APPENDIX 4

Existing Austar Operations

Appendix 4 – Current Austar Coal Mine Infrastructure, Operations and Mining Leases

1.0 Ellalong Drift and Pit Top Facilities

The location of the existing Ellalong Drift and Pit Top facility for the mine is shown on **Figure 1**. The layout of Ellalong Drift and Pit Top facilities is shown on **Figure 2**. This facility will be retained and continue to function as the main access point for large equipment and maintenance of the mine. The existing pit top facilities at this location include:

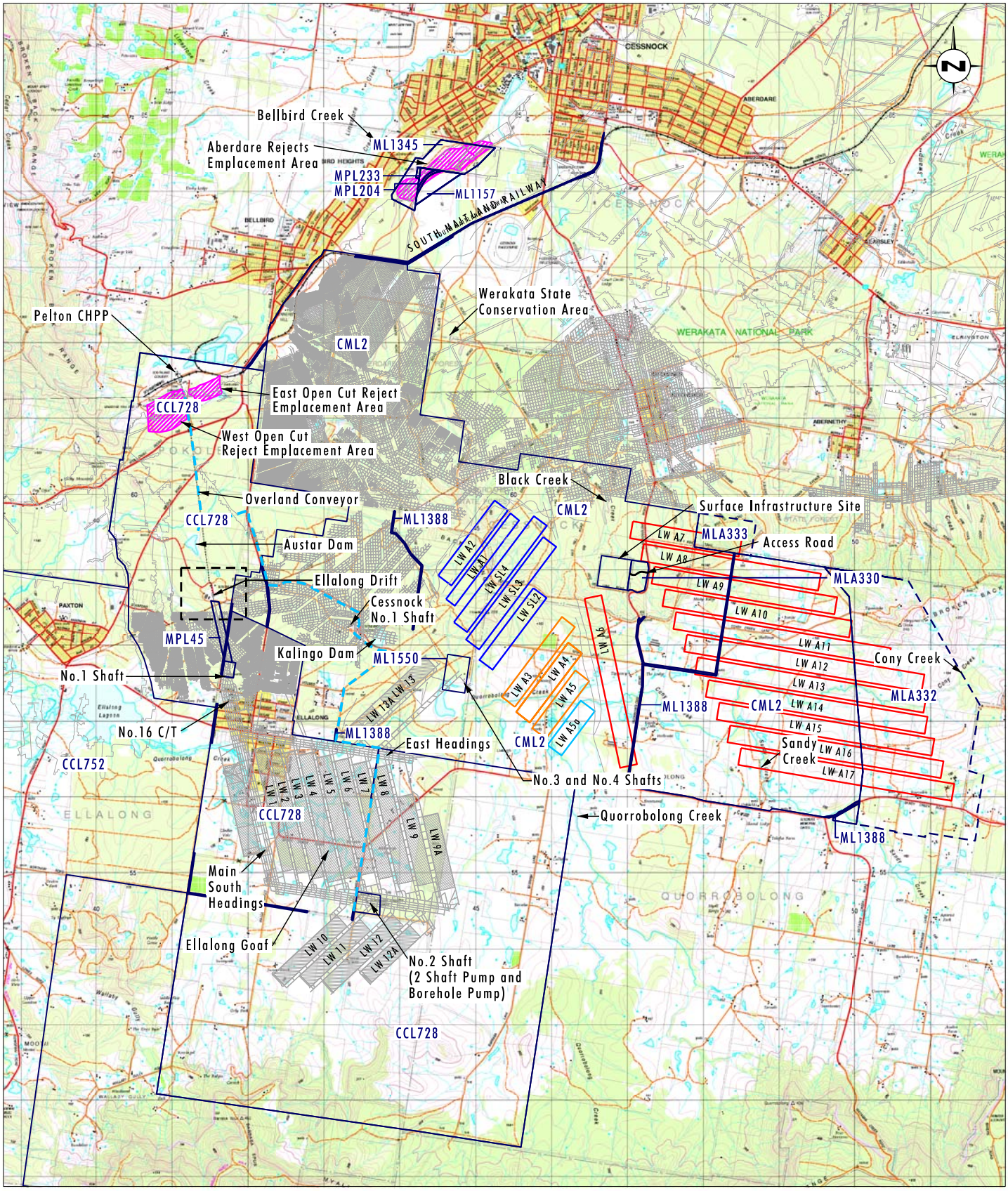
- administration buildings including amenities, training room, bathhouse, first aid room;
- ambulance access and helipad;
- car parks;
- explosive storage area;
- equipment compound;
- fuel and oil storages;
- bulk store;
- rescue station;
- electricity substation;
- coal handling facilities including bins, winder house, overland conveyor;
- sewage treatment facility;
- water storage tanks; and
- various sheds, equipment and materials storages.

1.1 Materials Access

Access to the underground workings is via the Ellalong drift which is 1200 metres long at a grade of 1 in 3.5. The drift houses a conveyor that removes mined coal and a slope haulage system which provides man and materials access. The drift also contains a pumping station and rising main pump line.

1.2 Air Ventilation Systems

Air ventilation systems at the mine consist of the following:



Source: Topo Maps: LPI NSW, Longwall Layouts: Austar Coal Mine

0 1 2 3km

1:70 000

Legend

- Layout for Stage 1 Longwall Panels
- Layout for Stage 2 Longwall Panels
- Layout for Stage 2 Extension Longwall Panel
- Conceptual Layout for Stage 3 Longwall Panels as Approved
- Reject Emplacement Areas
- Old Workings
- Mining Leases
- Pending Mining Lease Application Areas
- Water Pipeline

