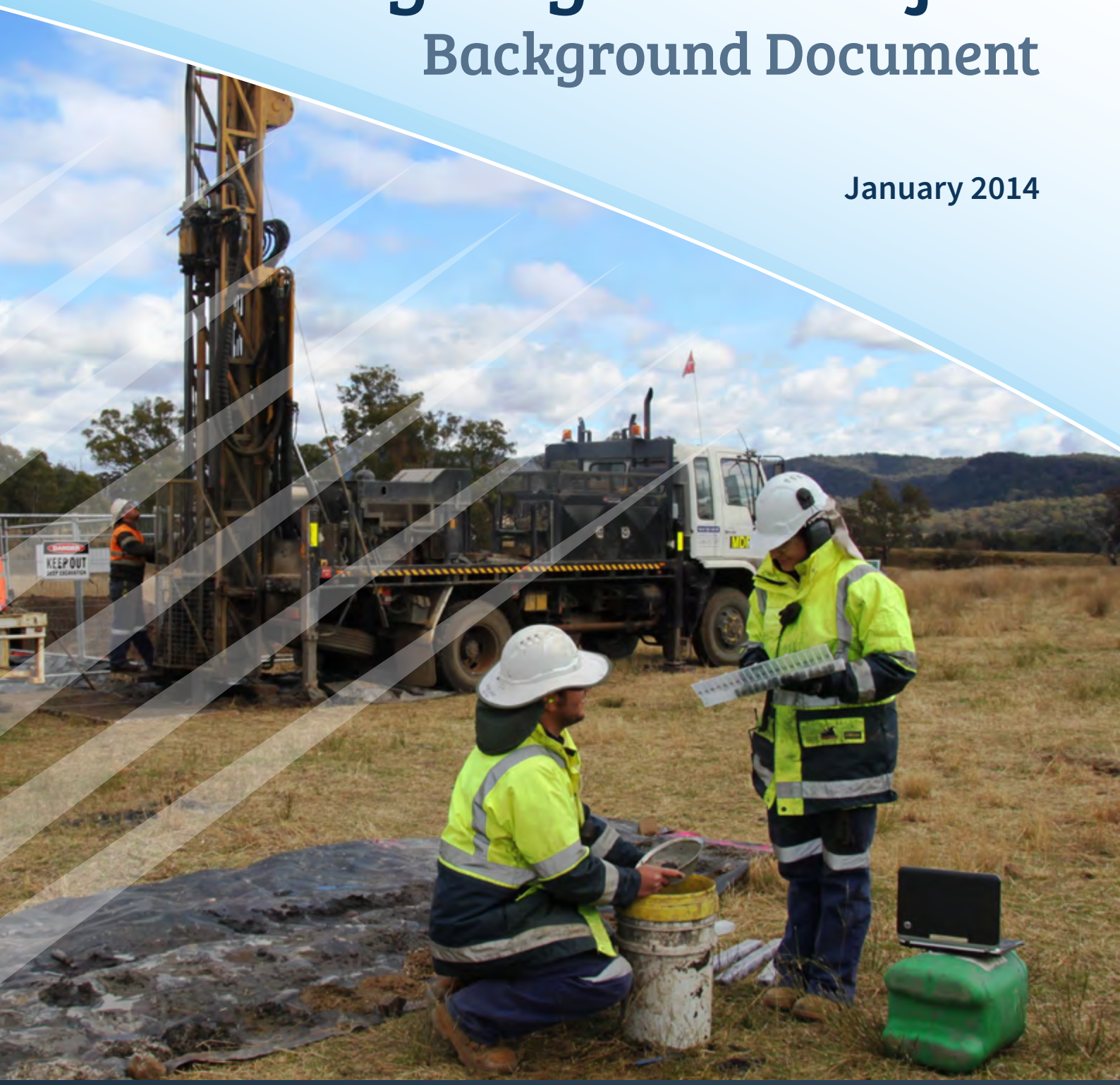
Cockatoo Coal Limited

KEPCO Bylong Australia Pty Ltd

Bylong Coal Project

Background Document

January 2014



Hansen Bailey
ENVIRONMENTAL CONSULTANTS

BYLONG COAL PROJECT

BACKGROUND DOCUMENT

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January 2014

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BYLONG COAL PROJECT
BACKGROUND DOCUMENT

for
KEPCO Bylong Australia Pty Ltd

1 INTRODUCTION

1.1 BACKGROUND

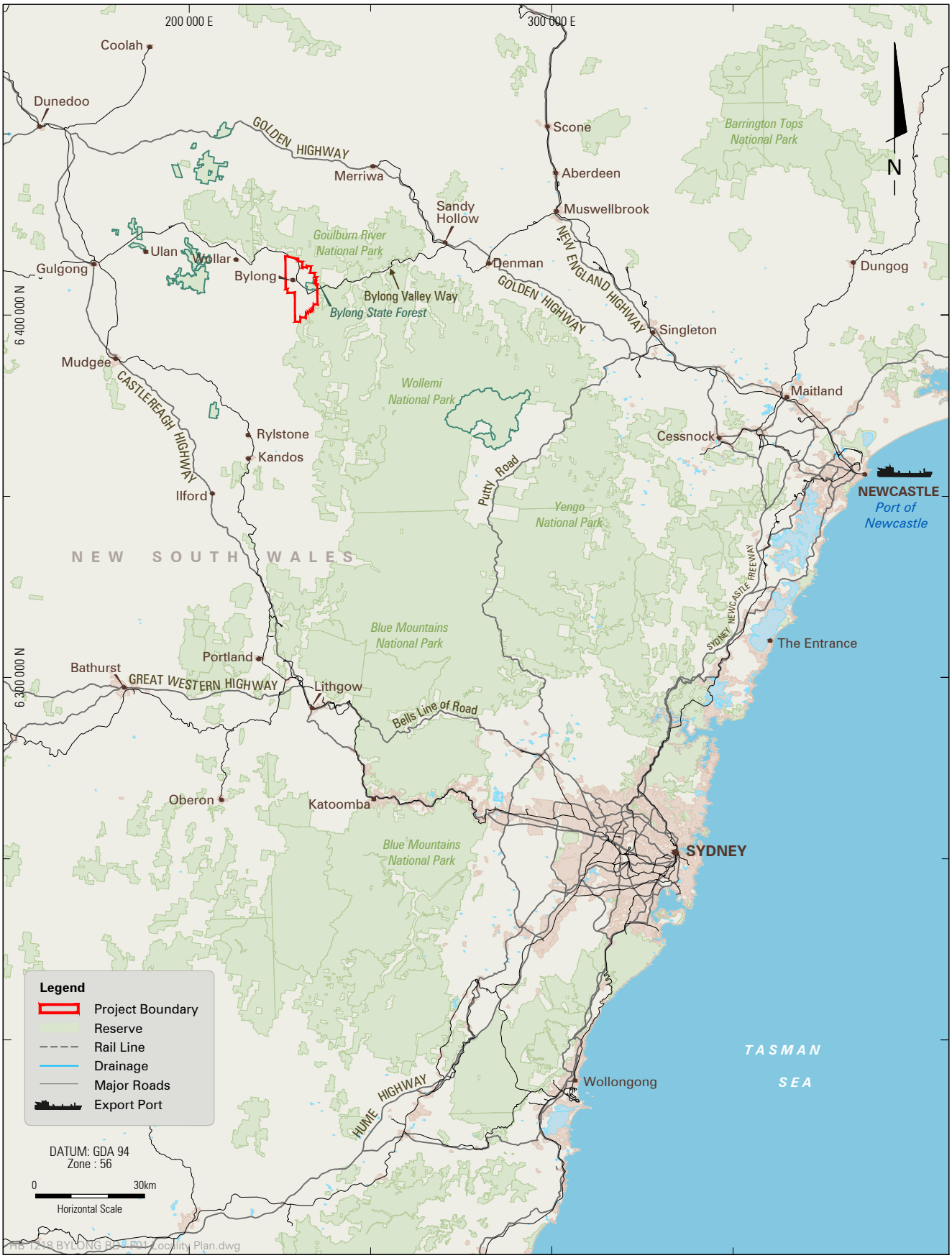
In December 2010, KEPCO Bylong Australia Pty Ltd (KEPCO) acquired Authorisation (A) 287 and A342. Cockatoo Coal Limited (Cockatoo Coal) was appointed by KEPCO as the manager to explore the feasibility of developing a coal mine within the authorisations, subsequently named the Bylong Coal Project (the Project).

The Project is located wholly within A287 and A342 which are located within the Mid-Western Regional Council (MWRC) Local Government Area (LGA). The closest regional centre is Mudgee, located approximately 55 km south-west from the Project. The small settlement of Bylong Village is located within the central portion of the Project Boundary. The Project is approximately 230 km by rail from the Port of Newcastle. **Figure 1** illustrates the locality of the Project within New South Wales (NSW). **Figure 2** shows the location of the Project in relation to the neighbouring regional town centres, mining tenements, major transport routes and reserves.

Since KEPCO's acquisition of A287 and A342, Cockatoo Coal has completed a comprehensive exploration, mine planning and environmental monitoring process focused on defining the extent of the coal resource, assessing all key Project alternatives, and determining the potential environmental constraints. This extensive process has resulted in the development of a mine plan for the Project, which will facilitate the extraction of approximately 121 Million tonnes (Mt) of Run of Mine (ROM) coal via open cut and underground mining methods for a period of approximately 29 years (including construction).

The mine planning process has involved a thorough consideration of numerous mine plan alternatives to maximise the recovery of coal within A287 and A342. This process has resulted in the development of a refined Project mine plan that is considered the most balanced approach in terms of minimising potential environmental impacts whilst maintaining the economic viability of the Project.

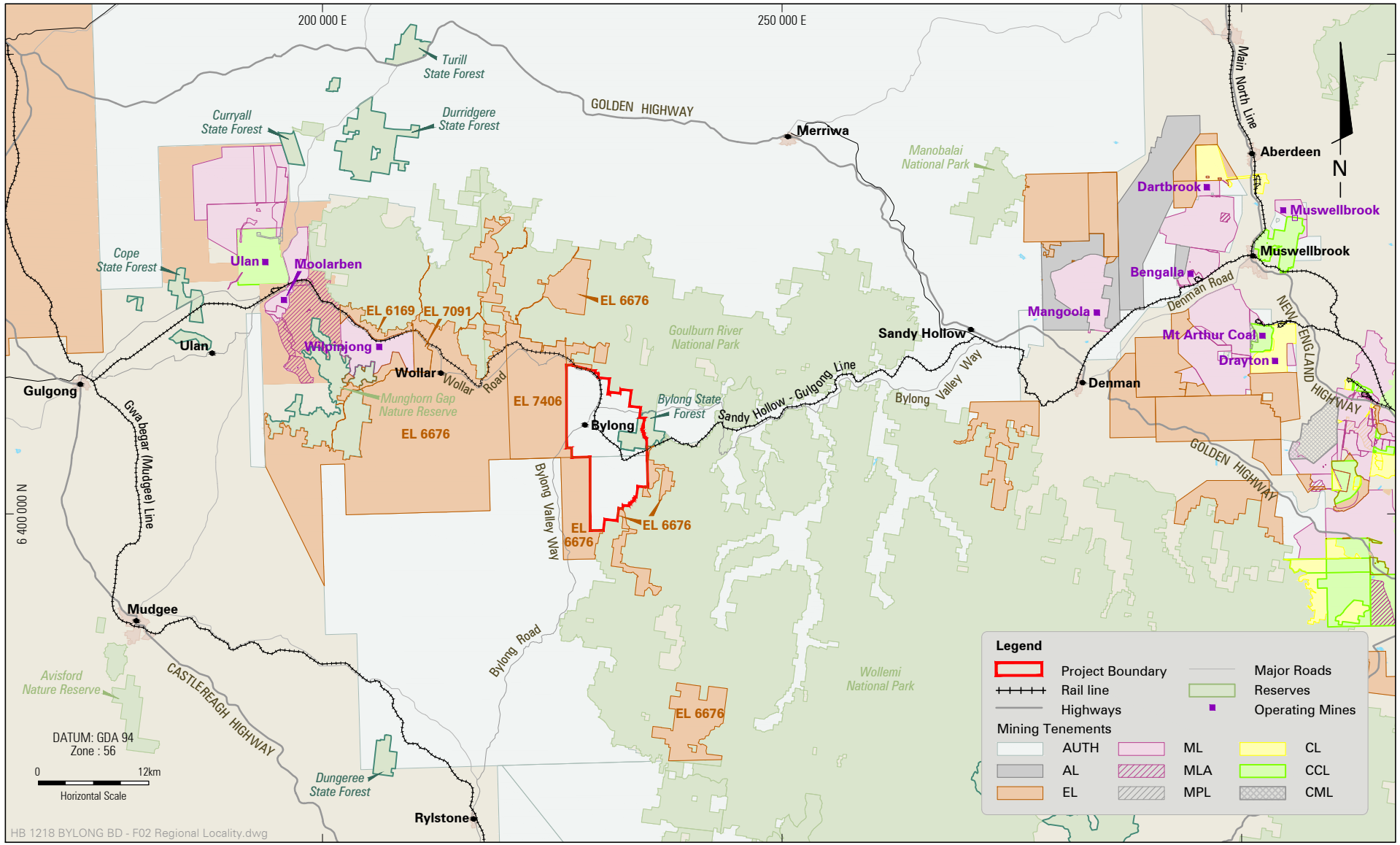
The open cut mining areas that are proposed to be developed in the first eight years of the Project (following construction) are located in areas where the coal resource is only suitable for recovery via open cut mining methods. These initial open cut mining operations are essential to the viability of the Project both operationally (by providing a storage location for the longer term storage of coal processing waste materials resulting from the more extensive underground mining operations).



BYLONG COAL PROJECT

Locality Plan

FIGURE 1



BYLONG COAL PROJECT

Cockatoo Coal Limited | KEPCO BYLONG AUSTRALIA | Hansen Bailey ENVIRONMENTAL CONSULTANTS

Coal Mining and Regional Location

FIGURE 2

KEPCO is seeking State Significant Development Consent under Division 4.1 of Part 4 of the *Environmental Planning & Assessment Act 1979* (EP&A Act) for the development and operation of the Project, which shall be supported by an Environmental Impact Statement (EIS). The Project Application Boundary (Project Boundary) is shown on **Figure 2**.

This Background Document has been prepared by Hansen Bailey Environmental Consultants (Hansen Bailey) on behalf of Cockatoo Coal, as the managers of the Project. The Background Document supports an application made by KEPCO to the Director-General of Department of Planning & Infrastructure (DP&I) for Environmental Assessment Requirements (DGRs) to prepare the EIS for the Project.

1.2 PROPONENT

The proponent is KEPCO Bylong Australia Pty Ltd. Contact details are as follows:

Suite 1301, 141 Walker Street
NORTH SYDNEY NSW 2060
Phone: 02 8904 9508
www.kepco.co.kr/eng
www.bylongproject.com.au

1.3 PROJECT OVERVIEW

The total Project mine life is anticipated to be approximately 29 years, comprising a two year construction period and a 27 year operational period, with underground mining operations commencing in Year 7. Various rehabilitation and decommissioning activities will be undertaken during both the course of, and following the 29 years of the Project.

