess whether the development is complying with the relevant standards, performance measures, and statutory requirements;
 - (d) review the adequacy of any strategy/plan/program required under this consent; and, if necessary; and
 - (e) recommend measures or actions to improve the environmental performance of the development, and/or any strategy/plan/program required under this consent.
38. Within 3 months of commissioning this audit, or as otherwise agreed by the Director-General, the Applicant shall submit a copy of the audit report to the Director-General, with a response to any recommendations contained in the audit report.

Updating Environmental Management Requirements

39. Within 3 months of the completion of the Independent Environmental Audit (see condition 37), the Applicant shall review, and if necessary revise, the Environmental Management Strategy, the Environmental Monitoring Program and all other environmental management plans and monitoring programs required under this consent to the satisfaction of the Director-General.

Community Consultative Committee

40. Prior to 31 December 2006, or other date agreed by the Director-General, the Applicant shall establish a Community Consultative Committee (CCC) to oversee the environmental performance of the development. The CCC shall:
- (a) be comprised of:
 - 2 representatives from the Applicant, including the person responsible for environmental management at the mine;
 - at least 1 representative from Council; and
 - at least 3 representatives from the local community,whose appointment has been approved by the Director-General in consultation with the Council. The local community representative positions will be re-appointed every two years unless otherwise agreed by the Director-General;
 - (b) be chaired by an independent chairperson, or council representative, whose appointment has been approved by the Director-General;
 - (c) meet at least 4 times a year, or as otherwise approved by the Director-General;
 - (d) review the Applicant's performance with respect to environmental management and community relations;
 - (e) undertake regular inspections of the mine operations;
 - (f) review community concerns or complaints about the mine operations, and the Applicant's complaints handling procedures; and
 - (g) provide advice to:
 - the Applicant on improved environmental management and community relations, including the provision of information to the community and the identification of community initiatives to which the Applicant could contribute;
 - the Department regarding the conditions of this consent; and
 - the general community on the performance of the mine with respect to environmental management and community relations; and
 - (h) be operated generally in accordance with any guidelines the Department may publish in regard to the operation of Community Consultative Committees for mining developments.

Note: The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Applicant complies with this consent.

41. The Applicant shall fulfil all responsibilities set out for companies in the CCC guidelines, including at its own expense:
- (a) ensuring that 2 of its representatives attend CCC meetings;
 - (b) regularly providing the CCC with reports and other information on the environmental performance and management of the development;
 - (c) providing meeting facilities for the CCC, if the CCC requests;
 - (d) arranging site inspections for the CCC, if the CCC requests;
 - (e) taking minutes of the CCC meetings, if the CCC requests;
 - (f) making these minutes available to the public; and
 - (g) responding to any advice or recommendations the CCC may have in relation to the environmental management or community relations.
42. The Applicant shall fund the payment of invoices received to facilitate the general purposes and functioning of the CCC up to \$2,000 each year until the cessation of operations under the consent.

Note. The contribution is to be indexed according to the CPI at the time of each payment. The first payment shall be made by the date of the first CCC meeting.

Access to Information

43. From 31 December 2006, and during the life of the development thereafter, the Applicant shall place a copy of the following documents and information (and any subsequent revisions) required under this consent on its website:
- (a) this consent, as may be modified from time to time;
 - (b) all current environmental management plans, strategies and programs;
 - (c) the current Independent Environmental Audit;
 - (d) the current AEMR; and
 - (e) a summary of all environmental monitoring results (to be updated at least every 6 months), to the satisfaction of the Director-General.

Dispute Resolution

44. In the event that the Applicant, the Council or a Government agency/authority other than the Department, cannot agree on the specification or requirements applicable under this consent, the matter shall be referred by either party to the Director-General or if not resolved, to the Minister, whose determination of the disagreement shall be final and binding on the parties.

APPENDIX 2

Preliminary Environmental Risk Analysis

Appendix 2 - Preliminary Environmental Risk Analysis

A preliminary environmental risk assessment has been undertaken for the project to identify the key issues which warrant further detailed assessment and discussion. The methodology used for this process follows the general principles outlined in Australian Standard AS/NZS 4360:1999 *Risk Management and Environmental Risk Management – Principles and Process* (Standards Australia, 2000). The results of the risk assessment are included below.