FIGURE 1

Existing Austar Infrastructure

File Name (A4): R64_V1/2274_957.dgn

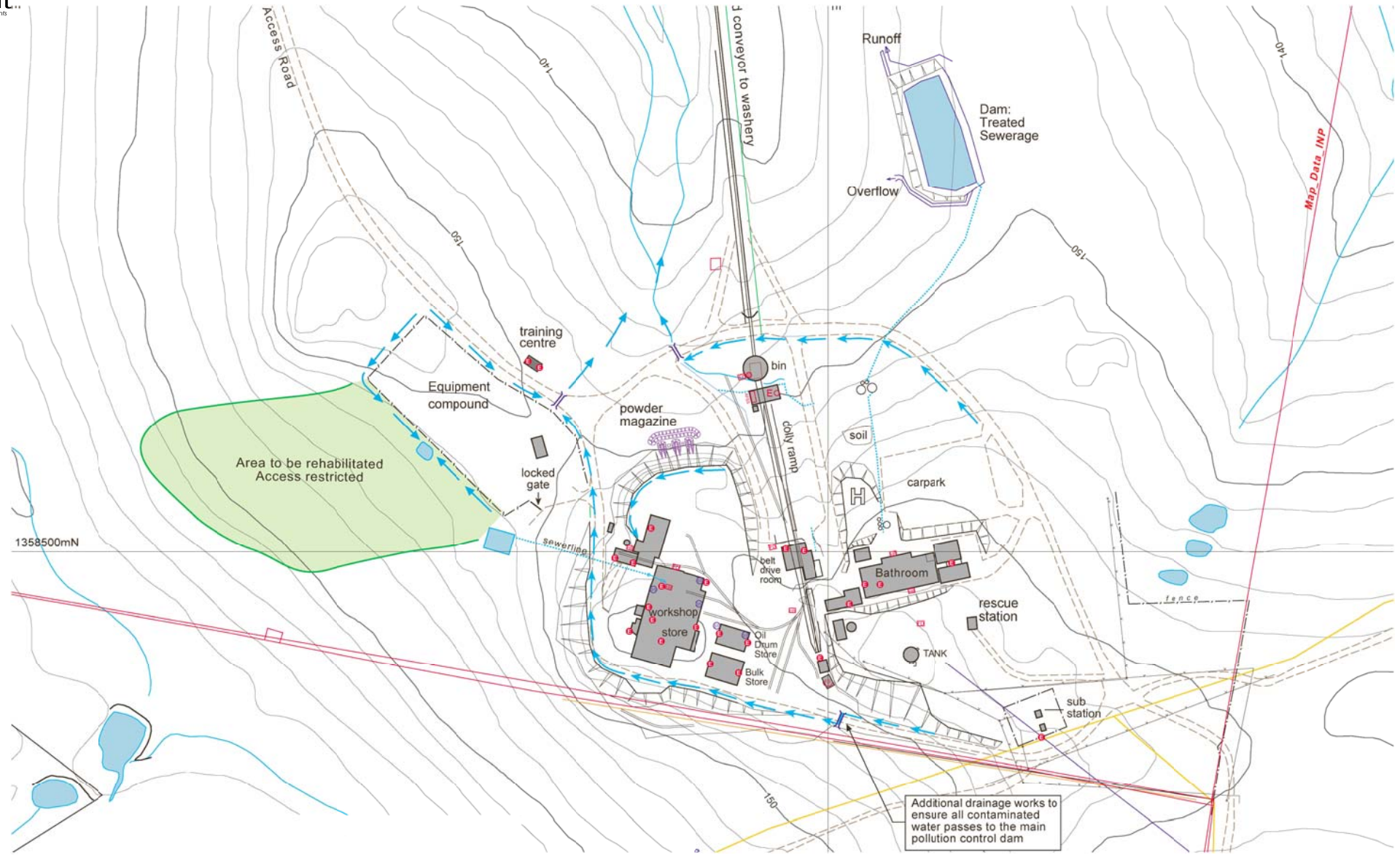


FIGURE 2

Existing Ellalong Drift and Pit Top Facilities

Source: Southland Colliery / Geospectrum 1998 Adapted from Figure 3, 2005 Austar MOP

File Name (A4): R64_V1/2274_958.dgn

1.2.1 Intakes

- The Ellalong drift which is 1200 metres long, 6.0 metres wide with a nominal 3.1 metre radius arched profile connects the surface to the pit bottom area;

- Ellalong No. 1 Shaft – Consists of a downcast shaft and second egress winder. The shaft is approximately 5.5 metres diameter and 270 metres deep and is located adjacent to the existing pit bottom area; and

- The No. 4 Downcast shaft – consists of a 2.44 metre diameter shaft and is 453 metres deep. This shaft solely provides fresh air to the current mine workings area.

1.2.2 Return

- Upcast Ventilation Fan at No. 3 Shaft Site – The facility includes 2 x 750 kW centrifugal fans capable of each supplying 200 m^3/s at 5 kPa.

The locations of each of the air ventilation systems are shown in **Figure 1**.

2.0 Coal Handling Preparation Plant

Coal from current underground mining operations (Stage 2) is loaded onto an underground conveyor system and transported along the Ellalong drift to the Ellalong Pit Top where it is transferred to an overland conveyor and transported to the Pelton Coal Handling and Preparation Plant (CHPP).

The existing Pelton CHPP is a single module design which utilises dense medium cyclones and spirals to treat the coal. The CHPP has a nameplate capacity to wash and handle 600 tonnes of coal per hour and currently processes up to 520 tonnes per hour of ROM coal making its maximum annual production capacity approximately 4.2 Mtpa of ROM coal or approximately 3.6 Mtpa to approximately 3.8 Mtpa of product coal. The CHPP can operate 24 hours per day, 7 days per week, 52 weeks per year with current operations restricted by export capacity at the Port of Newcastle.

Austar's ROM stockpile capacity consists of a primary and secondary stockpiles located immediately west of the Pelton CHPP. The ROM stockpile has a live capacity of 5000 tonnes and an overall capacity of 300,000 tonnes. Under normal conditions the maximum amount of coal that is stored in the stockpile is around 100,000 tonnes. All coal stored in excess of the live storage capacity of the system is handled using tracked bulldozers. Secondary products from the Pelton CHPP consist of specialty sized coal products which are collected in a 300 tonne coal bin located to the east of the CHPP.

The washed coal stockpile is located immediately north of the Pelton CHPP and has a maximum capacity of 250,000 tonnes. Under typical conditions, the washed coal stockpile is maintained at less than 100,000 tonnes. The conveyor system under the stockpile has a reclaim capacity of up to 1200 tonnes per hour.

3.0 Coal Transportation

Up to 3 Mtpa of product coal is transported by rail to the Port of Newcastle. The rail line begins at the Pelton CHPP site and extends 9.5 kilometres along the Austar Rail Line before joining the South Maitland Rail Line and then the Great Northern Line at Maitland Junction. The rail system allows 4 x 48 Class diesel locomotives and 38 wagons, making a train unit of 2200 tonnes. Up to six trains per day can be loaded.

Coal loading capacity at the Port of Newcastle is currently restricting the amount of coal that is transported from Austar Coal Mine. It is expected that the current restrictions and the lack of capacity at the Port of Newcastle will be resolved in the near future. Once additional capacity is available at the Port, the mine will be able to move into full production, and transport up to 3 Mtpa. It is envisaged at that this may occur by late 2011.