The Project generally comprises:

- The initial development of two open cut mining areas with associated haul roads and Overburden Emplacement Areas (OEAs), utilising a mining fleet of excavators and trucks and supporting ancillary equipment;
- The two open cut mining areas will be developed and operated 24 hours a day, 7 days a week over an approximate 8 year period and will ultimately provide for the storage of coal processing waste products from the longer term underground mining activities;
- Construction and operation of an underground coal mine operating 24 hours a day, 7 days a week for a 23 year period, commencing in around year 7 of the Project;
- A combined extraction rate of approximately 6 Million tonnes per annum (Mtpa) ROM coal;
- Underground mining operations utilising longwall mining techniques with primary access provided via drifts constructed adjacent to the rail loop and Coal Handling and Preparation Plant (CHPP);
- The construction and operation of a CHPP with a designed throughput of approximately 6 Mtpa of ROM coal;

- The construction and operation of facilities to support underground mining operations including (at least) personnel access to the underground mining area, ventilation facilities, workshop, offices and employee amenities, water and gas management facilities;
- A workforce of up to approximately 1,000 during construction and 550 full-time equivalent employees during the operation of the Project at full production;
- The dewatering of fine reject materials through belt press filters within the CHPP and the co-disposal of dewatered fine and coarse reject materials within OEAs and final open cut voids (avoiding the need for a fine reject materials dam);
- The construction and operation of a rail loop and associated rail load out facility and connection to the Sandy Hollow-Gulgong Railway Line to facilitate the transport of product coal;
- The upgrade of Upper Bylong Road and the construction and operation of a Mine Access Road to provide access to the site facilities;
- Relocation of sections of some existing public roads to enable alternate access routes for private landholders surrounding the Project;
- The construction and operation of administration, workshop and other mining related facilities;
- The construction and operation of surface and groundwater management and water reticulation infrastructure including diversion drains, dams (clean, dirty and raw water), pipelines, pumping stations and associated infrastructure for access to water from the neighbouring groundwater aquifers;
- The installation of communications and electricity reticulation infrastructure;
- Construction and operation of an Accommodation Facility and associated access road from the Bylong Valley Way; and
- Infilling of mining voids, progressive rehabilitation of disturbed areas, decommissioning of Project infrastructure and rehabilitation of the land at the completion of mining operations.

The Project description is discussed in further detail in **Section 3**.

1.4 DOCUMENT STRUCTURE

This Background Document describes the key social and environmental issues associated with the Project and its proposed assessment methodology for consideration by DP&I and other relevant government authorities at a Planning Focus Meeting (PFM).

The DGRs for the Project will be sought from DP&I following the PFM, stakeholder consultation and discussions with key government authorities.

This Background Document has been prepared in accordance with the *Supporting Documentation* requirements outlined in Section 8 of the DP&I application for DGRs for State Significant Development. **Table 1** lists the required supporting information and where this is addressed in this Background Document.

Table 1
Supporting Documentation Requirements

Information Requirement		Where Addressed
(1)	Site details: Provide high-quality aerial photographs, maps or figures that clearly depict the following:	
	• the local and regional context of the proposal;	**Figure 1** and **Figure 2**
	• surrounding development and any potentially affected properties; and	**Figure 2** and **Figure 3**
	• the location of key infrastructure and environmental features.	**Figure 5**, **Figure 6**, **Figure 7** to **Figure 14** and **Figure 16**
(2)	Development description: Provide a clear and concise summary of the proposal that describes the types of activities that will be undertaken during each stage of the development.	**Section 3**
(3)	Permissibility and Strategic Planning: Identify the strategic planning documents, environmental planning instruments and key development standards applying to the development, including any development standards not being met.	**Section 4**
(4)	Preliminary environmental impact assessment: Identify and prioritise the expected environmental impacts (positive and negative) associated with the development, based on a preliminary risk assessment. Briefly outline any strategies to address the impacts identified.	**Section 6** and **Section 7**
(5)	Justification: Explain why the site was chosen for the proposal and briefly discuss the alternatives considered. Outline the strategic context for the proposal, including the benefits to the region and/or State.	**Section 3.10** and **Section 8**
(6)	Consultation: Outline any consultation (with the community, local councils, other Government agencies) already undertaken and proposed to be carried out for the proposal.	**Section 5**
(7)	Capital investment value: Provide an accurate estimate of the cost of carrying out the proposal.	**Section 7.11**

This Background Document is structured as follows:

- **Section 2** provides an overview of the existing environment;
- **Section 3** provides a detailed description of the Project;
- **Section 4** identifies the regulatory framework relevant to the Project;
- **Section 5** describes the stakeholder engagement program conducted to date and to be undertaken to ensure all stakeholders continue to be consulted regarding the Project;
- **Section 6** summarises a contemporary environmental risk assessment conducted for the Project;
- **Section 7** describes the potential environmental and social impacts and proposed assessment methodology for all key environmental issues identified from previous environmental assessments;

- **Section 8** provides a preliminary justification for the Project;
- **Section 9** lists abbreviations used in this document; and
- **Section 10** shows all relevant references.

Appendix A presents the environmental risk assessment and **Appendix B** provides a list of the Project water licences.

2 EXISTING ENVIRONMENT

This section provides a brief discussion on the relevant components of the existing environment including climate, topography, geology, land use and land ownership. It also discusses the exploration program undertaken to date, the existing Environmental Monitoring Program (EMP) and a discussion on KEPCO's environmental management strategy.

2.1 REGIONAL SETTING

The closest settlement to the Project is the village of Bylong, within the central northern part of the Project Boundary. Mudgee is located approximately 55 km to the south-west, whilst Denman is approximately 53 km to the east of the Project Boundary. The Bylong Valley Way runs from east to west through the northern portion of the Project Boundary, which provides the main road access into the Bylong Valley. The Sandy Hollow-Gulgong Railway Line travels through the northern portion and follows the escarpment through the eastern side of the Project Boundary (see **Figure 2**).

The Bylong State Forest is located within the central eastern side of the Project Boundary which also links to the more extensive Goulburn River National Park (north-east of the Project Boundary) and the Wollemi National Park (east of the Project Boundary).

2.2 TOPOGRAPHY

The topography within the Project Boundary fluctuates greatly between the valley floors (approximately RL 250 m Australian Height Datum (AHD)) up to the escarpments and steeper slopes on the eastern margins (approximately RL 430 m AHD). Tal Tal Mountain (655 m AHD) is located within the south-eastern portion of the Project Boundary. Mount Penny (570 m AHD) is located in the northern portion whilst the western edge of the Project Boundary is bound by the Growee Ranges.

2.3 CATCHMENTS

The Project is located within a northerly draining catchment, which drains via a number of smaller creeks and rivers towards the Goulburn River. The Goulburn River is located approximately 1.5 km to the north, where it flows from the west to the east into the Hunter River.

The Bylong River enters the south-eastern portion of the Project Boundary travelling northward before joining the Goulburn River. Several named creeks and rivers feed the catchment of the Bylong River. These include:

- Wattle Creek;
- Cousins Creek;
- Lee Creek;
- Growee River;
- Dry Creek; and
- Coggan Creek.

Flooding is primarily constrained to the floodplains of the larger drainage lines including Bylong River, Lee Creek and the Growee River which all flow through the Project Boundary.

2.4 CLIMATE

Site specific climatic data has been recorded at the Bylong Meteorological Monitoring Station within the Project Boundary since 2011. The Bureau of Meteorology (BoM) has collected longer term climatic information in the vicinity of the Project. A range of longer term climatic information collected at the Nullo Mountain AWS (located approximately 20 km south-east of the Project) is presented in **Table 2**.

Temperatures within the Bylong Region range from an average maximum of 24°C in summer to an average minimum of 2.5°C in the winter months. Meteorological monitoring (see **Section 2.9**) within the Project Boundary has confirmed that temperature inversions are common during the winter months, generally forming in the late afternoon and reaching maximum resistance at dawn.

For the majority of the year, winds predominantly occur from the east-south-east, except during the winter and spring months when winds from the west and north-west prevail. The mean annual rainfall for the region is approximately 950 mm.

2.5 LAND USE

The majority of the Project Boundary contains cleared agricultural land with native vegetation constituting the remaining area (predominately within the Bylong State Forest and other portions of Crown Land). The Goulburn River National Park and the Wollemi National Park border the eastern boundaries of the Project Boundary.

Table 2
Average Climatic Conditions for Nullo Mountain AWS (1998 - 2013)

Month	Mean Daily Temperature (°C)		Mean Monthly Rainfall (mm)	Mean Monthly Rain Days
	Min	Max	Min	
January	13.5	23.8	96.3	7.9
February	13.3	22.7	109.7	8.3
March	11.3	20.0	83.6	7.7
April	8.4	16.7	54.1	5.4
May	5.7	12.8	61.5	6.4
June	3.4	9.6	76.6	8.3
July	2.5	9.1	64.7	7.8
August	3.1	10.9	59.0	6.6
September	5.5	14.1	67.7	6.8
October	7.6	17.0	75.9	7.6
November	10.0	19.6	107.6	8.9
December	11.6	21.9	91.9	8.1
ANNUAL	**8.0**	**16.5**	**949.5**	**89.8**

Source: BoM Station 062100 (2013)

Agriculture has played an important role in the area since the first inhabited by Europeans in the 1820s (Lawson, 1822). This has led to the valley floors of the catchments (i.e. Bylong River, Growee River and Dry Creek) being predominantly cleared and largely comprised of grasslands.

The Bylong River runs through the Project Boundary and plays an important role to the region's agricultural enterprises. Cropping within the Bylong Valley is also common with the Bylong River and the associated floodplain supporting the production of lucerne, rye prairie and English grasses.

The MWRC LGA also supports a number of coal mining related developments as shown on **Figure 2**. The Mount Penny Project owned by Cascade Coal is located immediately to the north-west of the Project Boundary. Operating coal mines are located to the north-west, distant from the Project Boundary and include Wilpinjong Coal Mine (24 km), Ulan Coal Mine (40 km) and Moolarben Coal Mine (36 km).

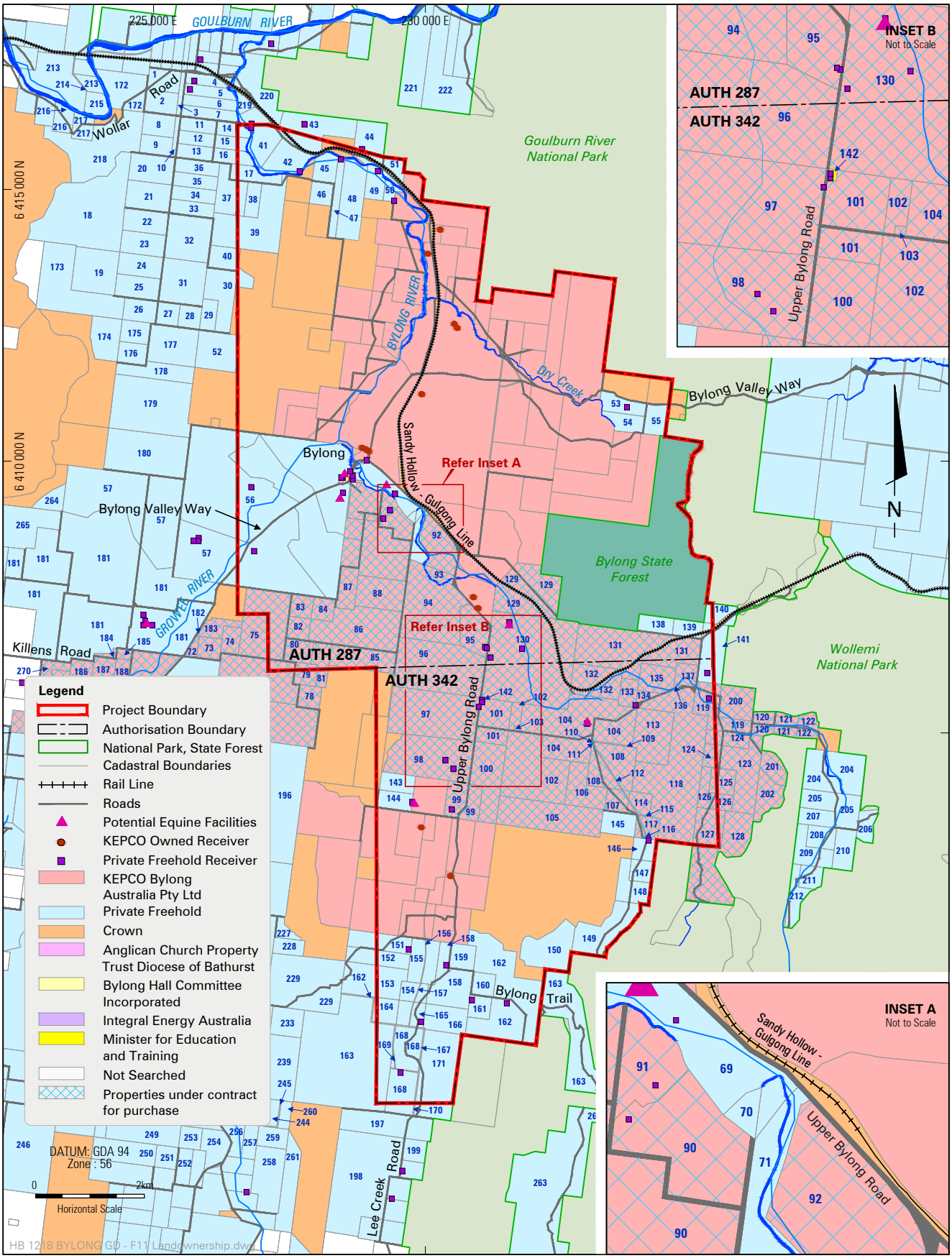
A small rock quarry is currently in operation within the north-eastern portion of A287 which is proposed to continue operations during the life of the Project. The Bowden Silver Project owned by Kingsgate Consolidated Limited is located approximately 35 km south-west of the Project Boundary. A number of wind farm projects, including Uungula Wind Farm, Liverpool Range Wind Farm and Crudline Ridge Wind Farm, are also located within the broader vicinity of the Project in the MWRC LGA.

2.6 LAND OWNERSHIP

Land ownership within and surrounding the Project Boundary is shown on **Figure 3**. KEPCO has a total land holding of 3,423 ha within and surrounding the Project Boundary. Of the 10,317 ha of the total land within the Project Boundary, around 3,139 ha (or 30.4%) is owned by KEPCO.

KEPCO has recently reached Agreements with the landholders of two additional properties to purchase land within the vicinity of the Project as illustrated on **Figure 3**. Upon finalisation of the acquisition of these properties, KEPCO will hold 6,307 ha (or 61%) of total land within the Project Boundary. KEPCO will hold 78.9% of freehold land within the Project Boundary. KEPCO will continue to facilitate agricultural activities on its land which is not required for mining or mining related purposes.

The remaining 20% of land within the Project Boundary is made up of Crown Land and State Forest. There are 23 parcels of Crown Land located in the north, south and south-west of the Project Boundary. The Bylong State Forest covers 6% of land to the north-east of the Project Boundary. The Goulburn River and Wollemi National Parks border the eastern side of the Project Boundary.



BYLONG COAL PROJECT

Land Ownership

FIGURE 3

2.7 GEOLOGY

2.7.1 Exploration

Since KEPCO acquired A287 and A342 in 2011, KEPCO has implemented an appropriate exploration program to further refine and understand the coal resource within these authorisations. A total of 59 cored and open holes have previously been drilled within the A287 and A342 by previous owners of the Project. Further exploration activities have been undertaken to supplement the previous drilling and have been managed by Cockatoo Coal (on behalf of KEPCO), consisting of:

- Desktop studies of previous exploration work completed within the authorisations;
- Aerial and 2D seismic surveys;
- Mining subsidence study;
- Geotechnical testing;
- Alluvial sediment testing;
- Drilling (large diameter, cored, partially cored and non-cored holes);
- Coal quality tests (including materials handling testing and washability testing); and
- Preliminary hydrogeological studies.