The method used for the environmental risk assessment encompasses the following key steps:

1. Establish the context for the risk assessment process.
2. Identify environmental risks.
3. Analyse risks.
4. Evaluate risks to determine significant issues.

Each of these steps is discussed further below.

Establish the Context

The risk assessment undertaken for the project considers risks to the natural environment and members of the public. The project was considered to be the processes and activities described in Section 2.0 of the Preliminary Environmental Assessment, and consist of the following activities:

- longwall extraction of coal in panels A6 to A18 using LTCC technology to enable extraction of up to 7 metres of coal from the Greta seam;
- new pit top facility to be constructed south-west of Kitchener including main mine ventilation fan, bath house, workshop, electricity sub station, store and offices on land owned by Austar bordered by Aberdare State Forest;
- continued use of existing approved coal handling, preparation and transport systems; and
- continued employment opportunities for approximately 200 people and ultimately up to 275 people when the mine reaches full production capacity.

Risk Identification

Risk identification involves identifying the environmental risks to be managed, and in its simplest form involves the analysis of the severity and frequency of potential impacts and the operational processes underlying any impact.

In order to provide a systematic framework to identify environmental risks, the following basic process was used:

1. Select a component of the surrounding environment that may be impacted by the Project.

2. Identify the activities described in Section 2.0 of the Preliminary Environmental Assessment that may affect the value.
3. Identify the potential environmental impacts (positive or negative, acute or chronic) for each value, as a result of these activities.

Risk Analysis

Risks are typically analysed by combining possible consequences and their likelihood, in the context of existing measures to control the risk. The consequence and likelihood of each risk determines the level of risk.

Each risk was assessed using a five level qualitative ranking of consequence and likelihood as listed in **Table 1** and **Table 2** respectively. This yields a five by five risk analysis matrix and results in four levels of risk: 'catastrophic', 'major', 'moderate' and 'minor', as shown in **Table 3**.

Table 1 - Qualitative Measures of Environmental Consequence

Severity Level	Natural Environment	Legal / Government	Heritage	Community/Reputation/Media
(1) Insignificant	Limited damage to minimal area of low significance.	Low-level legal issue. On the spot fine. Technical non-compliance prosecution unlikely. Ongoing scrutiny / attention from regulator.	Low-level repairable damage to commonplace structures.	Low level social impacts. Public concern restricted to local complaints. Could not cause injury or disease to people.
(2) Minor	Minor effects on biological or physical environment. Minor short-medium term damage to small area of limited significance.	Minor legal issues, non-compliances and breaches of regulation. Minor prosecution or litigation possible. Significant hardship from regulator.	Minor damage to items of low cultural or heritage significance. Mostly repairable. Minor infringement of cultural heritage values.	Minor medium-term social impacts on local population. Could cause first aid injury to people. Minor, adverse local public or media attention and complaints.
(3) Moderate	Moderate effects on biological or physical environment (air, water) but not affecting ecosystem function. Moderate short-medium term widespread impacts (e.g. significant spills).	Serious breach of regulation with investigation or report to authority with prosecution or moderate fine possible. Significant difficulties in gaining approvals.	Substantial damage to items of moderate cultural or heritage significance. Infringement of cultural heritage / scared locations.	Ongoing social issues. Could cause injury to people that require medical treatment. Attention from regional media and/or heightened concern by local community. Criticism by NGOs. Environmental credentials moderately affected.

Table 1 - Qualitative Measures of Environmental Consequence (cont)

Severity Level	Natural Environment	Legal / Government	Heritage	Community/Reputation/Media
(4) Major	Serious environmental effects with some impairment of ecosystem function. Relatively widespread medium-long term impacts.	Major breach of regulation with potential major fine and/or investigation and prosecution by authority. Major litigation. Project approval seriously affected.	Major permanent damage to items of high cultural or heritage significance. Significant infringement and disregard of cultural heritage values.	On-going serious social issues. Could cause serious injury or disease to people. Significant adverse national media/public or NGO attention. Environment/management credentials significantly tarnished.
(5) Catastrophic	Very serious environmental effects with impairment of ecosystem function. Long term, widespread effects on significant environment (e.g. national park).	Investigation by authority with significant prosecution and fines. Very serious litigation, including class actions. License to operate threatened.	Total destruction of items of high cultural or heritage significance. Highly offensive infringements of cultural heritage.	Very serious widespread social impacts with potential to significantly affect the well being of the local community. Could kill or permanently disable people. Serious public or media outcry (international coverage). Damaging NGO campaign. Reputation severely tarnished. Share price may be affected.