Up to 60,000 tpa of specialty sized coal and other special coal product is loaded by front-end loader into 25 tonne road-trucks for transport to special use customers. A very small amount of coal is also transported to special use customers in small loads of between 1 to 2 tonnes.

4.0 LTCC Mining Methodology

In Australia all coal seams of 5 metres in thickness or greater have not been able to be fully extracted by conventional longwall mining methods. 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 as it allows for significant improvements in the safe and reliable extraction of thick coal seams, optimising resource recovery, reducing energy required per tonne of coal to extract coal 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).

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 3.**

5.0 Water Management

The water management system at Austar Coal Mine is detailed in the Site Water Management Plan (SWMP) (Austar March 2009) and comprises three main components being the underground, Pelton CHPP site and the surface water storage systems. The locations of the main components of Austar's infrastructure are shown on **Figure 1**.

An assessment of predicted future groundwater inflow into the mine has been undertaken by Connell Wagner (2007) and forms part of the SWMP (Austar March 2009) which concludes that existing water management infrastructure as described in the SWMP, has sufficient capacity to accommodate mine water from the Stage 2 Extension Project. During the Stage 2 Extension Project, water will continue to be managed in accordance with Austar's SWMP.

5.1 Underground Mine Water Management System

Austar workings are located downdip of the old Pelton, Bellbird, Aberdare Central and Kalingo workings and receive groundwater inflows directly from these workings. Water quality of the inflows is poor having low pH (2.5 – 3.5), high conductivity (10,000 to 15,000 µS/cm^3), high iron, manganese and sulphur concentrations.

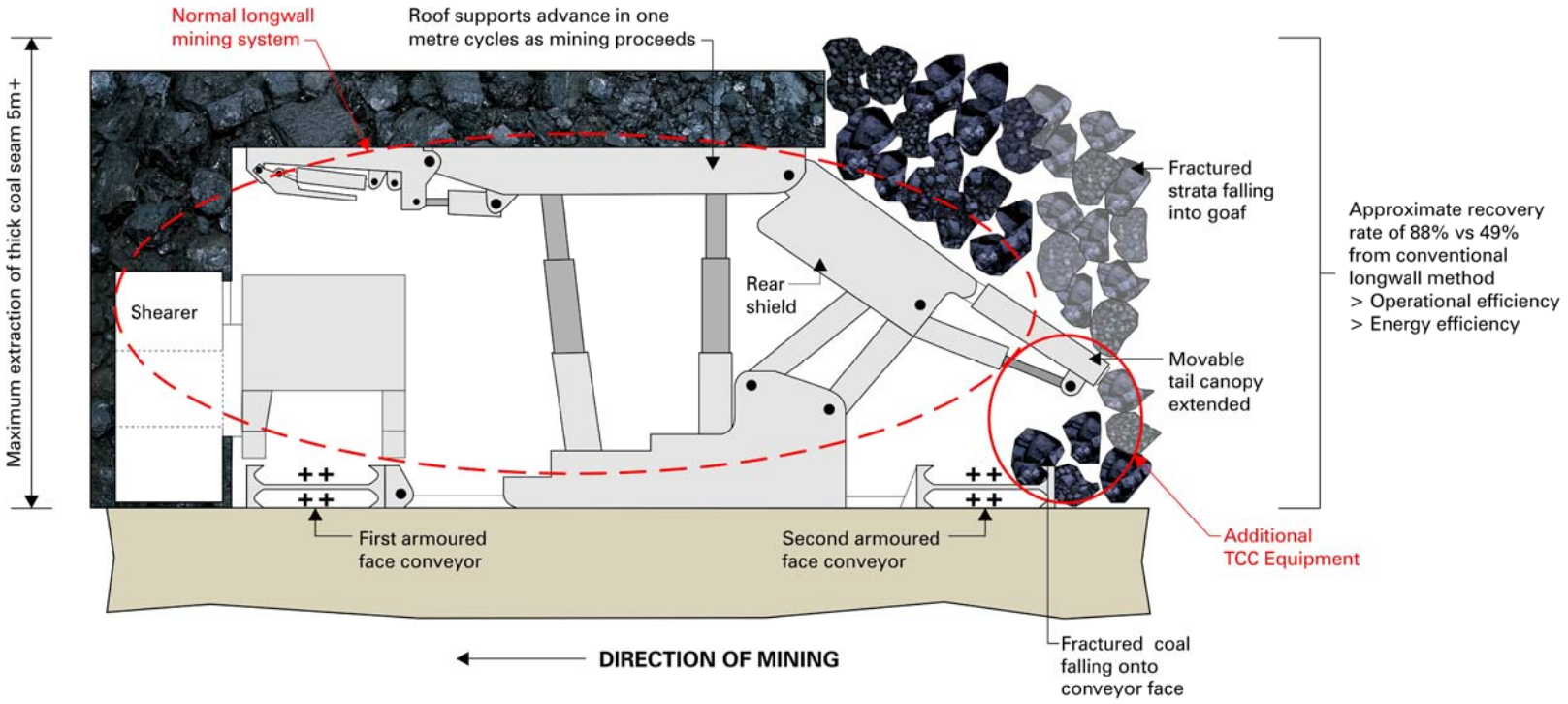
Austar's operations require that the underground workings be dewatered to prevent water flowing into the active mine area. Water is stored in various underground workings. Two underground pumping stations deliver mine water to the surface – No. 16 C/T Main South Pumping Station and the No. 2 Shaft Pumping Station (refer **Figure 1**).

5.2 Pelton CHPP Water Management System

The water management system at Pelton CHPP (see **Figure 4**) consists of four interconnected systems being the water pre-treatment and lime dosing system, the reverse osmosis (RO) treatment plant, the coal washing and handling system and the stormwater runoff and management system. Treated clean water in excess of site needs is discharged into Bellbird Creek in accordance with Austar's Environmental Protection Licence (EPL No. 416) at a rate of up to 2 ML/day annual average.