A total of 387 drill holes have been completed by KEPCO throughout A287 and A342 as at 31 December 2013. This correlates to a total of 135 rotary drill holes and 234 cored or partly cored drill holes. Drilling has also included 18 large diameter drill holes to obtain samples for materials handling and washability testing. The coal resource for the Project has been defined and is currently being reported in accordance with Australasian Joint Ore Reserves Committee (JORC) requirements.

2.7.2 Stratigraphy

The Project is located in the north-west portion of the Western Coalfield of the Sydney Basin of NSW. An indicative Stratigraphic Column of the strata within the Project Boundary is shown on **Figure 4**.

The stratigraphy of the area generally includes:

- Triassic Conglomeratic Sandstones;
- Permian Illawarra Coal Measures (including Farmers Creek, State Mine Creek, Goulburn, Glen Davis, Ulan and Coggan seams); and
- Late Permian Shoalhaven Group.

The Late Permian Shoalhaven Group forms the sedimentary basement within the Project Boundary, consisting primarily of shale, conglomerate and sandstone. The formation outcrops along the lower slopes of the Growee River and in the upper reaches of Lee Creek, in the southern and western portions of the Project Boundary.

The Permian Illawarra Coal Measures overlie the Shoalhaven Group and contain the economic seams within the Project Boundary. The dominant lithologies include mudstone, laminated siltstone, medium-grained quartz-lithic sandstone, lenses of polymictic conglomerate, coal, carbonaceous mudstone, rhyolitic tuff and sporadic torbanite. Thickness of sandstone varies across the site from 100 m to 200 m in the Project Boundary, thickening towards the east into the Sydney Basin. The coal measures dip approximately 2° to the east.

The Coggan Seam consists predominantly of dull coal with minor bright bands and average ash content ranging from 9% to 30%. The depth to the Coggan Seam varies across the lease from the land surface to 360 m due largely to the irregular topography. In the valleys around Dry Creek and the Bylong River, the depth to the Coggan Seam is less than 60 m with the average coal seam exceeding 3 m in thickness. The Coggan Seam varies from 2 m on the western margin of the lease to around 5 m near the eastern boundary.

Overlying the Illawarra Coal Measures is a Triassic sequence consisting of the Narrabeen Group and the Hawkesbury Sandstone. The Hawkesbury Sandstone is overburden by the Wianamatta Group to the south, and the Digby and Napperby formations in the north, which are within the Gunnedah Basin. The coal measures are overlain by the Triassic sequence.

Igneous intrusions and volcanic flows have been intersected within the Project Boundary. The largest igneous intrusion in the area is the Coggan Sill, which is located in the south-west of the Project Boundary.

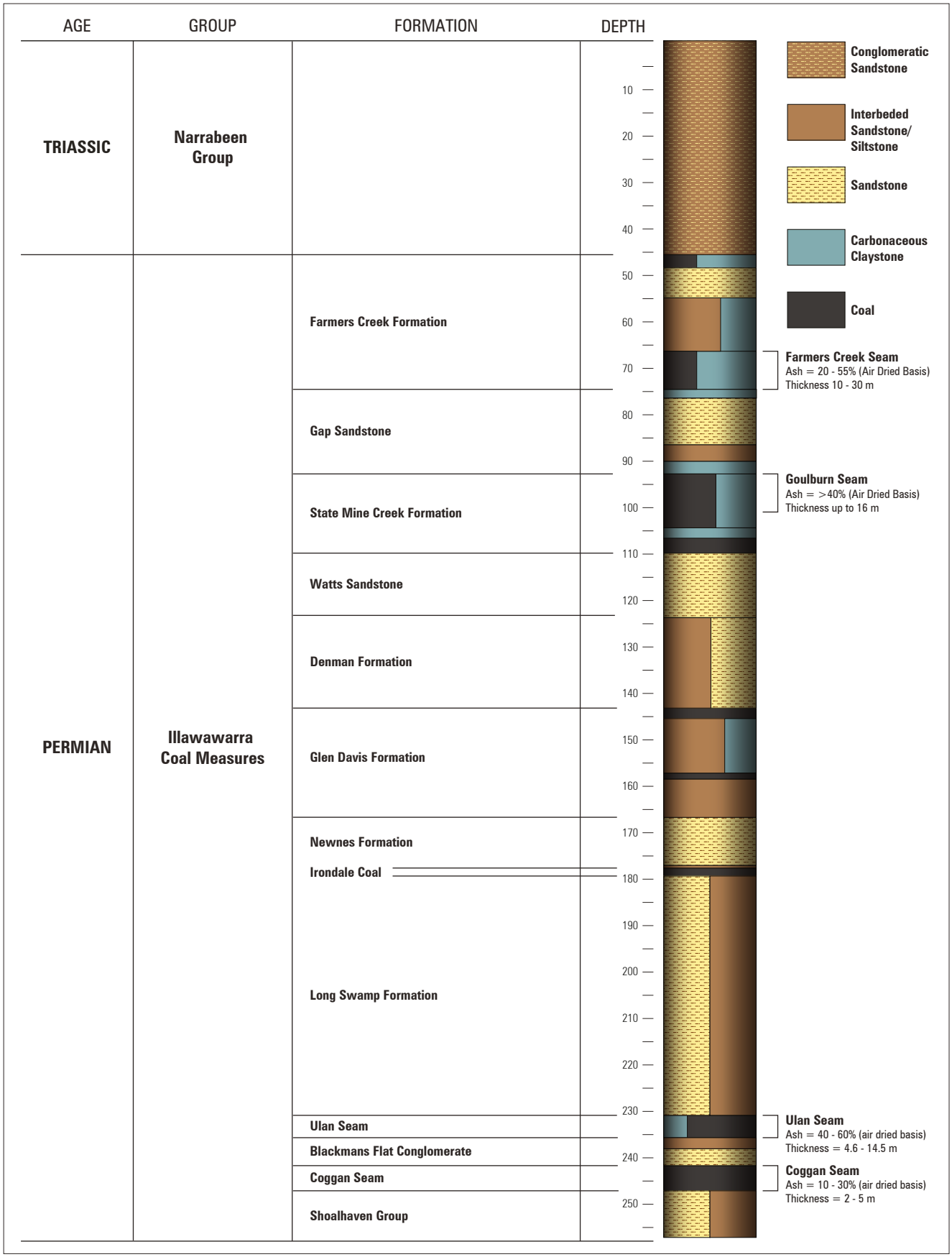
2.7.3 Target Coal Resource

The target coal resource for the Project is the Coggan Seam. The overlying Ulan Seam will also be intercepted and recovered by open cut mining methods within the Eastern and Western Open Cut Mining Areas. The Coggan Seam and the overlying Ulan Seam dip to the east, with the Open Cut Mining Areas proposed in the western portions where the resource exists closer to the surface and underground mining areas proposed to be extracted in the eastern areas, where topography provides a greater depth of cover.

The Project has an identified mineable ROM coal resource of approximately 121 Mt for the initial 29 years of the mine life. Further coal resources have been identified within the Project Boundary and will be the subject of future exploration and economic feasibility studies. The overburden to coal stripping ratio for the open cut mining areas is on average 5.6 bank cubic metres /ROM tonnes.

The Coggan seam and Ulan seam to be extracted for the Project are anticipated to produce two product types, as follows:

- 16% ash (As Received Basis (arb)); and
- 22% ash (arb).



Cockatoo Coal Limited

Hansen Bailey
ENVIRONMENTAL CONSULTANTS

BYLONG PROJECT

Indicative Stratigraphic Column

FIGURE 4

2.8 EXISTING APPROVALS

A287 and A342 encompass an area of approximately 10,317 ha. A287 and A342 were originally granted in 1982 and 1984 respectfully. Since this time, periodic exploration programs have been conducted across each authorisation in accordance with the *Mining Act 1992* (Mining Act).

In addition to land acquisitions, KEPCO has acquired Water Access Licences (WALs) issued under the *Water Management Act 2000* (WM Act). This includes approximately 1,959 units within the Bylong River Water Source under the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources*. KEPCO has also reached agreements with two landholders for land acquisition, which will secure an additional two WALs totalling 576 units. Further water allocations are likely to be obtained as the Project progresses.

Table 3 outlines the status of KEPCO's mining authorisations, licences and other environmental related approvals. **Appendix B** contains a list of the existing Project water licences.

Table 3
KEPCO Consents, Leases and Licences

Approval	Reference	Authority	Relevant Dates
Authorisation	287	Department of Resources & Energy (DRE)	Renewed 12 March 2013 to 27 July 2014
Authorisation	342	DRE	Renewed 12 March 2013 to 27 July 2014
Review of Environmental Factors	-	DRE	March 2011, August 2011, November 2011, August 2012 and August 2013
Australian Rail Track Corporation Licence (rail corridor permit)	65/430/3992	ARTC	1 October 2012 to 1 October 2017
Enclosure Permit	50471	DTIRIS	25 April 2013 to 25 April 2014
Enclosure Permit	50450	DTIRIS	25 April 2013 to 25 April 2014
Enclosure Permit	387250	DTIRIS	Unknown

2.10 ENVIRONMENTAL MANAGEMENT

Cockatoo Coal (as the manager of the Project) has progressively developed and operated an EMP for the purposes of ensuring sufficient background monitoring data to support various EIS studies. The EMP is shown on **Figure 5** and **Figure 6** has involved the collection of background monitoring data for a range of environmental parameters, including:

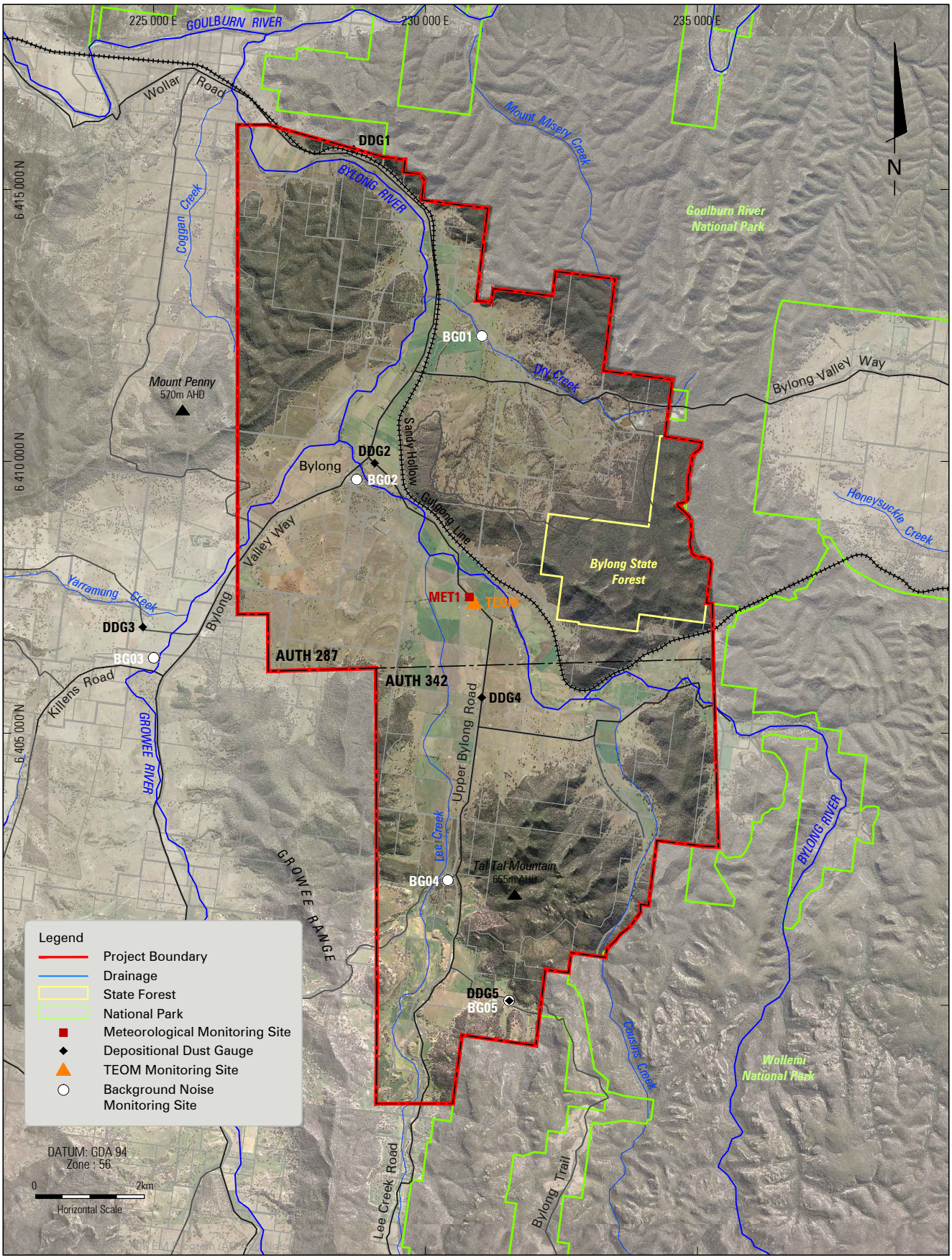
- Meteorological;
- Air Quality (depositional dust, particulate matter of 10 micrometers or less (PM_{10}) and particulate matter of 2.5 micrometers or less ($PM_{2.5}$));
- Background noise levels;
- Surface Water (quality and quantity); and
- Groundwater (levels and quality).

A summary of the various components of the EMP is provided in **Table 4**. The EMP has been regularly reviewed and enhanced as access has been gained to privately owned properties and appropriate monitoring equipment installed.