Table 2 - Qualitative Measure of Likelihood

Level	Descriptor	Description	Guideline
A	Almost Certain	Consequence is expected to occur in most circumstances	Occurs more than once per month
B	Likely	Consequence will probably occur in most circumstances	Occurs once every 1 month – 1 year
C	Occasionally	Consequence should occur at some time	Occurs once every 1 year - 10 years
D	Unlikely	Consequence could occur at some time	Occurs once every 10 years – 100 years
E	Rare	Consequence may only occur in exceptional circumstances	Occurs less than once every 100 years

Source: AS/NZS 4360:1999 Risk Management

Table 3 - Qualitative Risk Matrix

Likelihood of the Consequence	Maximum Reasonable Consequence				
	(1) Insignificant	(2) Minor	(3) Moderate	(4) Major	(5) Catastrophic
(A) Almost certain	High	High	Extreme	Extreme	Extreme
(B) Likely	Moderate	High	High	Extreme	Extreme
(C) Occasionally	Low	Moderate	High	Extreme	Extreme
(D) Unlikely	Low	Low	Moderate	High	Extreme
(E) Rare	Low	Low	Moderate	High	High

Source: AS/NZS 4360:1999 Risk Management

The level of risk assessed assumes that existing environmental management controls employed by Austar will remain in place. Consideration was also given to the need for further assessment of new risks that are associated only with Stage 3 of the project. This allows those key risks requiring further investigation to be identified whilst also identifying those risks that have adequate existing controls.

Although the risk rating does not quantify the actual value of the risk for a particular aspect, it allows a relative comparison between issues. This enables risks to be prioritised, facilitates informed decisions about treating risks and also helps to determine whether a risk is acceptable.

Table 4 shows the format used for the preliminary environmental risk assessment.

Table 4 - Format for Preliminary Project Environmental Risk Assessment

Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment	Further Assessment Requirements	Key Issue
Identifies the project's activities that may affect the Environmental Value.	Category of Environmental Impact that the activity may affect.	This describes any change to the environment, whether adverse or beneficial, wholly or partly resulting from the project's activities.	Details current understanding of the existing environment and existing controls.	Risk Assessment results based on methodology outlined above.	Details of further assessments required as part of the Environmental Assessment (EA) process.	Identifies if the issue will require further assessment during the EA.

Risk Evaluation

Risk evaluation concerns setting priorities for decisions about risk. The purpose of risk evaluation is to compare risks against significance criteria to determine the degree of assessment required. The application of significance criteria will reduce the number of activities that require specific management attention and provides an opportunity to prioritise environmental issues based on predetermined criteria.

Although guidelines and regulations provide great detail on risk identification and characterisation, there is less guidance on what constitutes an acceptable level of risk. This is because the development of risk acceptance criteria is subjective and is not an exact science or based on a complex formula. For each risk assessment process there is a degree of flexibility in defining its own criteria to determine which impacts are potentially “significant” and which are not. For the purposes of this Preliminary Environmental Assessment, significant risks have been defined as those with a risk rating of high or extreme, as defined by **Table 3**.

It is important to note that certain impacts associated with the Project’s activities may be predetermined as significant by State or Federal legislation. These ‘regulated’ impacts, whilst not always rated as significant based on risk score alone, will also require further assessment to be undertaken.

Austar Coal Mine – Stage 3

Preliminary Environmental Risk Analysis

Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
Construction Phase								
Construction of general surface facilities (incl. roads and infrastructure)	Historic Heritage	Disturbance of sites of historic heritage significance.	Based on existing knowledge of the study area, it is unlikely that subsidence would result in impacts to any items of European heritage. As undiscovered heritage items could exist in the study area, a desktop analysis of European heritage values will be undertaken.	2	D	L	An assessment of the potential impact of the project on European heritage values is required.	No
	Ecology	Loss of native flora and fauna.	A number of Endangered Ecological Communities, threatened fauna species and threatened flora species are considered to potentially occur within the study area. An ecological survey of the project area will be completed. A full assessment of the potential impacts of the project on ecological values will also be completed.	3	C	H	An assessment of the potential impacts of the project on ecological values is required.	Yes
	Cultural Heritage	Disturbance of Aboriginal places or objects.	There is potential that both surface and subsurface Aboriginal heritage sites are located within this area. A cultural heritage survey will be completed. A full assessment of the potential impacts of the project on cultural heritage values will also be completed.	3	C	H	An assessment of the potential impacts of the project on cultural heritage values of the site is required. The assessment will be completed in consultation with the local Aboriginal community.	Yes
	Erosion and sediment runoff	Sedimentation of local waterways.	Appropriate erosion and sediment controls will be designed and constructed for all construction areas in accordance with <i>Soils & Construction</i> (Landcom, 2004).	1	B	M	Due to effective mitigation of this potential impact further assessment is not required.	No

Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
Construction of general surface facilities (incl. roads and infrastructure) (cont)	Clean Water Management	Contamination of clean water.	Diversion drains will be constructed to divert surface water from undisturbed areas away from major construction areas. The controls will be designed and constructed in accordance with <i>Soils & Construction</i> (Landcom, 2004).	1	C	L	Due to effective mitigation of this potential impact further assessment is not required.	No
	Air Quality	Degradation of air quality.	Construction of the proposed new surface infrastructure has potential to generate some dust. Controls will be employed to mitigate dust generation throughout the construction phase. An air quality assessment will be completed in accordance with current DECC guidelines.	2	B	H	An assessment to determine the impact of the project on air quality is required.	Yes
	Noise Generation	Degradation of noise amenity (cumulative).	Construction of the proposed new surface infrastructure has potential to create noise impacts. An assessment of noise impacts would be undertaken in accordance with the EPA's <i>Industrial Noise Policy</i> .	2	B	H	An assessment of the potential for the project to cause noise impacts is required.	Yes
	Visual Amenity	Aesthetics of new pit top facility and associated construction works.	The construction phase will be relatively short in duration, with the majority of construction locations distant from residential receivers and shielded by topography and surrounding vegetated areas. No further assessment of construction phase visual impacts is therefore considered necessary.	1	B	M	No further assessment is required.	No
	Land use and agricultural productivity	Impact on land use, land capability and agricultural suitability.	The majority of new surface facilities will be constructed within Austar owned land bordering Aberdare State Forest. The footprint of the site will be kept to a minimum as the existing pit top facility will be retained as the main point of access for equipment and bring coal to the surface. Significant impacts to land	1	C	L	No further assessment is required.	No

Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
Construction of general surface facilities (incl. roads and infrastructure (cont))			capability are not expected. Areas disturbed for infrastructure will be rehabilitated post mining.					
	Soils	Loss of topsoil.	The overall area of topsoil requiring disturbance is relatively small. Areas disturbed for infrastructure will be rehabilitated post mining. Erosion and sediment controls will be implemented in accordance with <i>Soils & Construction</i> (Landcom, 2004).	1	B	M	Due to effective management of this potential impact further assessment is not required.	No
	Traffic	Supply of materials for construction project resulting in increased traffic.	The project will increase local traffic flows to and from the proposed surface infrastructure during construction. Increased traffic movements may also occur on Quorrobolong Road and Sandy Creek Road due to subsidence and subsidence remediation works. A traffic impact assessment will be completed as part of the Environmental Assessment.	2	B	M	A traffic impact assessment is required.	Yes
Mine Surface Facilities & Services (office, workshop, bathhouse, roads etc)								
Operation of surface facilities	Erosion and sediment runoff	Sedimentation of local waterways.	Appropriate erosion and sediment controls will be designed and constructed for all surface facility areas in accordance with <i>Soils & Construction</i> (Landcom, 2004).	1	B	M	Due to effective mitigation of this potential impact further assessment is not required.	No
	Clean Water Management	Contamination of clean water.	Diversion drains will be constructed to divert clean waters away from surface facility areas. The drains will be designed and constructed in accordance with <i>Soils & Construction</i> (Landcom, 2004).	1	B	M	Due to effective mitigation of this potential impact further assessment is not required.	No
	Dirty Water Management	Contamination of clean water.	Runoff from the proposed surface facilities drains to the Black Creek system and eventually drains into the Hunter River. Surface facilities will require specific water management	1	B	M	Further assessment of the projects potential to impact on surface water and shallow groundwater quality is required. An	Yes

Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
Operation of surface facilities (cont)			controls in accordance with <i>Soils & Construction</i> (Landcom, 2004). Further assessment is required in order to assess potential impacts on: - the mines water balance; and - surface water management requirements for the new infrastructure site.				assessment of the project's surface water management requirements is also required.	
	Surface Water Flows	Flooding.	Operation of the proposed surface facilities is unlikely to have a significant impact on localised flooding.	1	C	L	An assessment of the overall flooding impacts associated with mining activities will be undertaken.	Yes
	Air quality	Degradation of air quality.	An air quality assessment will be completed in accordance with current DECC guidelines to determine the potential impact on air quality of emissions from the exhaust fan.	2	B	H	An air quality assessment will be completed.	Yes
	Noise Generation	Degradation of noise amenity (cumulative).	Noise is not expected to be a significant issue for the proposed new pit top area as it is relatively distant from surrounding residential receivers and will be positioned to mitigate the potential impacts. A detailed noise study of the operation and construction of the proposed operations will be undertaken as part of the EA.	2	B	H	A detailed noise assessment is to be completed.	Yes
	Visual Amenity	Aesthetics of mine surface facilities.	Some mine surface facilities may be visible from receiver locations and an assessment of visual impacts will be completed. However, given the location of pit top facilities in relation to receiver locations potential impacts are likely to be low.	1	C	L	An assessment of the visual impact of the project will be completed.	Yes

Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
Operation of surface facilities (cont)	Energy Use	Emission of greenhouse gas emissions.	The operation of the surface facilities will require use of electricity, diesel and petrol. A detailed assessment of predicted emissions will be undertaken and opportunities identified to reduce or mitigate these emissions.	2	B	M	Greenhouse gas emissions will be calculated and appropriate management and mitigation measures identified.	Yes
	Water Demand	Water for bathhouse and other uses on site.	A water balance model will be prepared to assess the adequacy of water supplies and potential discharge requirements.	2	C	M	A water balance will be completed.	Yes
Mining								
Underground Mining	Water Demand	Water for mining.	A water balance model that builds on the existing water balance model for Austar Mine will be completed to determine the project water balance and assess the adequacy of water supplies and potential discharge requirements.	2	C	M	A water balance will be completed.	Yes
	Energy Use	Emission of greenhouse gas emissions.	The operation of the mine will require use of electricity, diesel and petrol. A detailed assessment of predicted emissions will be undertaken and opportunities identified to reduce or mitigate these emissions.	3	B	H	Greenhouse gas emissions will be calculated and appropriate management and mitigation measures identified.	Yes
	Gas drainage and venting of mine air	Emission of greenhouse gas emissions.	Venting of mine air will result in the emission of greenhouse gasses. There is not gas drainage requirement at Austar.	3	B	H	Greenhouse gas emissions will be calculated and appropriate management and mitigation measures identified.	Yes
	Dewatering	Changes to groundwater flow and quality.	Mine dewatering has the potential to impact local and regional groundwater resources. With respect to shallow aquifers associated with the Quorrobolong Creek drainage system the potential impact is low due to the significant	3	B	H	A groundwater impact assessment will be completed.	Yes

Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
Underground Mining (cont)			depth of cover between the coal seam to be mined and the alluvium. Regional groundwater resources are extensively controlled by previous mining activities and groundwater stored in former mining areas that adjoin the proposed Stage 3 area.					
Subsidence and subsidence remediation works	European Heritage	Disturbance of sites of European heritage significance.	Based on existing knowledge of the study area, it is unlikely that subsidence would result in impacts to any items of European heritage. As undiscovered heritage items could exist in the study area, a desktop analysis of European heritage values will be undertaken.	2	D	L	An assessment of the potential impacts of the project on European heritage values is required.	Yes
	Ecology	Loss of native flora and fauna, loss of forest, riparian and aquatic habitat.	Subsidence has the potential to impact on ecological values. An ecological survey of the project area will be completed. A full assessment of the potential impacts of the project on ecological values will also be completed.	3	C	H	An assessment of the potential impact of the project on ecological values is required.	Yes
	Surface Improvement	Damage to residential dwellings, garages, fences, contour banks, dams, access tracks, irrigation pipelines etc.	Subsidence has the potential to impact surface improvements. A full assessment of the potential impact on surface improvements will be undertaken.	3	C	H	An assessment of the potential impact of the project on surface is required.	Yes
	Public Infrastructure	Damage to public utilities including roads, water, power, telecommunications.	Subsidence has the potential to impact a range of public infrastructure. A full assessment of the potential impact on all public services will be undertaken.	3	C	H	An assessment of the potential impact of the project on public infrastructure is required.	Yes
	Cultural Heritage	Disturbance of Aboriginal places or objects.	Subsidence has the potential to impact on cultural heritage values. A cultural heritage survey will be completed for the study area. A full assessment of the potential impacts of the project on	3	C	H	An assessment of the potential impacts of the project on cultural heritage values of the project area is required.	Yes

Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
Subsidence and subsidence remediation works (cont)			cultural heritage values will also be completed.				The assessment will be completed in consultation with the local Aboriginal community.	
	Erosion and sediment runoff	Sedimentation of local waterways.	Remediation works will be undertaken in areas impacted by subsidence to return the land to a stable landform, reducing the potential for erosion. Further details of subsidence remediation techniques and rehabilitation measures will be included in the EA.	3	B	M	Further details of subsidence remediation techniques and rehabilitation measures will be included in the Environmental Assessment report.	Yes
	Surface Water Flows	Alteration to natural overland drainage flow. Surface water capture.	Subsidence has the potential to change existing flow paths and drainage line remediation works may be required. The surface water flow impacts and likely remediation requirements will be assessed. The potential for loss of surface water flows due to cracking will also be assessed.	3	C	H	Subsidence impacts on surface water flows will be assessed.	Yes
	Visual Amenity	Aesthetics of exposed earthworks and top soil stockpiles.	Visual impacts associated with subsidence and subsidence remediation works will be localised and short-term in nature. Due to the local undulating topography and the lack of nearby residences, visual impacts will be minimal.	1	C	L	No further assessment is required.	No
	Land use and agricultural productivity	Impact on land use, land capability and agricultural suitability.	Subsidence remediation works may result in disturbance of land resulting in a short-term loss of agricultural productivity in some areas. Further assessment of the potential impacts of subsidence on land use will be included in the EA.	1	C	L	Further assessment of land use impacts will be included in the Environmental Assessment.	Yes
	Topography	Alteration to existing topography.	The impacts of subsidence on the existing landform and the potential for localised subsidence impacts such as	4	C	L	An assessment of subsidence impacts on topography is required.	Yes

Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
Subsidence and subsidence remediation works (cont)			landslips will be subject to further assessment.					
ANCILLARY ACTIVITIES AND ISSUES								
Waste Management	Waste disposal (including sewage)	Pollution / contamination due to incorrect disposal. Inefficient use of resources.	All wastes generated as part of this project will be disposed of in approved manner by licensed contractors.	1	B	M	Due to effective mitigation of this potential impact, no further assessment is required.	No
	Waste oil and grease storage	Soil and/or water contamination from spills or leaks.	Waste oils, grease, fuel etc will be collected and handled using systems designed and operated in accordance with relevant Australian standards and DECC guidelines.	2	D	L	No further assessment is required.	No
Materials supply and storage	Oil, fuel and grease supply and storage	Soil and/or water contamination from spills or leaks.	All fuels, oils, grease etc will be stored and handled using systems designed and operated in accordance with relevant legislation, Australian standards and DECC guidelines (e.g. stored in bunded areas).	2	D	L	No further assessment is required.	No
	Dangerous goods supply and storage	Soil and/or water contamination from spills or leaks. Explosion hazard.	All dangerous goods will be handled using systems designed and operated in accordance with relevant legislation and Australian standards.	2	D	L	No further assessment is required.	No
	Materials delivery	Increase in traffic.	The project will increase local traffic flows during both the construction and operational phases due to materials delivery activities. A traffic impact assessment will be completed as part of the Environmental Assessment.	2	C	M	An assessment of traffic impacts is required.	Yes

Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
Workforce and Amenities	Transport and access of employees to site	Increase in traffic.	The project will increase local traffic flows to and from the proposed surface infrastructure site during both the construction and operational phases due to staff traffic movements. A traffic impact assessment will be completed as part of the Environmental Assessment.	2	C	M	An assessment of traffic impacts is required.	Yes
	Increased local population	Impact on services/local infrastructure.	The project will employ up to 275 people plus contractors. Impacts associated with workforce demand for services and on local infrastructure require further assessment.	2	C	M	A detailed Social Impact Assessment will be completed.	Yes

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