5.3 Surface Water Storage and Management System

Austar's surface water management system is designed to match the capacity of the underground dewatering systems with additional provision to store and handle surface runoff during heavy rain events. The system is managed in accordance with the requirements of



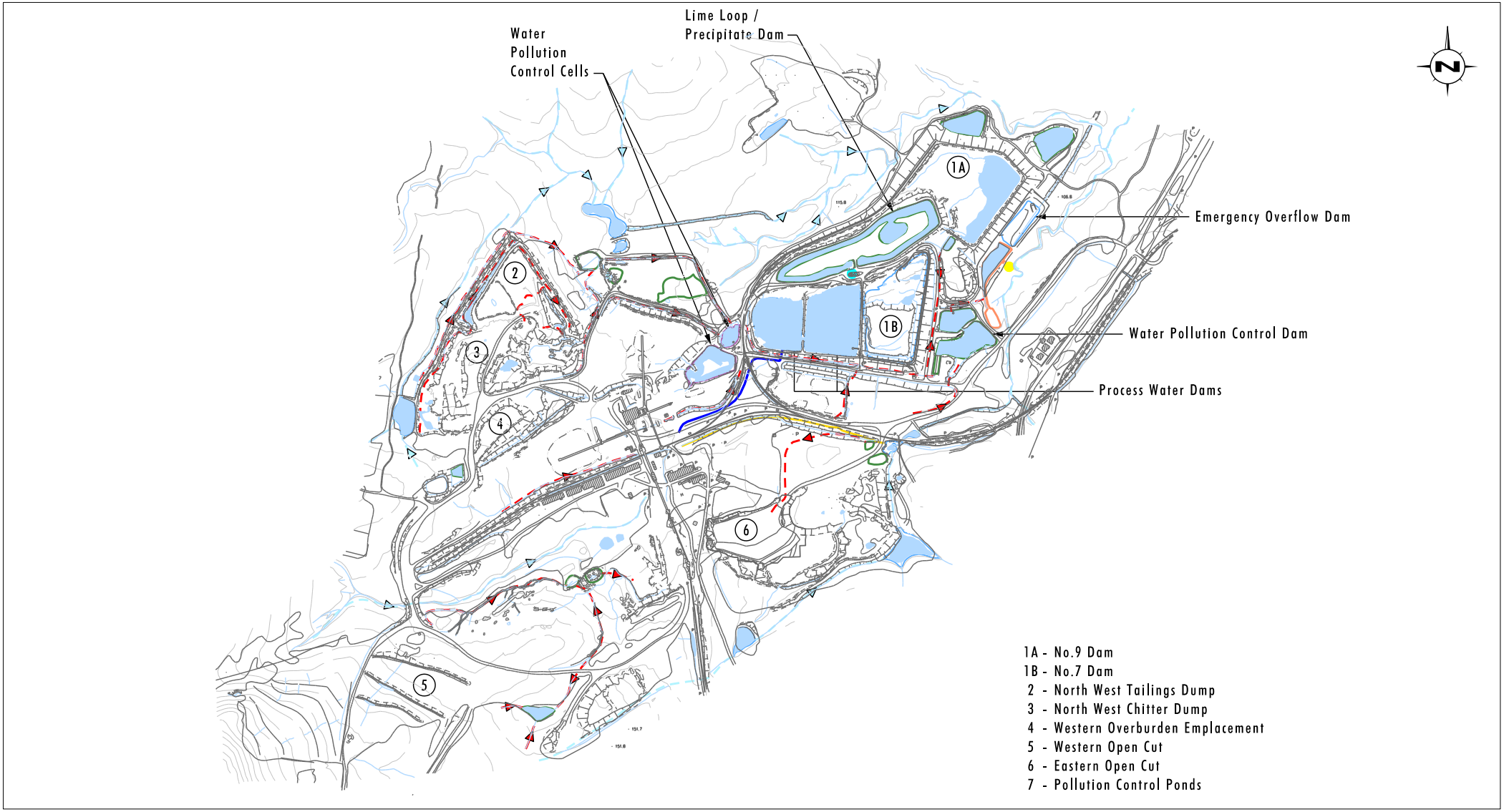
Longwall Top Coal Caving LTCC Method

Combination of conventional retreat longwall face with second armoured face to recover coal that falls into goaf

Base Source: Austar Coal Mine (2007)

FIGURE 3

Longwall Top Coal Caving Method



Source: Southland Colliery / Geospectrum 1998, Adapted from Figure 4, 2005 Austar MOP
Note: Contour Interval 5m

0 200 400 600m
1:12 000

Legend

- Licensed Discharge Point
- Lime Dosing Plant
- Clean Water Dam
- Clean Water Flow
- Contaminated Water Dam
- Contaminated Water Flow
- Discharge Channel
- Emergency Dam
- Pipeline
- Pollution Control Dam

FIGURE 4

Current Water Management System Pelton CHPP

the SWMP (Austar March 2009). The two main surface water storages (apart from the water pollution control dams at the washery) are Kalingo Dam and Austar Dam which are shown in **Figure 1**.

6.0 Reject Disposal and Tailings Management

Austar has development approval to dispose of rejects and manage tailings at Pelton Colliery (both north and south of Wollombi Road), Pelton Open Cut, Aberdare Extended Open Cut and the areas identified under the 1996 Minister's Consent as Reject Emplacement Areas 1, 3 and 4. Reject emplacement will continue to be in areas previously approved for Ellalong Colliery (DA 74/75/79), Pelton Open Cut (DA 118/691/181) and the Bellbird South extension to Ellalong Colliery (DA 29/95). These areas have capacity for the emplacement of approximately 17.5 Mt of coarse reject. The locations of the approved reject emplacement areas are shown in **Figure 5**.

Coarse reject from the Pelton CHPP is delivered to an 80 tonne refuse bin and trucked via the private haul road to either the Aberdare Extended Open Cut refuse emplacement area or is emplaced in open cut voids at the Pelton Open Cut.

Tailings from the Pelton CHPP is presently discharged into underground mine workings. The return water from these tailings gravitates through the mine workings and is recovered into the Austar Mine via dewatering boreholes.

Reject emplacement and tailings disposal is undertaken in accordance with an approved Mining Operations Plan (MOP) (Austar 2008) as required by Mining Lease conditions issued under the *Mining Act 1992*.

The currently approved reject emplacement areas as defined in the MOP have capacity to readily emplace in excess of 5.5 Mt of coarse reject. Details of Austar's reject emplacement strategy are provided in the MOP (Austar 2008) which will continue to be revised and updated throughout the life of the mine.