Table 4
Environmental Monitoring Program

Aspect	Mechanism	Monitoring Location	Parameters Monitored
Meteorological	Meteorological Station	• Property adjacent to the site office (MET 1)	• Rainfall • Temperature • Relative Humidity • Solar Radiation • Wind speed, direction and deviation of wind direction
Air Quality – Depositional Dust	Depositional Dust Gauges	5 Locations: • Redbank Cottage (DDG1) • Bylong Primary School (DDG2) • Wingarra (DDG3) • Bylong Village (DDG4) • North of Authorisation (DDG5)	Monthly dust deposition rates (g/m^2/month)
Air Quality – Suspended Particulates	Tapered Element Oscillating Microbalance (TEOM)	• Project Site Office (TEOM)	Continuous PM_{10} and $PM_{2.5}$ ($\mu g/m^3$)
Noise	Unattended Noise Loggers & Attended Noise Monitoring Surveys	5 Locations: • Bylong Station (BG01) • Bylong Village (BG02) • Wingarra (BG03) • Harley Hill (BG04) • Redbank Cottage (BG05)	• The unattended noise loggers were set to record A-weighted noise levels every 15 minutes • The attended noise measurements recorded LA_{eq}, LA_1, LA_{10}, and LA_{90}

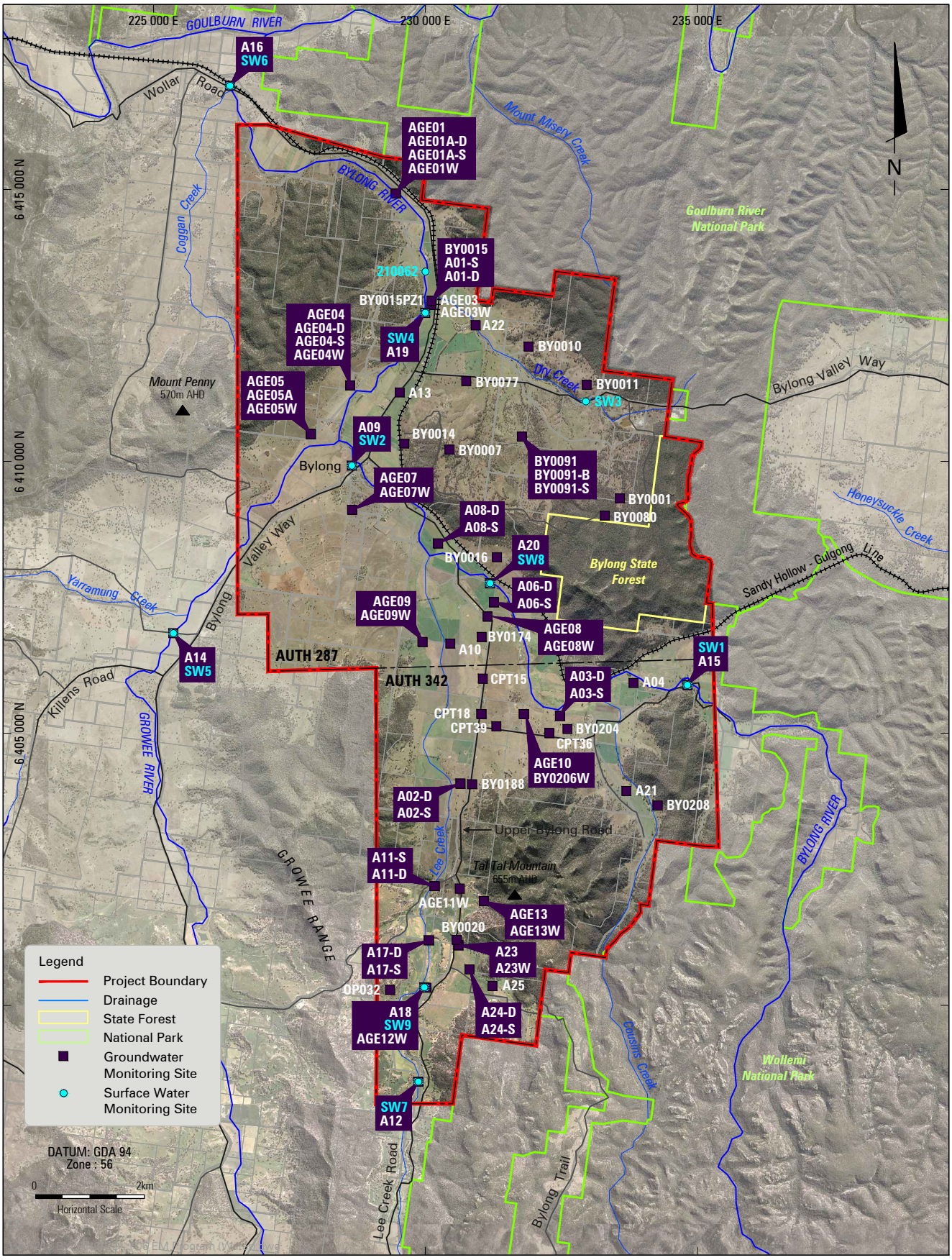
Aspect	Mechanism	Monitoring Location	Parameters Monitored
Surface Water	Sample Collection	• 9 surface monitoring locations will be sampled (SW1-SW9)	• In situ measurement of pH, EC, Oxidation-Reduction Potential (ORP), Dissolved Oxygen (DO), turbidity and temperature • Lab analysis pH, EC, DO, Cations, Anions, NOx, Total P, NH_3 and metals
	Automated Loggers	• 3 locations will be the basis of continuous monitoring using Doppler velocity meters and telemetry transfer of data	Water Levels and Flow rates
Groundwater	Sample Collection, Vibrating Wire Piezometers & Automated Loggers	• 84 monitoring locations (with 107 observation points) located within the alluvium (37), shallow hardrock (17) and deep hardrock aquifers (23) and vibrating wire piezometers into various strata depths (7)	Water quality, depth and pressures



BYLONG COAL PROJECT

Environmental Monitoring Program
- Air Quality and Noise

FIGURE 5



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Environmental Monitoring Program - Water

FIGURE 6

3 PROJECT DESCRIPTION

This section provides a description and a discussion of the key alternatives considered during the development of the Project.

3.1 INTRODUCTION

The Project seeks the grant of a Development Consent for State Significant Development under Division 4.1 of Part 4 of the *Environmental Planning & Assessment Act 1979* (EP&A Act) for the construction and operation of an open cut and underground coal mining operation for a period of approximately 29 years (each to operate for approximately 8 and 23 years respectively). The Project will facilitate the recovery of approximately 121 Mt of ROM coal from the Illawarra Coal Measures at a rate of approximately 6 Mtpa ROM coal.

The total Project mine life is anticipated to be approximately 29 years, comprising a two year construction period and a 27 year operational period. Open cut mining operations will commence following the construction period and continue to around Year 10, with underground mining operations commencing in approximately Year 7 of the Project and continue for the remainder of the Project mine life.

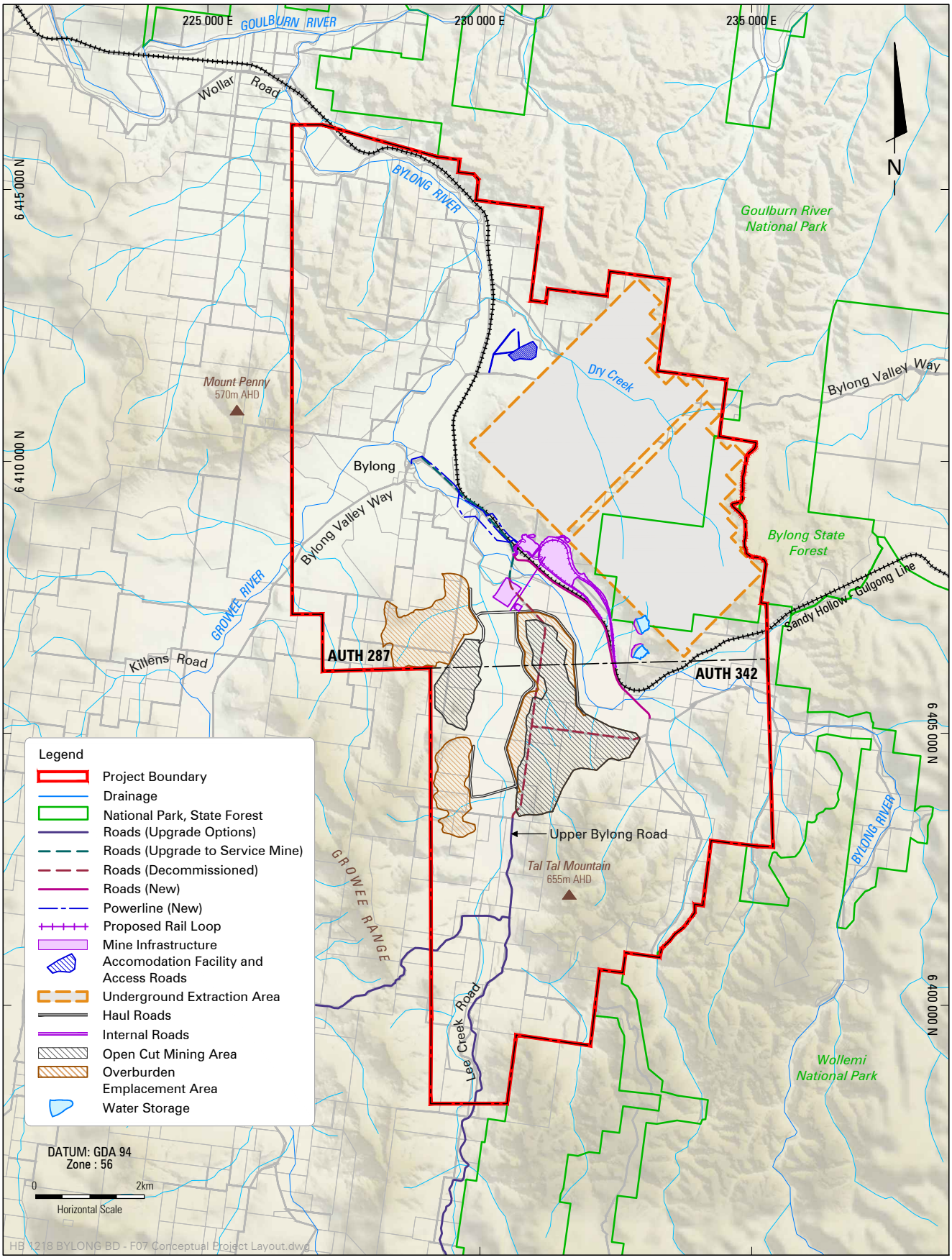
Product coal will be transported from site via rail to the Port of Newcastle for export or, directly to the domestic market for electricity generation (under suitable market conditions).

Key features of the Project are shown on **Figure 7** and include:

- The initial development of two open cut mining areas with associated haul roads and OEAs, utilising a mining fleet of excavators and trucks and supporting ancillary equipment;
- The two open cut mining areas will be developed and operated 24 hours a day, 7 days a week over an approximate 8 year period and will ultimately provide for the storage of coal processing waste products from the longer term underground mining activities;
- Construction and operation of an underground coal mine operating 24 hours a day, 7 days a week for a 23 year period, commencing in around year 7 of the Project;
- A combined extraction rate of approximately 6 Mtpa ROM coal;
- Underground mining operations utilising longwall mining techniques with primary access provided via drifts constructed adjacent to the rail loop and Coal Handling and Preparation Plant (CHPP);
- The construction and operation of a CHPP with a designed throughput of approximately 6 Mtpa of ROM coal;
- The construction and operation of facilities to support underground mining operations including (at least) personnel access to the underground mining area, ventilation facilities, workshop, offices and employee amenities, water and gas management facilities;
- A workforce of up to approximately 1,000 during construction and 550 full-time equivalent employees during the operation of the Project at full production;

- The dewatering of fine reject materials through belt press filters within the CHPP and the co-disposal of dewatered fine and coarse reject materials within OEAs and final open cut voids (avoiding the need for a fine reject materials dam);
- The construction and operation of a rail loop and associated rail load out facility and connection to the Sandy Hollow-Gulgong Railway Line to facilitate the transport of product coal;
- The upgrade of Upper Bylong Road and the construction and operation of a Mine Access Road to provide access to the site facilities;
- Relocation of sections of some existing public roads to enable alternate access routes for private landholders surrounding the Project;
- The construction and operation of administration, workshop and other mining related facilities;
- The construction and operation of surface and groundwater management and water reticulation infrastructure including diversion drains, dams (clean, dirty and raw water), pipelines, pumping stations and associated infrastructure for access to water from the neighbouring groundwater aquifers;
- The installation of communications and electricity reticulation infrastructure;
- Construction and operation of an Accommodation Facility and associated access road from the Bylong Valley Way; and
- Infilling of mining voids, progressive rehabilitation of disturbed areas, decommissioning of Project infrastructure and rehabilitation of the land at the completion of mining operations.

Figure 7 illustrates the Conceptual Project Layout, indicatively showing the key components of the Project within the Project Boundary as described within the following sections.



BYLONG COAL PROJECT

Cockatoo Coal Limited | KEPCO BYLONG AUSTRALIA | Hansen Bailey ENVIRONMENTAL CONSULTANTS

Conceptual Project Layout

FIGURE 7

3.2 MINING OPERATIONS

Following extensive exploration and mine planning, a coal resource has been identified as feasible for recovery utilising both open cut and underground mining techniques. The Project proposes the extraction of a portion of the known coal reserves within the Project Boundary for a period of approximately 27 years following a construction period of up to 2 years. Decommissioning of Project infrastructure and the final rehabilitation activities may extend beyond the 29 years of the Project.

Additional coal resources are known to exist within A287 and A342 beyond the proposed 27 years of mining operations within the Project Boundary. KEPCO has no plans to recover these coal resources as part of the current planning approval application. However depending upon the outcome of ongoing exploration activities, market conditions and global demand for coal in the future, KEPCO may seek approvals to recover these coal resources at a later date.

Due to topographic relief, local geology and current land uses, the majority of the area is more suited to underground mining methods. However, there are some areas where the coal is too shallow to enable safe underground mining operations. Two open cut mining areas are therefore proposed for the efficient recovery of coal resources utilising open cut mining methods as part of the Project. The early recovery of coal from the two open cut mining areas within the initial eight years of mining operations is pivotal in securing the economic viability of the Project, whilst also ensuring a suitable facility for the emplacement of fine and coarse reject materials throughout the life of the underground mining operations in the most environmentally acceptable manner.

3.2.1 Open Cut Mining

Figure 8 to **Figure 11** illustrate the progression of open cut mining operations within the Eastern Open Cut Mining Area (Eastern Open Cut) and Western Open Cut Mining Area (Western Open Cut). The coal resource within these areas occurs at relatively shallow depths (i.e. between 20 m to 90 m depth of cover), which makes this resource suitable for recovery using open cut mining methods only. The nature of one of the target coal seams and its stratigraphic position, coupled with its relatively shallow depths of cover which are not practical and safe for underground mining methods warrants the use of open cut mining methods. It also enables the coal to be recovered efficiently which ensures that the significant economic investment in the Project is able to be justified by KEPCO.

The sterilisation of significant open cut coal resources has been committed to by KEPCO to ensure impacts on SAL are minimised (i.e. a reduction from seven mining areas to the two as proposed in the Project Alternatives in **Section 3.10**).

Prior to surface disturbance commencing, suitable soil materials will be recovered and stored for use in future rehabilitation activities. The proposed open cut activities will be consistent with conventional open cut mining operations, utilising hydraulic excavators matched with suitably sized haul trucks to facilitate the relocation of overburden to uncover the coal.

The geology within the Eastern Open Cut requires the mine development to commence within a box cut in the north-western part of this mining area. Concurrently, mining operations will also be developed within the south-western portion of the Eastern Open Cut. Mining operations will progress with a laid back advancing face that allows the two mining areas to eventually join and progress eastwards as a single mining area with north to south orientated benches.

Overburden from the Eastern Open Cut will initially be placed within the North-Western OEA and South-Western OEA until the mining void is suitably developed to enable progressive backfilling. The southern portion of the Eastern Open Cut will remain as an open void for the storage of coarse and fine reject materials for the longer term underground mining operations. This void will be filled over the life of the Project and will be capped and rehabilitated at the end of the mine life, so that no final void remains.

In parallel to the commencement of mining operations in the Eastern Open Cut, the recovery of ROM coal will also commence within the Western Open Cut with the development of a box cut in the northern end. Mining operations within the Western Open Cut will advance from the north to south using east to west orientated benches. Overburden extracted from this area will initially be placed within the North-Western OEA, until mining has been sufficiently developed to enable the overburden to be used to backfill the mining void. Once the open cut mining activities have advanced and OEAs have been shaped and graded, the soil resources collected prior to mining disturbance will be directly placed onto the shaped OEAs to facilitate rehabilitation.