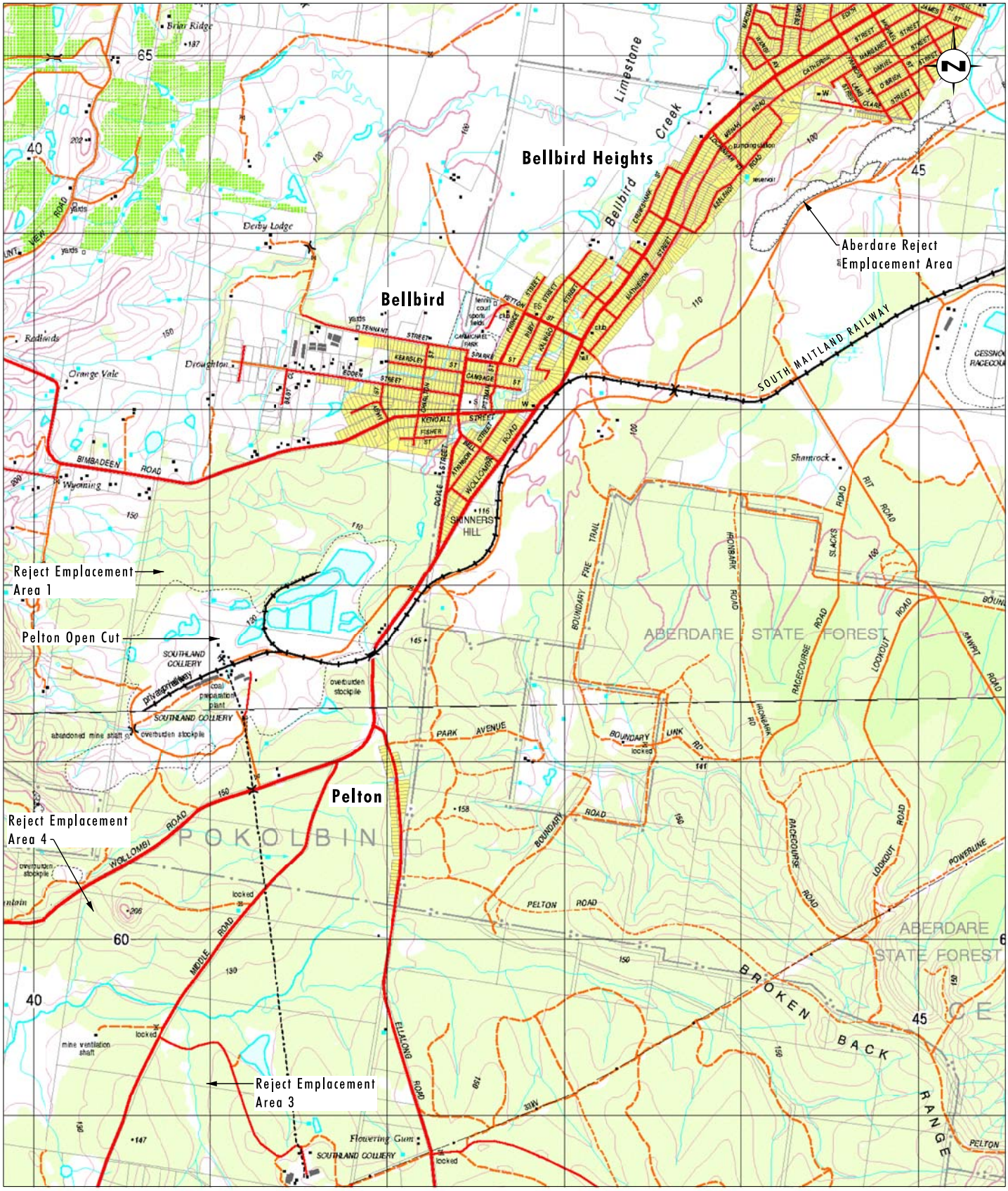
Reject emplacement will continue to be undertaken in accordance with the provisions and controls set out in the MOP (Austar 2008). The MOP will continue to be revised and updated throughout the life of the mine.

7.0 Planning Approvals

The approvals platform for the operation of the Austar Mine comprises the development consents under Part 4 of the EP&A Act particularised in **Table 1**.

The principle consents in the approvals platform of the Austar Mine are:

> (a) Development Consent No. 74/75/9 dated 4 December 1975 granted by the Cessnock City Council (CCC) for the establishment of a coal mine at Ellalong (**1975 Development Consent**); and
>
> (b) Development Consent No 29/95 dated 14 February 1996 granted by the Minister for Planning (**1996 Minister's Consent**) and as modified by the Minister for Planning on 27 September 2006 (**2006 Modification**), 5 June 2008 (**2008 Modification**), 28 May 2009 (**2009 Modification**) and 7 December 2010 (**2010 Modification**).



Source: LPI NSW

0 0.5 1.0 1.5km
1:30 000

Legend

Reject Emplacement Area (DA 29/95)
Reject Emplacement Area (DA 74/75/79)

FIGURE 5

Reject Emplacement Areas (DA 29/95 and DA 74/75/79)

Table 1 – Summary of Approval Platform for Austar Mine

Consent Description	Date	Approval Authority	Approved Development
DA 74/75/79	4 December 1975	CCC	Development Consent for a coal mine at Ellalong • Approval for an underground coal mine. • Construction of a new access drift, upcast shaft and ventilation shaft. • Expansion of the Pelton CHPP. • Conveyance of coal from the Ellalong pit top to the Pelton CHPP, operation of the Pelton CHPP for the washing and handling of coal. • Water management systems. • Upgrade of the Pelton rail loading facility and railway spur. • Reject emplacement underground, company owned land, open cut areas adjoining Pelton and other abandoned mine sites.
DA 118/680/93	8 October 1980	CCC	Downcast ventilation shaft and man access shaft, bathhouse and offices at Ellalong Colliery
DA 118/691/181	26 November 1992	CCC	Pelton Open Cut Coal Mine • Approval of an open cut coal mine adjoining Pelton Colliery up to 300,000 t of coal and underground mining of approximately 27,000 t of coal from a section of prior workings south of the proposed open cut.
DA 118/691/181	11 January 1993	CCC	Pelton Open Cut Coal Mine – Modification • Extension of open cut mining area. • Infrastructure and water management modifications.
DA 118/691/229	7 January 1993	CCC	Pelton Coal Handling Preparation Plant – raw coal handling facility, washed coal facility and upgrading water management system • Upgrade and replacement of coal handling infrastructure such as surge bin, automatic stacking system, reclaim facilities and skyline conveyor. • Increase in stockpile capacity. • Upgrade to water management system. • Extension of the reclaim tunnel. • Construction of a mine water transfer pipeline from Ellalong Colliery to Pelton. • Provision of underground workings for emergency mine water disposal. • Upgrade of lime treatment plant.
DA 118/693/42	26 November 1993	CCC	Extension of Pelton Open Cut Mine • Extension of open cut mining area including emplacement of overburden in previously mined blocks and extension of the mine's water management system.
DA 118/694/152	7 July 1994	CCC	Relocatable office and temporary bathhouse at Pelton Colliery