Coal production for the open cut mining operations will progressively increase to approximately 5 Mtpa of ROM coal by Year 5 of the Project. Open cut mining operations are anticipated to recover approximately 30 Mt of ROM coal over a period of approximately 8 years.

Coal and overburden material from the open cut mining areas will be blasted prior to excavation by excavator and truck fleet. There will be on average over a year, one blast event per day at maximum production (excluding Sundays).

The Project will necessitate two OEAs external to the open cut mining areas, including the:

- North-Western OEA located to the north-west of the Western Open Cut; and
- South-Western OEA located to the west of the Eastern Open Cut and south of the Western Open Cut.

Each of these OEAs will be developed in conjunction with the initial years of mining operations. Once the mining areas have been fully developed and the coal resource has been recovered, overburden will be used to backfill the previously mined areas. The South-Eastern OEA will be progressively developed within the Eastern Open Cut. The North-Eastern OEA will be developed within the Western Open Cut.

The conceptual design of the OEAs has been developed to minimise disturbance to sensitive surface features, whilst blending into the natural topography and mitigating visual impacts to neighbouring receivers where possible. Rehabilitation of these OEAs will occur progressively throughout the early years of mining operations (see **Figure 8** to **Figure 11**).

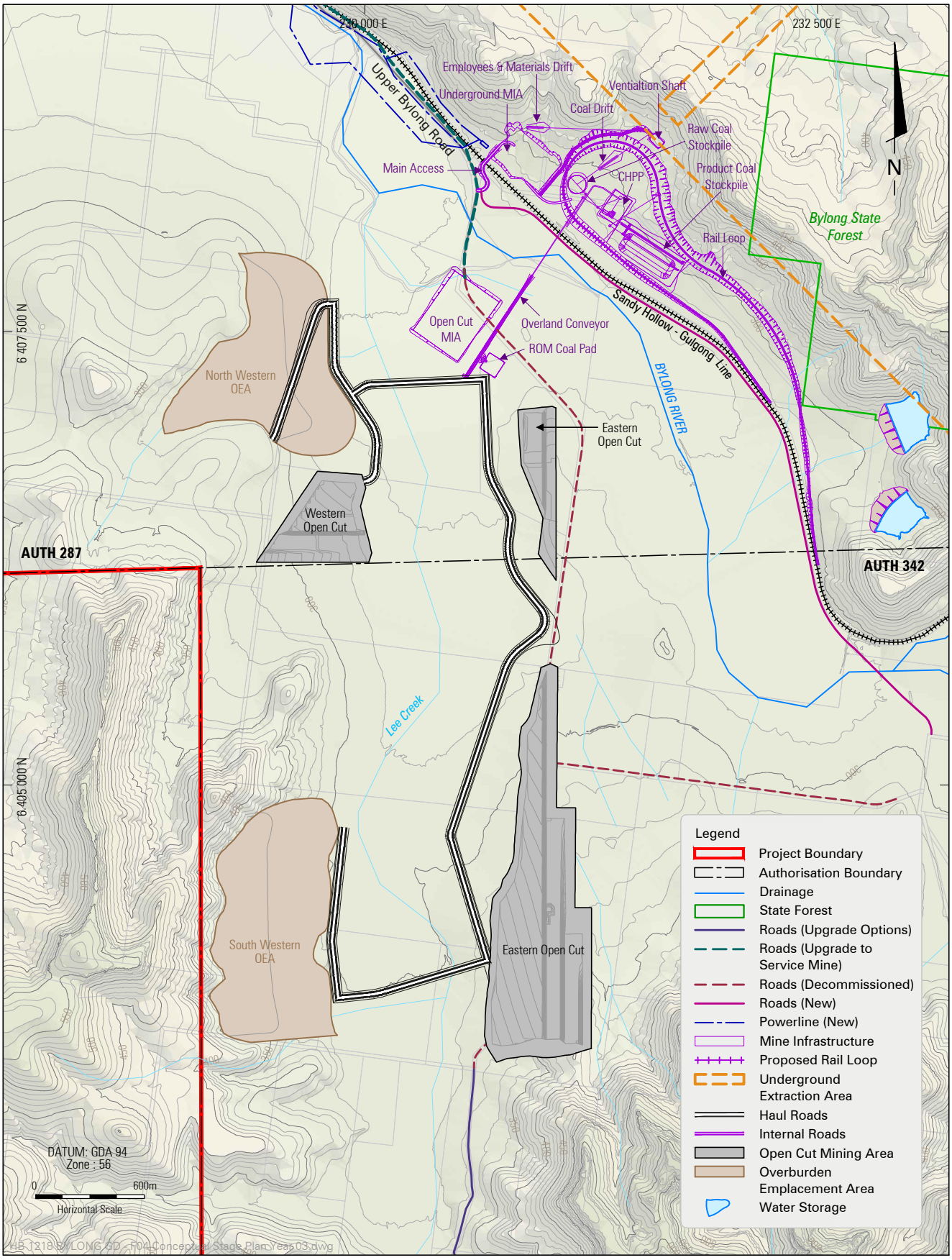
At the completion of open cut mining operations in approximately Year 10, sufficient space will be retained within the southern-most portion of the Eastern Open Cut for the storage of coarse and fine reject materials generated from the processing of ROM coal from the underground operations. Once this void has been filled with coarse and fine reject materials, overburden material from the South-Western OEA and/or the OEAs within the Eastern Open Cut will be used to cap and facilitate rehabilitation to achieve the final landform as conceptually illustrated in **Figure 12**. The remaining areas of the South-Western OEA will be shaped and rehabilitated to complement the surrounding natural topography.

3.2.2 Open Cut Mobile Equipment

An indicative equipment fleet for the open cut mining operations at peak production for the Project is shown in **Table 5**. This will be refined and revised as required during the development of the EIS.

Table 5
Indicative Open Cut Project Equipment List

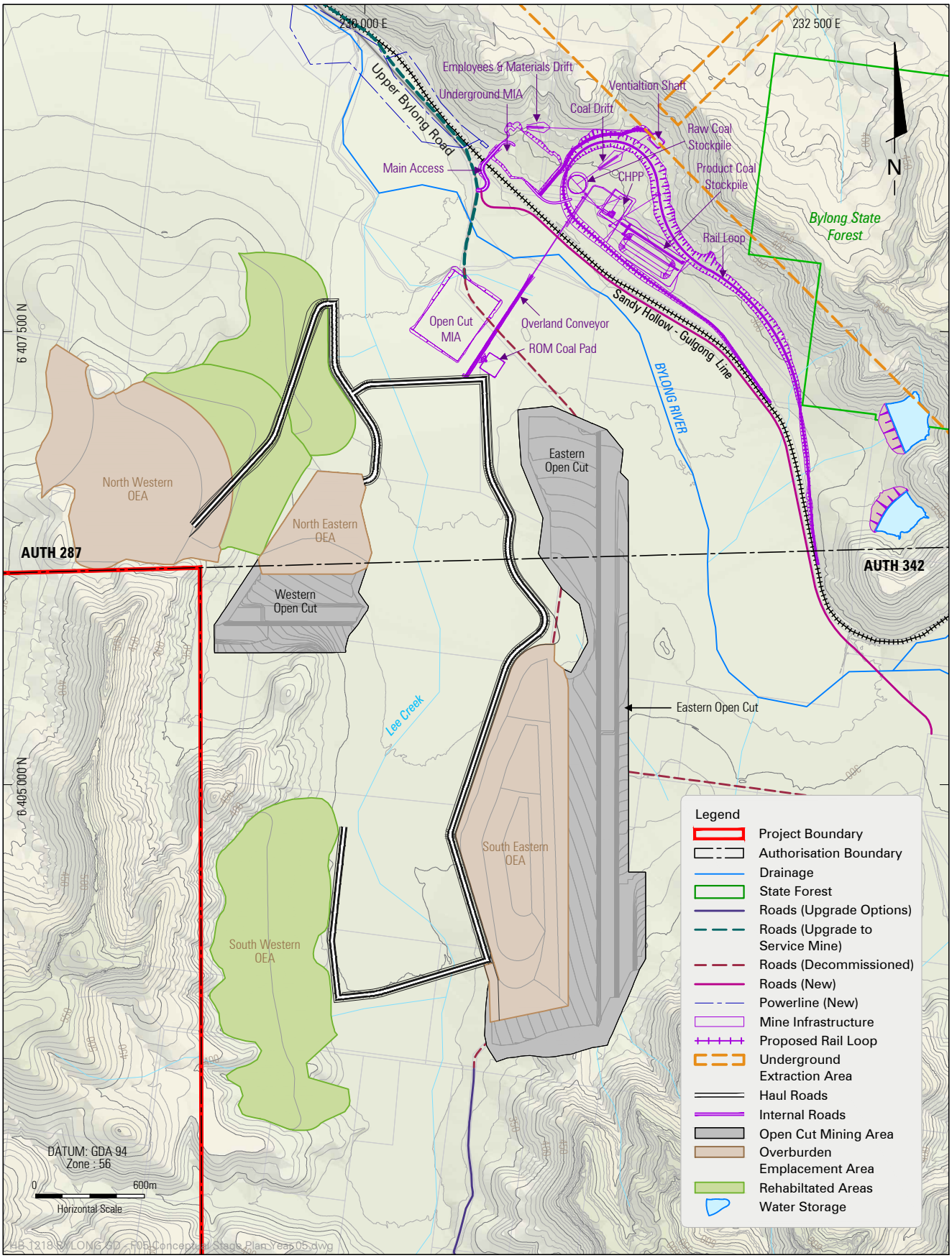
Equipment	Number
550 t Hydraulic Excavators	2
360 t Hydraulic Excavator	1
250 t Hydraulic Excavators	2
Front End Loaders	2
220 t Haul Trucks	12
190 t Haul Trucks	4
150 t Haul Trucks	18
Dozers	7
Graders	3
150 t Water Carts	3
Blast Hole Drill	1
Fuel / Lube Trucks	2



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Conceptual Stage Mine Plan - Year 3

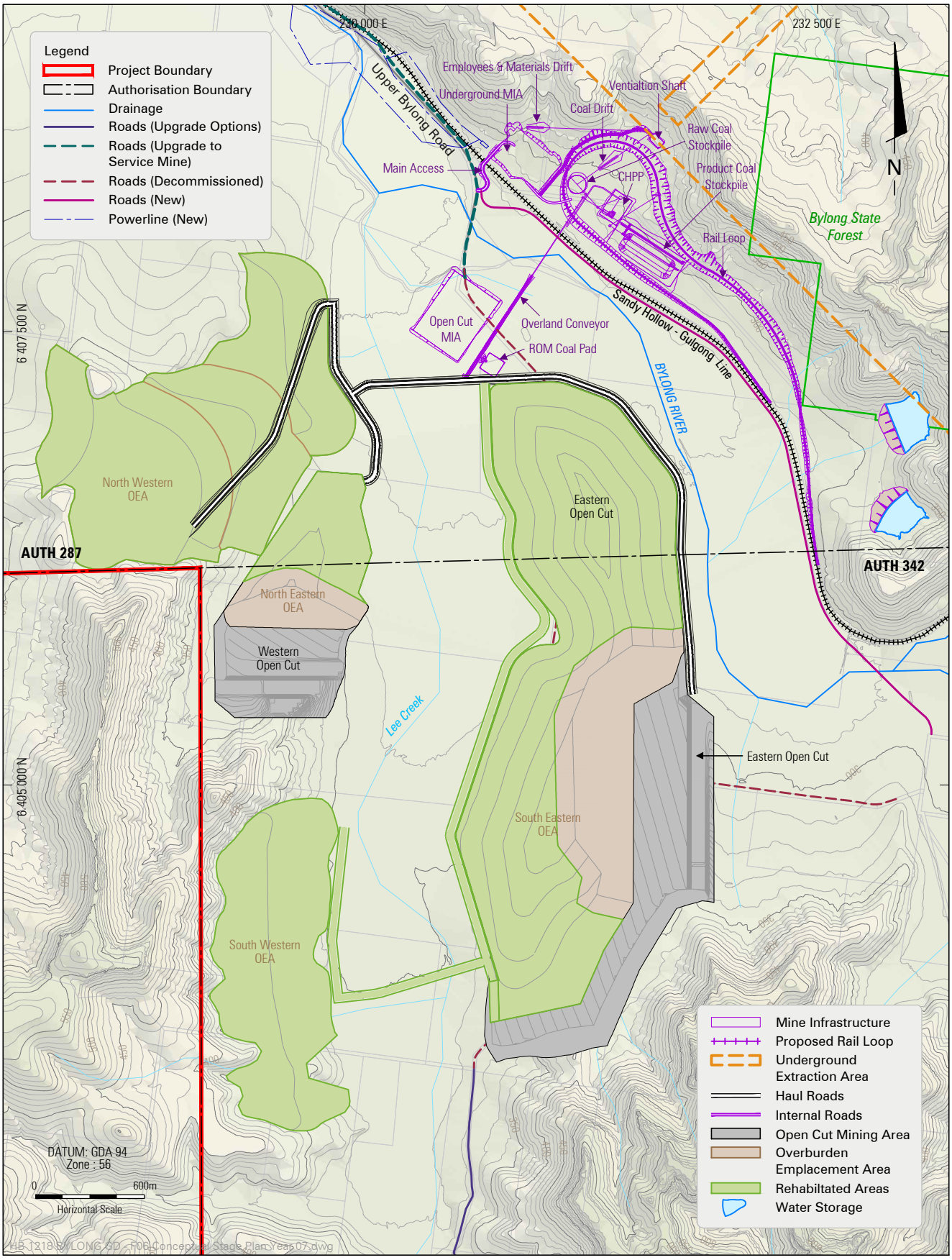
FIGURE 8



BYLONG COAL PROJECT

Conceptual Stage Mine Plan - Year 5

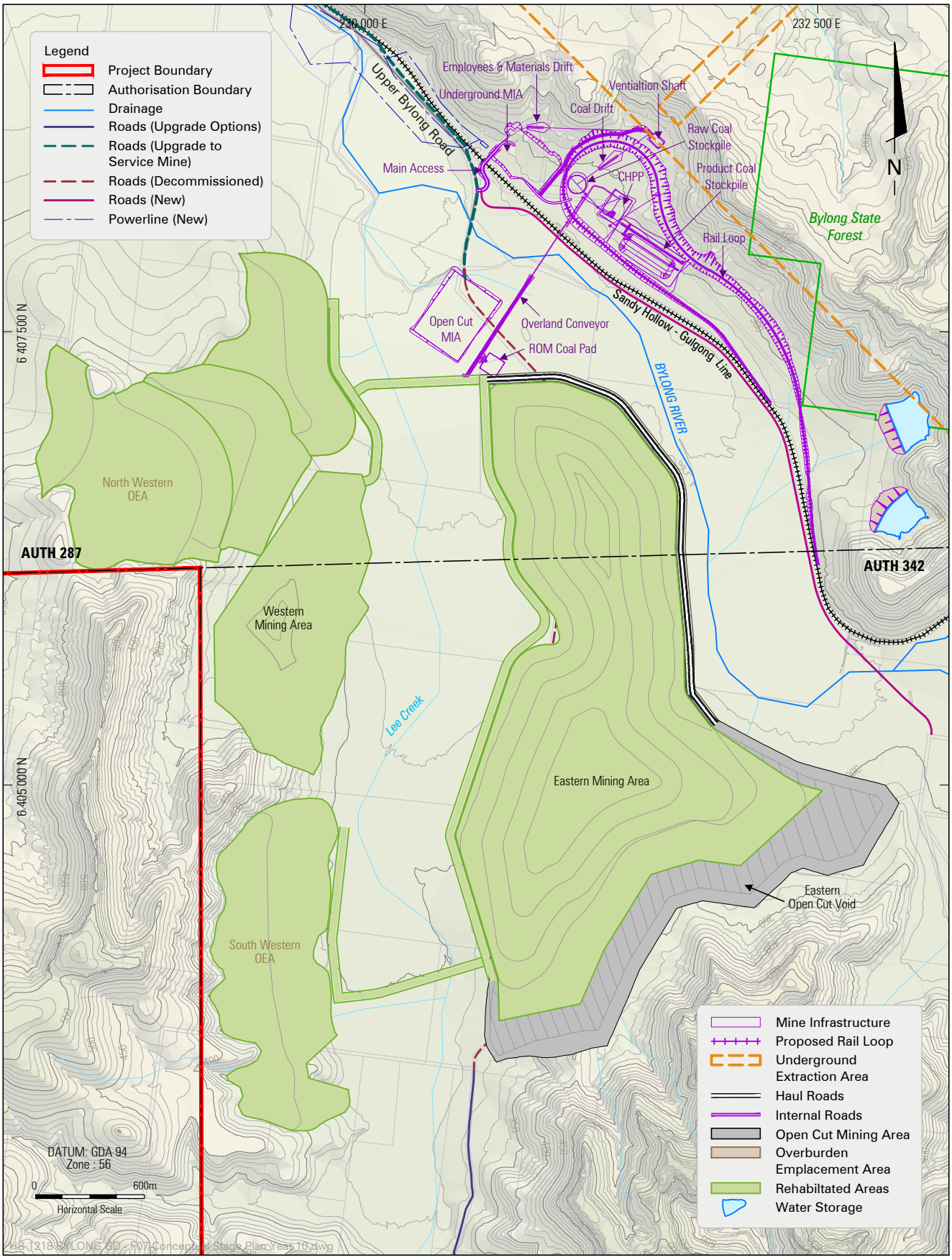
FIGURE 9



BYLONG COAL PROJECT

Conceptual Stage Mine Plan - Year 7

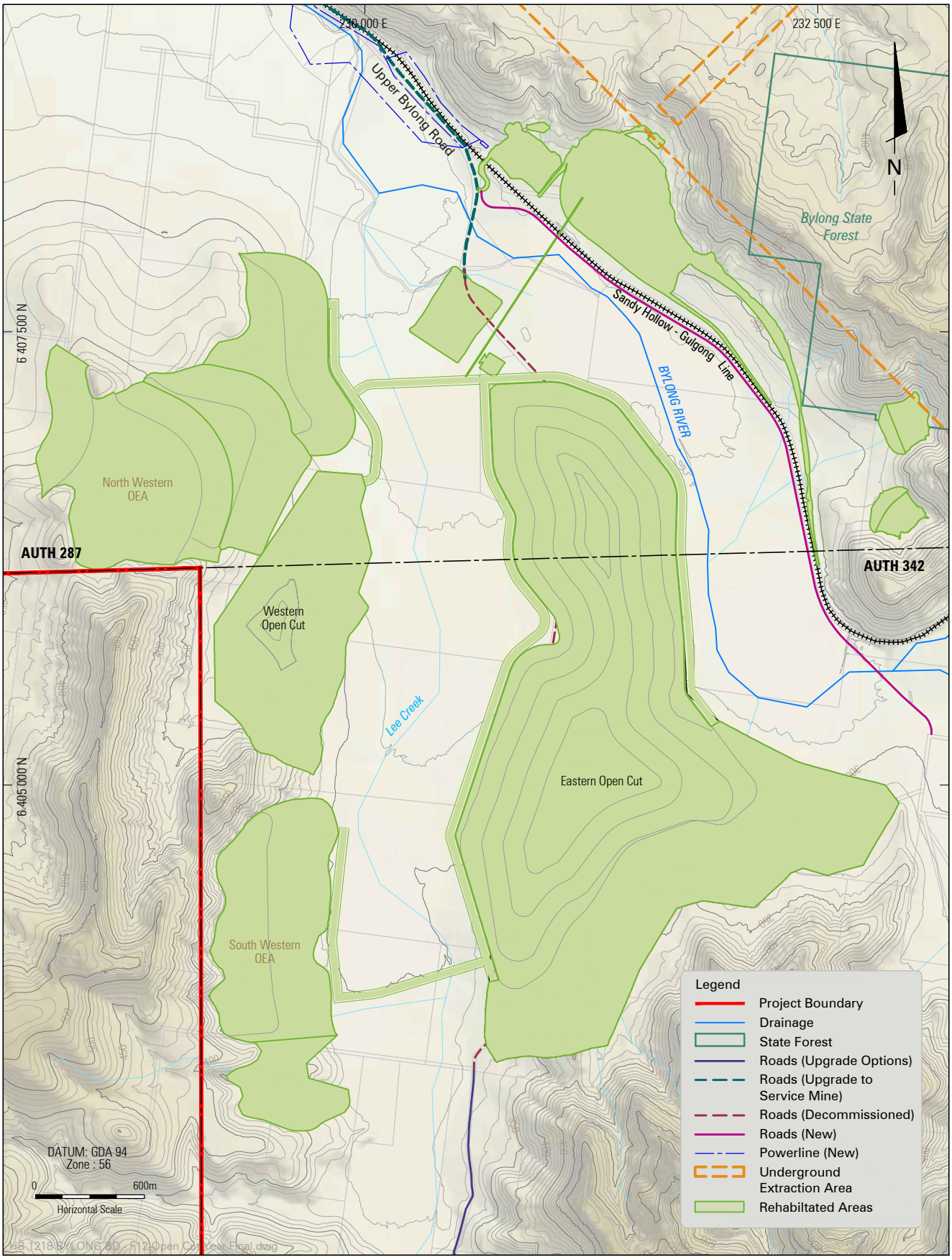
FIGURE 10



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Conceptual Stage Mine Plan - Year 10

FIGURE 11



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Conceptual Open Cut Mine Plan
- Year 29 (Final Landform)

FIGURE 12

3.2.3 Underground Mine Operation

The proposed conceptual underground mine plan has been designed based on an extensive knowledge of the coal resource within the Project Boundary. The conceptual underground mine plan is located in an area where the geology and sequence of the coal resource allows for the safe and efficient recovery via underground mining methods. As mentioned in **Section 3.2.1**, there are areas within the Project Boundary that are not able to be recovered utilising underground mining methods and would be sterilised if this option were implemented.

A number of alternative layouts of the underground mine plan have been investigated to ensure that the proposed underground mine plan is the most viable option for the Project in conjunction with the open cut mining operations. The mine plan options considered are detailed in **Section 3.10**.

The proposed underground extraction area for the Project (Underground Extraction Area) occurs in the more elevated terrain in the north-eastern portion of the Project Boundary as shown on **Figure 7**. **Figure 13** illustrates the location of the two decline drifts to provide access to the Coggan Seam in the vicinity of the proposed rail loop and Underground Mine Infrastructure Area (MIA) on the northern side of the Sandy Hollow-Gulgong Railway Line. The decline drifts will provide ongoing access to the underground mining operations for coal clearance, materials, ventilation and employees.

As illustrated on **Figure 13**, the permanent main headings are proposed to be developed in a south-east to north-westerly direction to generally align with the elevated topography leading up from the valley areas (i.e. protection of surface cliffs and steep topography). Development of the permanent main headings will commence within the central portion of the Underground Extraction Area and will be developed progressively to provide access to longwall panels to be recovered in the near future. The main headings will be constructed utilising continuous miners and will provide permanent roadways for employee access, ventilation and mining services throughout the life of the underground mining activities. The development work for the main headings will also be designed such that there will be no material surface subsidence.

During the initial development of the main headings, the installation of an appropriate mine ventilation network will be required to ensure relevant mine safety standards are met. A ventilation shaft is proposed on the north-eastern side of the proposed rail loop (**Figure 13**).

The conceptual longwall panel design generally follows the easterly dip of the geology within the Underground Extraction Area, with each longwall panel being developed to be extracted from the north-east to the south-west where the permanent main headings have been developed. Underground mining operations are proposed to commence at approximately Year 7 of the Project (around Year 5 of open cut mining operations), with initial longwall panel extraction able to commence around two years following the development of the first panel. Longwall operations will commence in the central portion of the Underground Extraction Area with subsequent panels towards the south.

Following completion of the initial southern longwall panels, longwall mining equipment will move to the central area to commence mining the longwall panels which are north-west of the initial longwall panel. Eight longwall panels are proposed within the northern longwall area.

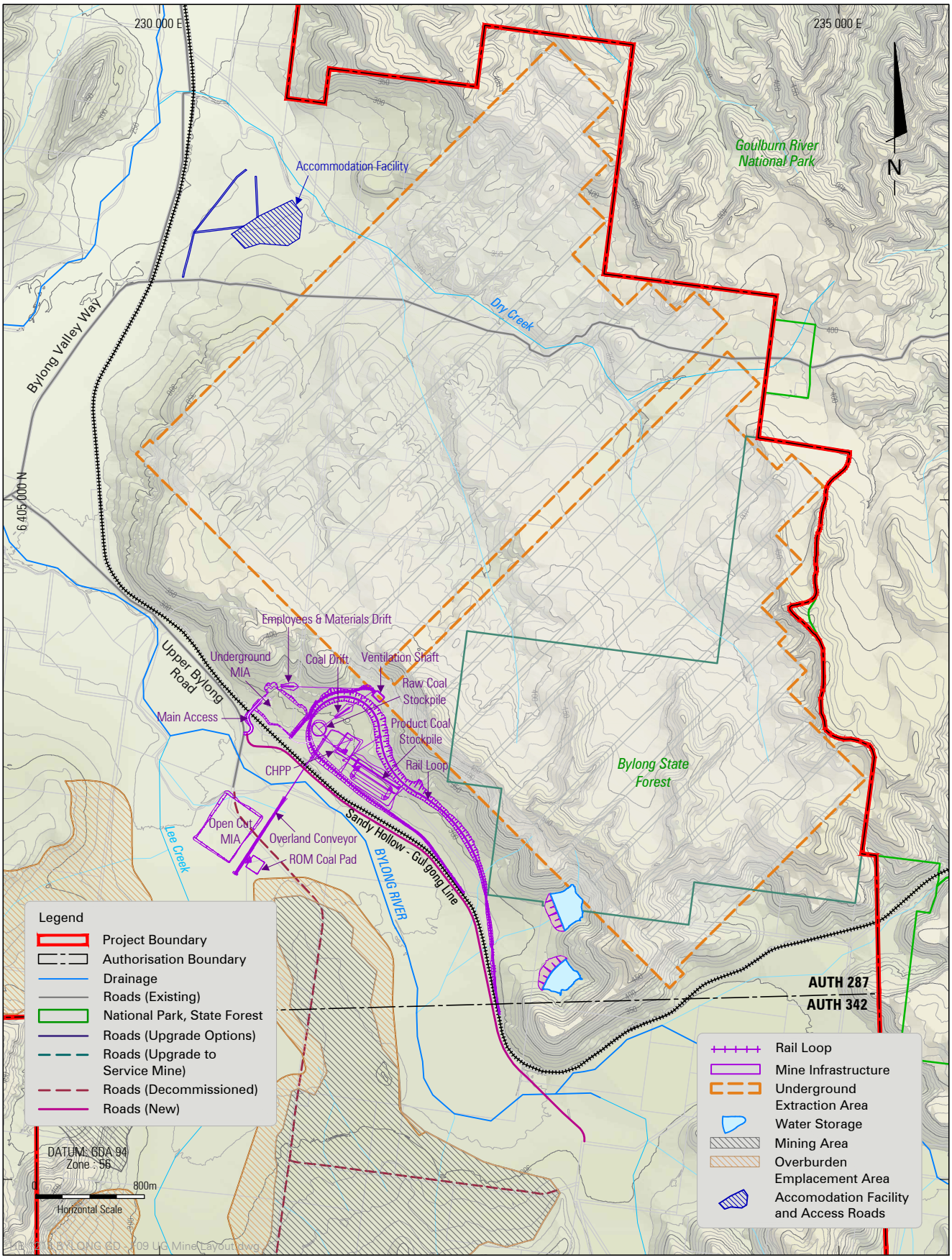
Underground mining is proposed to occur under a section of the Bylong Valley Way in the northern portion of the Underground Extraction Area. Upon the completion of each longwall panel extraction, the panel will be sealed off. Where practical, any mining related infrastructure such as electrical cables, belt conveyors and water pipelines will be removed from the mining area prior to the panels being sealed off.

3.2.4 Underground Mining Equipment

An indicative equipment fleet for the underground operations for the Project is provided in **Table 6**. This will be refined and revised for assessment in the EIS as required.

Table 6
Indicative Underground Equipment List

Equipment	Number
Continuous Miner	3
Longwall Miner	1
Ancillary fans	4
Conveyor systems	1
Electrical power system	1
Communication system	1



BYLONG COAL PROJECT

Conceptual Underground Mine Plan

FIGURE 13

3.3 MINE INFRASTRUCTURE

3.3.1 Coal Handling and Preparation Plant

The Project will include the construction of a CHPP and associated facilities to enable the handling and processing of approximately 6 Mtpa of ROM coal. The CHPP and associated facilities are proposed to be located in a central location of the Project Boundary at the foothill of the natural escarpment to the north-east of the Sandy Hollow-Gulgong Railway Line (see **Figure 14**).

ROM coal from the underground will be delivered by way of conveyor drift to a ROM coal stockpile at the CHPP. The open cut operation will deliver ROM coal by haul trucks to a ROM coal hopper located at the northern extent of the eastern open cut, approximately 1 km south-west of the CHPP. Open cut coal will be primary crushed and conveyed directly to the CHPP at a rate of up to 2,000 tonnes per hour (t/h).