Table 1 – Summary of Approval Platform for Austar Mine (cont)

Consent Description	Date	Approval Authority	Approved Development
DA 118/695/22	12 July 1995	CCC	Establishment of overburden stockpile at Pelton Colliery • Establishment of an overburden stockpile for the Pelton Open Cut Operations.
DA 118/695/81	12 July 1995	CCC	Additions for bathhouse, office and car park at Ellalong Colliery • Extension to the bathhouse at the Ellalong drift site. • Extension of existing offices or construction of portable offices. • Construction of a 4,000 square metre car park.
DA 8/1999/1658	18 February 2000	CCC	Relocation of ventilation facilities at Bellbird South Underground Mine • Installation of a ventilation shaft and fan house. • Upgrading of the existing access track to the site from the Pelton-Ellalong Road.
DA 8/2002/655/1	16 October 2002	CCC	Compressor and pump enclosure buildings at Ellalong Colliery
DA 118/695/18	21 February 1995	CCC	Relocatable office at Pelton Colliery
DA 29/95	14 February 1996	Minister for Urban Affairs and Planning	Ellalong Colliery extension into Bellbird South • Extension of underground mining activities into Bellbird South area (CML 2). • Mine life of 21 years with a production of 3 Mtpa. • Reject emplacement. • Construction and operation of a new infrastructure site including new ventilation shaft and fan(s) (No. 2 Shaft) adjacent to Sandy Creek Road. • Use of Pelton CHPP for washing and handling of coal. • Provision of a maximum raw coal stockpile of 100,000 t. • Reopening of disused Cessnock No.1 Colliery shafts for ventilation and access, or the sinking of new shafts, as required. • Construction of various water management devices including sedimentation and clean water dams and drainage systems. • Transport of up to 3 million tonnes of coal per year by rail and up to 60,000 tonnes per year of coal product by road.

Table 1 – Summary of Approval Platform for Austar Mine (cont)

Consent Description	Date	Approval Authority	Approved Development
DA 29/95	27 September 2006	Minister for Planning	Extension of underground mining activities into Bellbird South (Ellalong Colliery) – modification • Production and transport up to 3 Mtpa of coal with up to 60,000 tonnes of coal being transported by road and the remainder being transported by rail • Use of long wall top caving mining methods in longwall panels A1 and A2. • Installation of a larger capacity fan at the site approved for DA 8/1999/1658. • Installation of a new downcast ventilation shaft. • Installation of a new 10 MVA substation. • Installation of a nitrogen inertisation plant with a 2,000 cubic metre capacity. • Provision of a diesel and emulsion fluid storage area and dispatch system. • Installation of a tube bundle shed to house electronic monitoring equipment. • Upgrade of the existing water treatment plant. • Upgrade of water reticulation and pumps. • Minor embankment stabilisation works at Kalingo Dam.
DA 29/95	2008	Minister for Planning	Extension of underground mining activities into Bellbird South (Ellalong Colliery) – modification • Use of long wall top caving mining methods in longwall panels A3 to A5.
DA 29/95	2009		Extension of underground mining activities into Bellbird South (Ellalong Colliery) – modification • Change in the size and dimensions of longwall panels A4 and A5.
DA 29/95	2010		Extension of underground mining activities into Bellbird South (Ellalong Colliery) – modification • Use of long wall top caving mining methods in longwall panel A5a.
Development for the purpose of a mine does not require consent		Cessnock Local Environmental Plan 1989 (LEP)	Clause 6 of the LEP adopts Clause 35 of the Environmental Planning & Assessment Model Provisions 1980 which saves from the need for consent under the Cessnock LEP development for the purpose of a mine other than certain exclusions. A number of elements of the Austar Mine were constructed and now operate pursuant to this exemption from the requirement for planning approval.
Development for the purpose of a railway undertaking does not require consent		Cessnock Local Environmental Plan 1989	Clause 6 of the LEP adopts Clause 35 of the Environmental Planning & Assessment Model Provisions 1980 which saves from the need for consent under the Cessnock LEP development for the purpose of a railway undertaking.

Note: CCC – Cessnock City Council

7.1 Austar Rail Line (also known as the Pelton Branch Line)

The Austar Rail Line was built in 1918 and serviced the Pelton Colliery and the surrounding mines. The line has always been used for the sole purpose of transporting coal. The line is either on land owned and operated by Austar or within land subject to Mining Purposes Leases No. 23, 89, 217, 269, and 1364 held by Austar. The use of the rail line is properly characterised as a 'mine' under the Cessnock LEP.

Development for the purposes of a 'mine' could be carried out without development consent under the clause 6 of the Cessnock LEP. However, since 1 August 2007, Part 3A of the EP&A Act has applied to the rail line. The line therefore operates under the continuing use rights provisions of clause 6B of State Environmental Planning Policy (Major Development) 2005 which allows the transport of coal as part of the operation of the Austar coal mine. As set out in **Table 1** the 1996 Minister's Consent provides for Austar Coal mine to produce and transport up to 3 Mtpa.