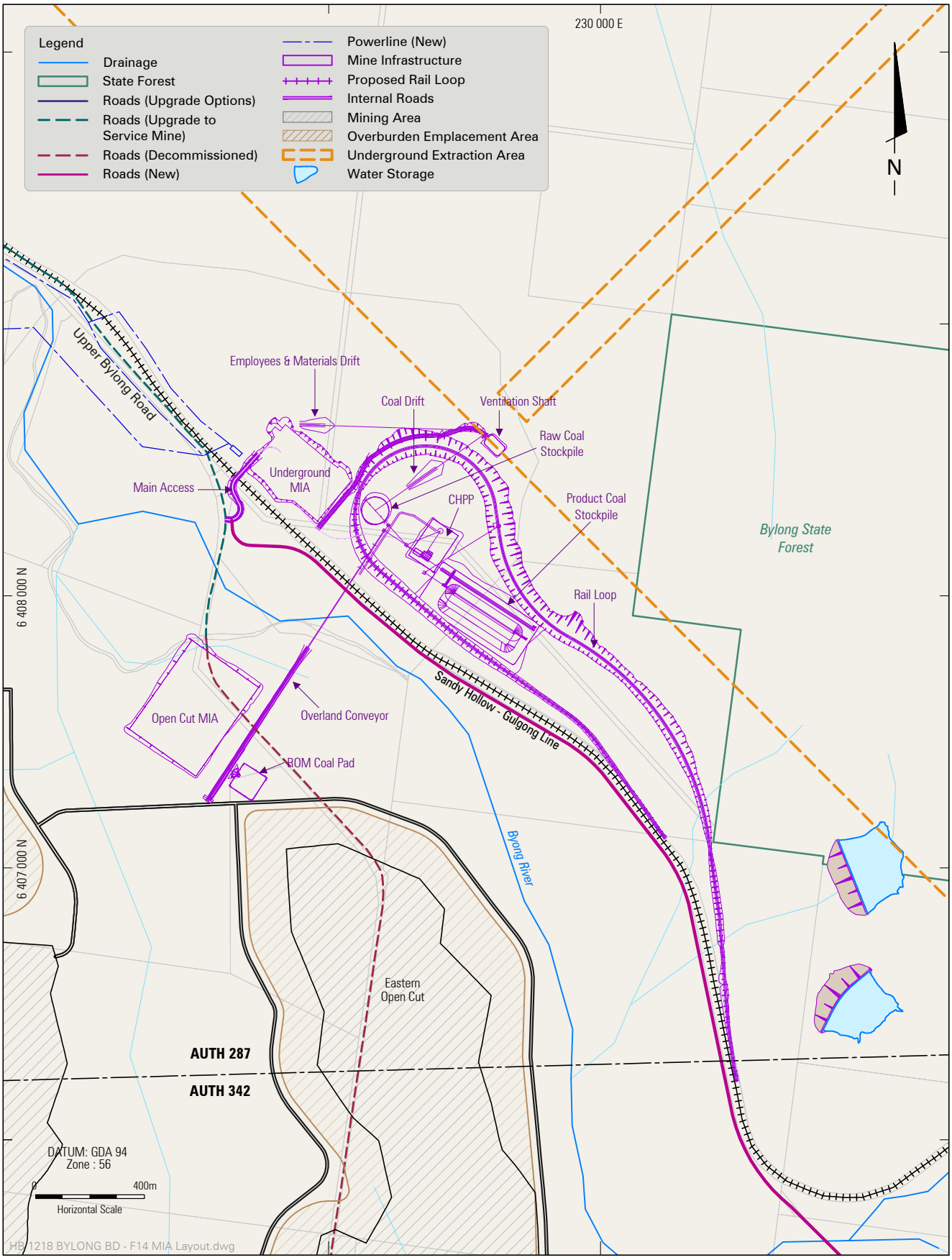
The ROM coal will be nominally fed directly to the CHPP, however if required may be stockpiled on the ROM coal stockpiles for subsequent reclaiming and processing. In some instances, the coal quality may be suitable to bypass the CHPP and be sent directly to the product coal stockpile.

The CHPP will wash the ROM coal at a nominal rate of 1,000 t/h using a conventional dense-medium cyclone and spiral process. The dense-medium cyclones will clean the coarser fractions and coal spirals for the fine-size fractions. This process will be used to generate the following two types of coal:

- 16% ash (arb); and
- 22% ash (arb).

Product coal that is processed through the CHPP will be stockpiled by a travelling luffing stacker to a linear stockpile with a 250,000 t capacity (with additional push-out capacity to 400,000 t), and will be reclaimed by dozer and underground tunnel conveyor system, feeding into a train loading bin located over the rail loop adjacent to the CHPP. The train loading system is based on a two hour turn-around time for trains.

All product coal processed through the CHPP will be mechanically dewatered. Fine reject materials will be recovered by a conventional thickener. The thickened material will be dewatered using belt press filters, and then combined with the coarse reject stream from the CHPP process. The combined reject material will be conveyed to a reject bin with an approximate capacity of 700 t and then transported by haul truck to the North-Western OEA during the initial mining years. When the mining area has been progressed sufficiently, fine and coarse rejects will be transported to the open cut mining areas and co-disposed with overburden. Once completed, these areas will be capped and rehabilitated to integrate with the natural landform.



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Conceptual Mine Infrastructure Area

FIGURE 14

A temporary emergency fine rejects cell will be developed in the near vicinity of the CHPP, in the unforseen event that the belt press filters are out of service. Material placed within the emergency fine rejects cell will be allowed to dry sufficiently prior to be excavated and loaded onto haul trucks and co-disposed within overburden within the OEAs. The area for the temporary emergency fine reject cells will be decommissioned and rehabilitated with the other Project infrastructure following the completion of mining operations.

3.3.2 Mine Site Facilities

The Project will require the construction of various items of surface infrastructure to enable the operation of the mine. The main facilities generally include two additional MIAs, rail loop, CHPP with associated facilities and an Accommodation Facility. There will be two MIAs constructed for the Project as conceptually illustrated on **Figure 14**, including Open Cut MIA and the Underground MIA. The Open Cut MIA is proposed to contain (at least) the following main items:

- Internal mine access roads and light vehicle parking;
- Associated power reticulation and communication infrastructure;
- Administration and bathhouse facilities;
- Sewerage treatment systems;
- Sufficient lighting facilities;
- Mine workshop, store and laydown facilities;
- Hardstand areas;
- Fuel and lubrication station and refuel facility;
- Compressor facility;
- Associated water management infrastructure;
- Feeders and sizers; and
- ROM and rejects bins and associated conveyors.

The Underground MIA is proposed to contain (at least) the following main items:

- Internal mine access roads and light vehicle parking;
- A high voltage transmission line and associated power reticulation infrastructure;
- Mine office, administration and bathhouse facilities;
- Sewerage treatment systems;
- Sufficient lighting facilities;
- Communications lines, towers and other facilities;
- Mine workshop, store and laydown facilities;
- Hardstand areas;
- Fuel and lubrication station and refuel facility;
- Compressor facility;
- Associated Water Management Infrastructure;
- In pit area and portals;
- Ventilation plant;
- Feeders, sizers and conveyors; and
- Underground Inertisation plant.

3.4 PRODUCT TRANSPORT

Coal processed within the CHPP would be fed by product conveyors onto the stacker which will place the coal onto product coal stockpiles. The coal stockpile areas will be centred on reclaim hoppers mounted within pits located below the ground level. Product coal will be reclaimed for loading onto trains using a bulldozer to push coal from the stockpile into the underground product coal reclaim feeder. The reclaim feeder will feed coal to the train loading conveyor.

The train loading station would comprise an approximate 300 t capacity batch loading bin which will load the trains. The bin would be fed by the train loading conveyor at an average rate of approximately 4,000 tonnes per hour. The system allows for the train to remain in motion while being loaded.

The Project will require the construction of a rail loop that connects to the Sandy Hollow–Gulgong Railway Line. The Sandy Hollow–Gulgong Railway Line connects with the Main Northern Railway Line at Muswellbrook, where it continues down to the Port of Newcastle.

The rail loop will be located to the north-east of the existing Sandy Hollow–Gulgong Railway Line (**Figure 14**). The conceptual design for the rail loop has been developed to accommodate two trains on the loop and will enable a two hour turnaround time for trains to be filled and travel from the site. Signalling, switch machines, turnouts, bridge and culvert structures, and road crossing protection will also be constructed in line with the relevant guidelines and standards as specified by the Australian Rail Track Corporation (ARTC).

3.5 SITE ACCESS

Access to the Project would generally be via the existing Upper Bylong Road from the Bylong Valley Way. Access to the Open Cut MIA will be via Upper Bylong Road. An upgrade to the Upper Bylong Road and its intersection with Bylong Valley Way will be necessary to support the additional construction and operational traffic.

The Underground MIA will be accessed via an access road to be constructed over the Sandy Hollow-Gulgong Railway Line, including an upgrade to an existing rail crossing. Various other internal access roads will be constructed to provide routes to access various mining infrastructure, including CHPP, underground mine drifts, ventilation facilities and mine water management system.

The southern reaches of Upper Bylong Road after the Open Cut MIA will need to be decommissioned to facilitate mining operations within the Eastern Open Cut. It is proposed that a realignment of the Upper Bylong Road will occur along the southern side of the Sandy Hollow-Gulgong Railway Line to connect with an existing public road to the east, providing continued access for private landholders to the east of the Project (see **Figure 7**).

For the southern portion of Upper Bylong Road (south of the Project) two options are currently being considered in relation to providing access for neighbouring landholders. Upper Bylong Road continues to the south as Lee Creek Road, which connects with Bylong Valley Way further to the south of the Project Boundary. Buddens Gap Road intersects Lee Creek Road in the southern part of the Project Boundary and is a more direct but elevated access track to Bylong Valley Way.

KEPCO will consider upgrades to either Lee Creek Road or Buddens Gap Road as appropriate to provide comparable access for landholders in this area. Further details of the road realignments and upgrades to facilitate access for neighbours will be discussed and described within the EIS.

Access to the Accommodation Facility will be via an upgraded intersection into an existing access to a residence located on the Bylong Station property (owned by KEPCO). The road intersection will be upgraded in accordance with the relevant Government standards and guidelines, as specified by the relevant roads authority. Two access tracks will be constructed from the current access along existing fence lines to the Accommodation Facility.

3.6 POWER RETICULATION

Power for the Project will be sourced from upgraded infrastructure and sub-station that is located within the village of Bylong. KEPCO has been liaising with Endeavour Energy over the capacity of the existing power reticulation infrastructure and any requirement for upgrades to this infrastructure. Any required upgrades to the existing infrastructure to the sub-station in Bylong will be the subject of separate planning approvals applications, as required.

The construction of a 66 kilovolt (kV) transmission line from the Bylong sub-station and upgraded infrastructure will occur as part of the Project to provide the principle power supply for the mining operations. The 66 kV transmission line will be constructed within the Project Boundary, crossing the Bylong Valley Way and travelling adjacent to the upgraded Upper Bylong Road to the Underground MIA.

Various realignments of existing power reticulation infrastructure will be required to accommodate the Project. Power reticulation for the Project and any relocation of existing infrastructure will be described within the EIS.

3.7 WORKFORCE AND HOURS OF OPERATION

The Project will require approximately a total of 550 full-time equivalent employees at peak operation, with approximately 1,000 full-time equivalent employees required during the construction phase.

Construction activities are generally proposed to be undertaken seven days a week. Some construction activities that will cause negligible noise impacts to sensitive receivers will be undertaken in the night time period. Maintenance activities, deliveries, coal processing, coal transport and mining operations will be conducted 24 hours a day, seven days a week. Additional contractors and construction personnel will also be required during operations.

The Project will require up to six blast events per week from Monday to Saturday between the hours of 7:00 am to 5:00 pm. No blasting will occur on Sundays or Public Holidays without prior approval from the EPA.

3.8 WATER MANAGEMENT

The mine water management system will enable the optimal collection, use, recovery and recycling of water within the Project Boundary.

The Project will require a central mine water dam which will be located proximate to the CHPP and the underground portal. Other mine water dams, diversion drains, sedimentation dams and culverts will be sized and located as required to capture runoff from mining and overburden emplacement areas. Detailed requirements for the various mine water structures and erosion and sediment control devices will be developed for the Project and included in the EIS.

Preliminary findings indicate the likely water demands of the Project will be approximately 1,330 megalitres (ML)/year when the open cut and underground operations are operating concurrently. The main uses of water for the Project includes: dust suppression for the open cut mining operations, for surface facilities and within underground operations including the longwall and the continuous miner units, and the make-up water required for the processing of coal in the CHPP.

It is envisaged that the main source of raw water will generally be from the groundwater collected from the open cut and underground operations and supplemented as required from groundwater bores within the neighbouring aquifers. Details of the particular groundwater bores to be used to supplement water for the Project will be further detailed within the EIS.

KEPCO currently holds various water licences as detailed in **Appendix B** which provides 1,959 units of water allocation from the Bylong River Water Source. KEPCO has also reached agreements with two landholders for land acquisition, which will secure an additional two WALs totalling 576 units. Further water allocations are likely to be obtained as the Project progresses.

3.9 ACCOMMODATION FACILITY

In light of the remoteness of the Project from regional town centres and available accommodation (township of Mudgee is over 1 hours travel from Bylong) an Accommodation Facility is proposed to be constructed to accommodate a portion of the workforce and contractors for the Project. Discussions with the MWRC and the local community are ongoing in relation to the Accommodation Facility and any other options to accommodate employees throughout the life of the Project.

The location of the facility is proposed within the northern portion of the Project Boundary, north of Bylong Valley Way, near the intersection of Wollar Road (see **Figure 7**).

During the construction phase, the Accommodation Facility is anticipated to house a fair proportion of the 1,000 full time equivalent employees that will be required. The facility will accommodate up to 550 employees during the peak period of operations where both the underground and open cut mining operations are occurring.

The Accommodation Facility will be designed so that the provision of utilities will be via those accessed by the Project (including a communications tower). Further, the development of the facility will include a water treatment plant and a sewage treatment plant.

3.10 PROJECT ALTERNATIVES

Since the granting of A287 and A342, an extensive exploration program and series of feasibility studies have been conducted in order to assess the most economic and environmentally responsible mining operation to extract available coal resources.

This process has included the consideration of numerous mine plans, operational methods and infrastructure designs and alternatives.

The primary objective of the studies was to develop an economically viable mine plan that considered the principles of Ecologically Sustainable Development (ESD), minimised potential environmental and social impacts whilst maximising coal recovery. The various Project alternatives that were considered during this process are described below.

The mine planning process has involved the completion of a number of distinct study phases. Each mine planning phase was assessed in terms of key economic criteria set by KEPCO with relevant consideration of all applicable constraints to the Project at that time. The mine planning process that has been or is planned for completion for the Project includes the following:

- Exploration Studies (various since 1984 and are ongoing) have been commissioned to gather the knowledge required on the geology within A287 and A342 in order to complete required mine planning studies;
- Concept Study (March 2011) was undertaken to identify conceptual mine plans and understand the potential of a proposed coal mine;
- Pre-Feasibility Study (PFS) (July 2012) was undertaken to develop several mine plan options (with up to seven open cut mining areas and underground mining areas) and determine the most appropriate option to take forward;
- Option Study (October 2013) to determine the proposed final Project that incorporated significant changes from the PFS in consideration of BSAL, alluvium, CIC and regulatory advice; which resulted in the reduction of five open cut mine areas to two and the relocation of significant surface infrastructure);
- Feasibility Study (currently underway, scheduled for completion June 2014) is being completed to increase levels of understanding and certainty with selected option; and
- Construction (aspiration 2017, pending relevant approvals) will involve the implementation of the preferred mine plan that will hold the relevant planning approvals.

The various mine planning phases conducted to date have been completed over several years. During this time, the planning approval process has changed according to the evolving understanding, perceptions and expectations by the local community and the Government regulators. The mine planning phases have adapted to the evolving requirements as they have occurred over time.

The Gateway Process has been implemented during critical timing of the associated mining studies (i.e. between completion of the Pre-Feasibility Study and the commencement of the Feasibility Study). As a result, the Project team has understood the requirement of these further considerations and has proactively introduced another layer of study phase to not only address the resulting additional constraints that need to be applied to the mine plan, but quantify the trade off with expected economic benefits.

An Options Study was introduced as an additional step in the mine planning process to supplement the work completed within the Pre-Feasibility Study. This additional step was considered to be required to ensure the preferred option taken into Feasibility Study was both environmentally acceptable to external stakeholders (including the community) as well as being economically viable from an investor/owner's point of view.

Further to this, key study milestones have been tabled with relevant government bodies (during briefings with Department of Planning and Infrastructure (DP&I) and Division of Resources and Energy (DRE)) throughout the duration of mine planning process. This has assisted the Project team to understand and implement relevant changes to the regulator requirements to the mine plans during this time. This approach demonstrates the proactive and iterative mine planning process that has been adopted throughout the initial stages for the Project.