7.2 South Maitland Railway

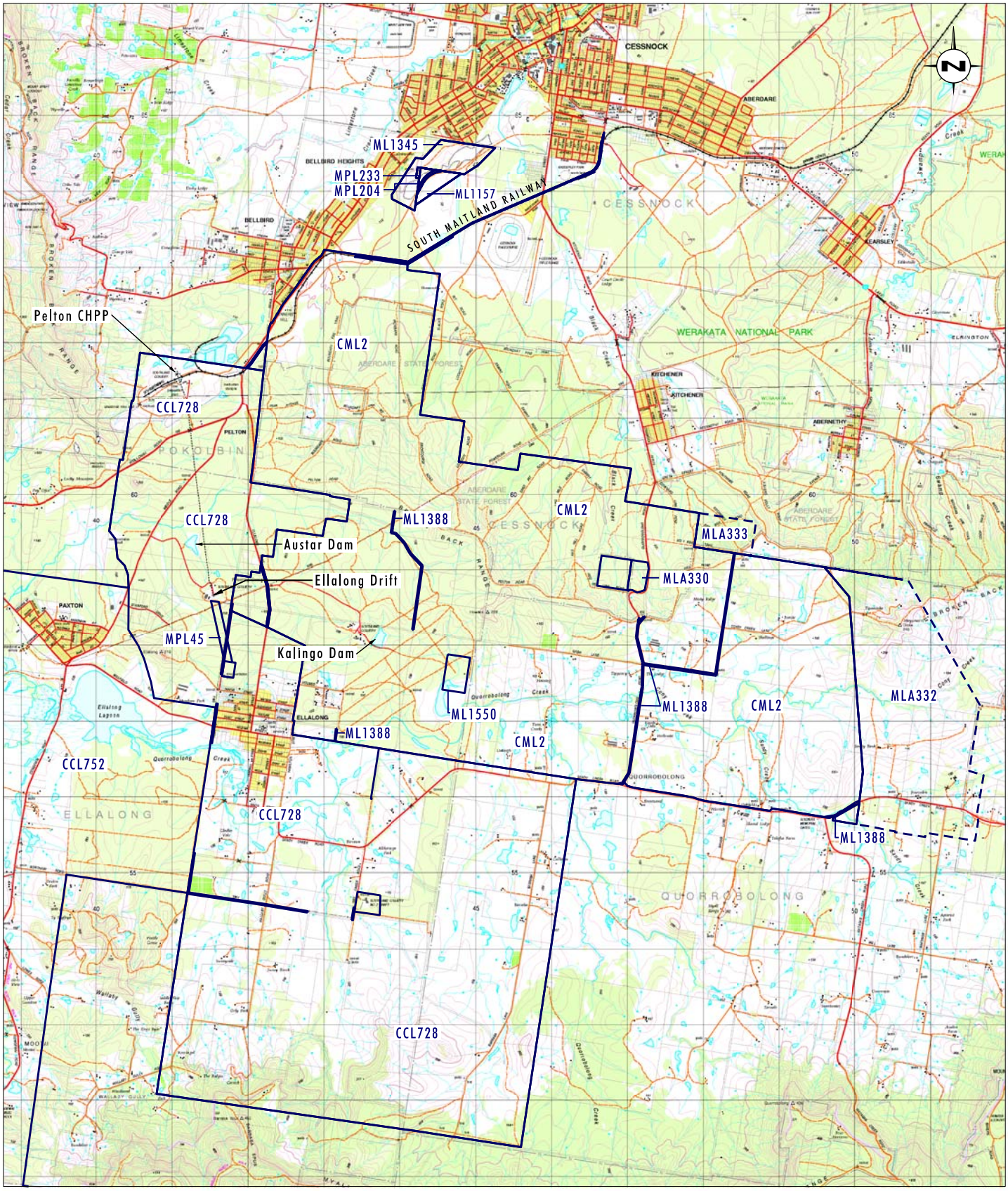
The South Maitland Railway was used for the conveyance of passengers and the transport of coal and other goods. As it is not solely dedicated to coal mining, nor operated by a mining company, the operation of the line is properly characterised as a 'railway undertaking'.

The Cessnock LEP in respect to 'railway undertakings' provides to the effect that such development does not require development consent under Part 4 or project approval under Part 3A.

8.0 Current Mining Leases

The current mining leases of the Austar Mine Complex are shown on **Figure 6** and are listed as follows:

- CCL728;
- CCL752;
- CML2;
- ML1157;
- ML1345;
- ML1347;
- ML1388;
- ML1550;



Source: Topo Maps: LPI NSW, Mine Leases: Austar Coal Mine

0 1 2 3km
1:70 000

Legend

- Mining Leases
- Pending Mining Lease Application Areas

FIGURE 6

Existing Austar Mining Leases

- MPL204;
- MPL233;
- MPL45;
- PLL150;
- MLA322, and
- MLA333.

APPENDIX 5

List of Stage 3 Modification Properties

Table 1 – Austar Coal Mine Stage 3 Properties

Lot 1 Alt DP 171040
Lot 1 Alt DP 738718
Lot 1 Alt DP 738726
Lot 1 Alt DP 798955
Lot 1 Alt DP 950221
Lot 1 DP 170894
Lot 1 DP 240664
Lot 1 DP 828916
Lot 1 DP 852328
Lot 1 DP 873717
Lot 1 DP 996145
Lot 10 Alt DP 1093269
Lot 10 DP 240664
Lot 100 DP 755254
Lot 1002 Alt DP 856790
Lot 11 DP 1093269
Lot 111 Alt DP 859794
Lot 12 DP 705614
Lot 2 Alt DP 595102
Lot 2 Alt DP 747207
Lot 2 DP 240664
Lot 2 DP 575428
Lot 2 DP 828916
Lot 2 DP 873717
Lot 21 Alt DP 1079917
Lot 22 DP 1079917
Lot 3 Alt DP 745656
Lot 3 DP 240664
Lot 32 DP 755215
Lot 4 Alt DP 571638
Lot 4 DP 240664
Lot 51 DP 599170
Lot 51 DP 794214
Lot 52 DP 599170
Lot 521 DP 1003186
Lot 522 DP 1003186
Lot 54 DP 755254
Lot 61 Alt DP 1039031
Lot 62 Alt DP 1039031
Lot 7 DP 240664
Lot 8 DP 240664
Lot 9 DP 240664
Lot 91 DP 1064579
Lot 973 DP 804896
Pt 26 DP 755215
Pt 72 DP 755254

APPENDIX 6

Austar Stage 3 Modification Risk Assessment

Appendix 6 - 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.

1.1.1 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 3.0 of the Preliminary Environmental Assessment, and consist of the following activities:

- re-orientation of the east-west aligned longwall panels to a northeast-southwest direction;

- removal of the planned longwall A6 panel to be replaced with main headings;

- extension of the longwall panels slightly further to the west in place of where the main heading were planned; and

- an increase in the chain pillar width across the area.

1.1.2 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 3.0 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.

1.1.3 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 the Austar qualitative ranking of consequence and likelihood provided in **Table 1**.

Table 1 – Risk Ranking Matrix

CONSEQUENCE							
5	**4**	**3**	**2**	**1**			
Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**			
No Injuries	First Aid treatment	Medical treatment required	Extensive injuries	Death	**People**		
No environmental effects	Could affect the Environment	Water, soil or air likely to be affected for the short term	Water, soil or air affected badly. Damage or death to flora or fauna	Long term damage to water, soil or air. Damage or death to significant numbers of flora or fauna	**Environment**		
Under $5K damage	$5K to $50K Damage	$50K to $100K Damage	$100K to $500K Damage	Above $500K Damage	**Equipment Damage**		
Less than one (1) day	One (1) days delay	Two (2) days delay	Less than one (1) week & greater than two (2) days delay	Greater than one (1) weeks delay	**Production Loss**		
15	**10**	**6**	**3**	**1**	**Almost Certain** Is expected to occur in most circumstances	**A**	**LIKELIHOOD**
19	**14**	**9**	**5**	**2**	**Likely** Will probably occur in most circumstances	**B**	
22	**18**	**13**	**8**	**4**	**Moderate** Has occurred at some time	**C**	
24	**21**	**17**	**12**	**7**	**Unlikely** Could occur at some time	**D**	
25	**23**	**20**	**16**	**11**	**Rare** May occur only in exceptional circumstances	**E**	

PRIORITY OF ACTIONS		
E	Extreme Risk	Consider stopping work (Designed Out)
H	High Risk	Should be reduced as soon as possible (introduce a hard barrier immediately, implement a permanent barrier as soon as possible)
M	Moderate Risk	Manage responsibility & action dates must be specified (introduce a soft barrier SWP)
L	Low Risk	Manage by routine procedures (Toll box talks)

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 the modification of Stage 3. 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 2 shows the format used for the preliminary environmental risk assessment.

Table 2 - 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.

1.1.4 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 1**.

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		
Underground Mining	Water Demand	Water for mining.	There are no proposed changes to water demand within the modification to the approved Stage 3 project.				As there are no proposed changes to water demand no further assessment is required.	No
	Energy Use	Emission of greenhouse gas emissions.	There are no proposed changes to energy use within the modification to the approved Stage 3 project.				As there are no proposed changes to energy use no further assessment is required.	No
	Gas drainage and venting of mine air	Emission of greenhouse gas emissions.	There are no proposed changes to gas drainage and venting of mine air within the modification to the approved Stage 3 project.				As there are no proposed changes to gas drainage and venting of mine air no further assessment is required.	No
	Gas drainage and venting of mine air	Degradation of air quality	There are no proposed changes to gas drainage and venting of mine air within the modification to the approved Stage 3 project				As there are no proposed changes to gas drainage and venting of mine air no further assessment is required	No
	Noise Generation	Degradation of noise amenity (cumulative).	There are no proposed changes to noise generating activities				As there are no proposed changes to noise generating activities no further assessment is required.	No
	Dewatering	Changes to groundwater flow and quality.	Subsidence has the potential to affect both shallow and deep aquifers. The changes to groundwater flow due to the Stage 3 Modification will be assessed.	4	D	L	Subsidence impacts on groundwater will be assessed.	Yes

Preliminary Environmental Risk Analysis (cont)

Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
Subsidence and subsidence remediation works	European Heritage	Disturbance of sites of European heritage significance.	Subsidence predictions have been developed which show a slight reduction in impact to historic sites. No surface works are anticipated in subsidence area. Whilst impacts are unlikely, a desktop analysis of European heritage values will be undertaken.	4	D	L	An assessment of the potential changes to 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 changes to impacts due to the Stage 3 Modification project on ecological values will also be completed.	4	D	L	An assessment of the potential changes to impacts of the Stage 3 Modification 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 changes to impacts on surface improvements due to the Stage 3 Modification will be undertaken.	3	C	H	An assessment of the potential impact of the modification to the Approved Stage 3 project on surface improvements 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 changes to impacts on all public services due to the Stage 3 Modification will be undertaken.	3	C	H	An assessment of the potential changes to impacts due to the Stage 3 Modification project on public infrastructure is required.	Yes

Preliminary Environmental Risk Analysis (cont)

Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
	Vibration	Increased vibration events due to mining	Underground mining has the potential to create vibration events as the land subsides. The Stage 3 Modification will not increase vibration potential over what is already approved. As vibration is an issue of community concern, a desktop vibration assessment will be undertaken as a part of the EA.	4	E	L	An assessment of the potential vibration impacts associated with the Stage 3 Modification project is required.	Yes
	Cultural Heritage	Disturbance of Aboriginal places or objects.	Subsidence predictions have been developed which show a slight reduction in impact to the Grinding Groove. Subsidence has the potential to impact on cultural heritage values. A cultural heritage management plan will be developed. Further surveys and an assessment of the potential impacts of the project on cultural heritage values will also be completed.	4	D	L	An assessment of the potential impacts of the modification to the approved Stage 3 project on cultural heritage values of the project area is required. The assessment will be completed in consultation with the local Aboriginal community.	Yes
	Erosion and sediment runoff	Sedimentation of local waterways.	If required, 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	H	Further details of subsidence remediation techniques and rehabilitation measures will be included in the Environmental Assessment report.	Yes

Preliminary Environmental Risk Analysis (cont)

Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
	Surface Water Flows	Alteration to natural overland drainage flow. Surface water capture.	Subsidence has the potential to change existing water flow and quality to ephemeral creeks. Changes to channel stability and ponding impacts are possible. Drainage line remediation works may be required. The changes to surface water flow impacts due to the Stage 3 Modification and likely remediation requirements will be assessed. The potential for loss of surface water flows due to cracking will also be assessed.	3	D	M	Subsidence impacts on surface water flows will be assessed.	Yes
	Groundwater	Alteration to groundwater level or quality	Subsidence has the potential to affect both shallow and deep aquifers. The changes to groundwater flow due to the Stage 3 Modification will be assessed.	4	D	L	Subsidence impacts on groundwater 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 change in impacts of subsidence on land use due to the Stage 3 Modification will be included in the EA.	4	C	M	Further assessment of changes to land use impacts due to the Stage 3 Modification will be included in the Environmental Assessment.	Yes

Preliminary Environmental Risk Analysis (cont)

Activity	Aspect	Potential Impact	Status and Proposed Control	Risk Assessment			Further Assessment Requirements	Key Issue
				C	L	R		
	Topography	Alteration to existing topography.	The changes to impacts of subsidence on the expected landform associated with the Approved Stage 3 project and the potential for localised subsidence impacts such as landslips will be subject to further assessment.	4	C	L	An assessment of subsidence impacts on topography is required.	Yes