3.10.1 Option 1 – Do Nothing

The '*do nothing*' approach would result in KEPCO suspending its current intentions to invest the significant capital required for the development of this State significant coal resource. It would result in the forfeiture of expenditure within the State of NSW associated with the preparation and lodgement of the relevant planning approval applications. Adopting this option would result in a loss of direct and indirect employment opportunities and socio-economic benefits in addition to a loss of benefits and royalties or other payments to both the Federal and NSW State Governments.

This alternative failed to maximise coal resource recovery from the area and therefore was not considered to be in satisfaction of the Objects of the EP&A Act to encourage the proper development of natural resources for the purpose of promoting the social and economic welfare of the community.

In addition to the above, at this stage of the Project, to do nothing would result in significant financial loss to KEPCO as a result of their previous investment acquiring the asset, land acquisitions and in mine planning and environmental assessments carried out to date.

3.10.2 Option 2 – Underground Only Operation

Option 2 involved considering the development of an underground only mining operation utilising either bord and pillar and/or longwall methods. Whilst this option would minimise the extent of surface disturbance within the Project Boundary, there are other constraints that were identified.

As mentioned in **Section 3.2.1**, there are areas within the Project Boundary where the coal resource is too shallow to enable the safe recovery of coal. Hence, this option would sterilise a coal resource that can only be safely and efficiently be recovered by open cut mining methods.

For a thermal coal deposit that exists within the Project Boundary, the economics of a stand-alone bord and pillar operation presented limited value and would sterilise large areas of the coal deposit within those areas suitable for recovery by underground mining methods.

Alternatively, a stand-alone longwall operation was considered, but presented with limited economic potential. A financial analysis has confirmed that an underground only option is not economically feasible at this stage.

Further to the above, an underground only scenario presents environmental constraints relating to the challenges surrounding the disposal and containment of coarse and fine reject material from the CHPP within an appropriate facility. Option 2 was rejected on the grounds of economic and environmental issues.

3.10.3 Option 3 – Open Cut Only Operation

As previously explained, the topography and the resulting depth of the coal resource within the Project Boundary effectively divides the resource into areas that can only be recovered via underground mining methods and areas that can only be recovered by open cut mining methods. The potential to mine the coal resource solely by open cut mining methods has been investigated.

Adopting this would result in the sterilisation of a significant amount of coal resource that can only practically be achieved by underground mining methods. It would also result in a significant modification to the landform within the Bylong Valley and result in substantial environmental and social impacts to local stakeholders, particularly in relation to amenity impacts.

Recovery of the entire coal resource that is suitable for open cut mining operations would result in significant disturbance to areas of agricultural land, sensitive ecology, items of heritage significance and also result in impacts to water resources due to the immediate vicinity of these coal resources to existing surface water and groundwater resources. Various mine plan options for the open cut mining operations were reviewed and refined in order to minimise the impacts on the identified sensitive environmental constraints, where possible.

Option 3 was rejected as it did not adequately satisfy the principles of ESD, nor did it appropriately address the Objects of the EP&A Act. Iterative processes were adopted to ascertain the appropriate balance of open cut mining within the Project Boundary. The extensive coal sterilisation that would result from adopting this option was not deemed acceptable to KEPCO.

Proactive meetings with both the DP&I and DRE have been conducted to understand perceptions and devise an appropriate strategy to best satisfy the needs of relevant stakeholders.

3.10.4 Option 4 – The Project

The preferred alternative is the Project as it is proposed, a 27 year mining operation including initial open cut mining technology within two refined areas over a period of 8 years and then a 23 year underground longwall mining operation within the Underground Extraction Area. This option will maximise the safety, social and economic benefits from the Project whilst minimising impacts on environmental aspects such as alluvial floodplains, sandstone outcrops and escarpments, surface water and groundwater resources, ecology, heritage items and agricultural lands and soils.

Significant mine planning was undertaken to minimise impacts to BSAL from open cut mining areas and the positioning of OEAs. This early identification and avoidance of alluvial lands was prioritised during the early mine planning phase of the Project. Mineable coal resources were determined to be preferably left in situ in consideration of the principles of ESD and the recently introduced '*NSW Strategic Regional Land Use Policy for the protection of Strategic Agricultural Land*'. Further specific details in this regard will be presented in the EIS.

Some BSAL (derived from sedimentary material) which is utilised for less intensive '*grazing*' purposes only (not highly productive crops or farming) remains within the Eastern Open Cut. Extensive deliberations were given to the benefits of the extracting the coal resource compared to the current and agricultural potential of this area. Extensive discussion and further justification in accordance with relevant guidelines on this issue are provided in the '*Bylong Coal Project Gateway Certificate Application Supporting Document*' (Hansen Bailey, 2014).

Option 5 also presents an opportunity to recover additional coal resources beyond the life of the Project, subject to future feasibility studies and the grant of the relevant approvals. For all of the reasons discussed above, it is considered to be the best alternative in terms of meeting the principles of ESD and the Objects of the EP&A Act.

3.10.5 Options in Respect of Project Related Infrastructure

A number of alternative locations were considered to accommodate the infrastructure required for the Project. Certain alternatives were rejected on the grounds of economic, environmental and/or social grounds throughout the planning and design phase. A summary of the options considered is provided in the following sections.

Accommodation Facilities

Various options for accommodation for each of the construction and operations' workforces have been considered for the Project. A detailed consideration of the potential labour pool with an approximately one hour drive of the Project (considered a safe drive time) has shown that the labour force presently seeking full time employment is few.

Experienced mining sector employees presently reside largely outside this area. In addition to training local workers, some sourcing of employees from outside the area is will be required.

Should an Accommodation Facility not be constructed as part of the Project, this would result in significant additional pressure on local infrastructure and accommodation facilities in the immediate area. This would also significantly increase traffic volumes on key local roads, travel times for workers and hence safety risk for workers and other road users.

A permanent Accommodation Facility was considered, however initial stakeholder analysis indicated that this may be unfavourable to the local community and MWRC. As such, an Accommodation Facility is currently proposed, with plans to conduct further consultation throughout the planning approval's process with the local community and MWRC in order to identify other opportunities to accommodate Project employees. This may include developing strategies with MWRC and the local community to encourage workers to progressively permanently reside and integrate within the local community within an acceptable travel distance of the Project.

The demand for the Accommodation Facility will generally be highest during the early years of the Project life for construction activities and the initial years of open cut mining operations. KEPCO intends to encourage the longer term employees to relocate their families to reside within the local community to minimise the demand on the Accommodation Facility in the later years of the Project.

The location of the Accommodation Facility was originally proposed further to the west. Following the completion of mapping of areas of BSAL within the Project Boundary, the proposed locality has been moved further east to avoid interfering with an area mapped as BSAL. Further, it has been located on and around existing farm access infrastructure to reduce disturbance impacts.

Consideration was also given to ensuring the Facility was located within acceptable amenity levels for noise and dust; as well as largely remote from private residences (including the township of Bylong). Ongoing consultation with stakeholders will continue in relation to this Project aspect during the preparation of the EIS.

Rail Loop

Due to the Project being remote from other mining projects within the region, it was deemed that a standalone rail loop or rail loadout facility will be required.

Various engineering and cost preferred locations were proposed for the rail loop, including on private land and within the alluvial floodplain. The final location was determined in consideration of avoidance of the above. Additionally, the CHPP and its associated facilities have been proposed to be constructed within the rail loop with an aim to minimise disturbance to BSAL and native vegetation.

66 kV Transmission Line

The conceptual alignment of the proposed 66 kV transmission line has been determined within the vicinity to public road easements to minimise impacts on land that has been identified by Government for potential CIC and also to reduce the impacts of fragmentation to existing agricultural enterprises, external to the Project. The preferred conceptual alignment will be further described and assessed within the EIS.

4 REGULATORY FRAMEWORK

This section sets out the planning and environmental regulatory framework applicable to the Project, including the identification of relevant legislation, environmental planning instruments strategic planning documents and development standards. Both NSW and Commonwealth legislation are discussed.

4.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The *Environmental Planning and Assessment Amendment (Part 3A Repeal) Act 2011* inserted a new Division 4.1 into Part 4 of the EP&A Act on 1 October 2011. This Division prescribes the current planning assessment and determination regime for State Significant Development (SSD).

Under section 89C of the EP&A Act, development will be SSD if it is declared to be such by *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). Clause 8(1) of the SRD SEPP provides:

> "***8 Declaration of State significant development: section 89C***
>
> *(1) Development is declared to be State significant development for the purposes of the Act if:*
>
> *(a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and*
>
> *(b) the development is specified in Schedule 1 or 2.*"

The Project is SSD since it satisfies both of the elements in clause 8(1) of the SRD SEPP, including:

- The Project is not permissible without Development Consent on the land on which it will be carried out; and
- The Project is development that is specified in Schedule 1 of the SRD SEPP.

Each of these elements is briefly discussed below.

4.1.1 Permissibility of the Project

The permissibility of mining developments is governed by the relevant local environment plan and subsequently by the *State Environmental Planning Policy (Mining, Petroleum Production and Extraction) 2007* (Mining SEPP). The Project consists of both underground and open cut mining.

Clauses 7(1)(a) & (b) of the Mining SEPP states:

> "***7 Development permissible with consent***
>
> *(1)* ***Mining***
> *Development for any of the following purposes may be carried out only with development consent:*
>
> *(a) "**Underground mining** can be carried out on any land;*
>
> *(b) mining carried out:*

(i) on land where development for the purposes of agriculture or industry may be carried out (with or without development consent), or

(ii) on land that is, immediately before the commencement of this clause, the subject of a mining lease under the Mining Act 1992 or a mining licence under the Offshore Minerals Act 1999,"

"*Underground mining*" is defined for the purposes of the Mining SEPP as follows:

"*underground mining* *means:*

(a) mining carried out beneath the earth's surface, including bord and pillar mining, longwall mining, top-level caving, sub-level caving and auger mining, and
(b) shafts, drill holes, gas and water drainage works, surface rehabilitation works and access pits associated with that mining (whether carried out on or beneath the earth's surface),

but does not include open cut mining."

And further, "*mining*" is defined for the purposes of the Mining SEPP as follows:

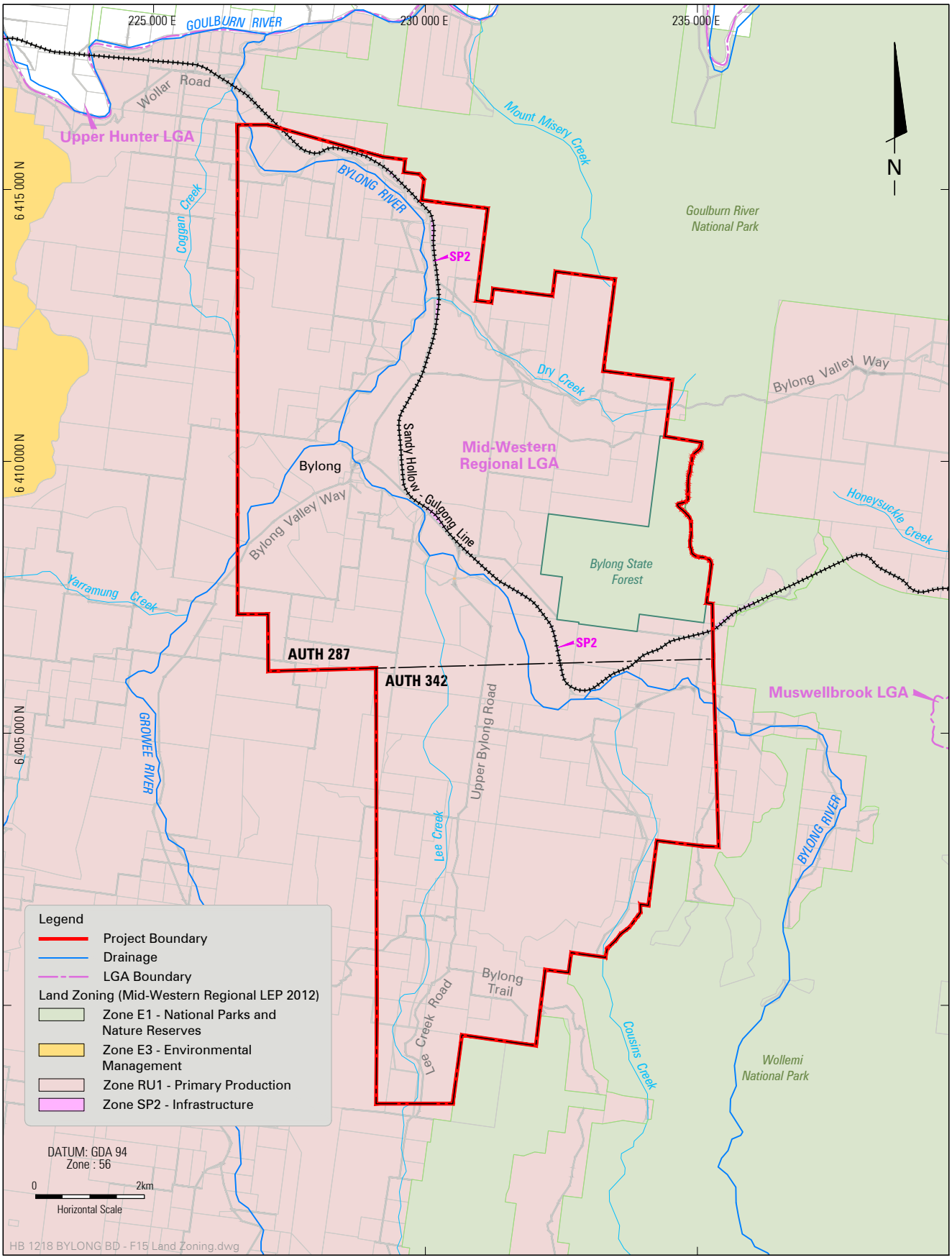
"***mining*** *means the winning or removal of materials by methods such as excavating, dredging, or tunnelling for the purpose of obtaining minerals, and includes:*

(a) the construction, operation and decommissioning of associated works, and
(b) the stockpiling, processing, treatment and transportation of materials extracted, and
(c) the rehabilitation of land affected by mining."

The Project is located entirely within the MWRC LGA and is therefore subject to land zoning as described within the *Mid-Western Regional Local Environment Plan 2012* (Mid-Western Regional LEP). **Figure 15** illustrates the land zoning within the Project Boundary which is primarily zoned as RU1 (Primary Production), with the exception of the Sandy Hollow–Gulgong Railway Line which is zoned as SP2 (Infrastructure).

Underground mining is permissible on any land with development consent in accordance with Clause 7(1(a)) of Mining SEPP. As such, all underground mining for the Project is permissible with development consent. The Land Use Table in the Mid-Western Regional LEP provides that open cut mining is permissible with development consent in Zone RU1. Some components of the Project will be undertaken within land presently used for the Sandy Hollow–Gulgong Railway Line which is zoned as SP2. Agriculture is permissible without development consent on land in Zone SP2. Therefore, consistent with Clause 7(1)(b), mining is permissible on this land with development consent.

Further, Clause 7(1)(d) of the Mining SEPP provides that facilities for the processing or transportation of minerals are permissible with development consent on land on which mining may be carried out, if the minerals were recovered from that land or adjoining land. Therefore, the activities associated with the Project are considered to be a permissible land use on the land on which they are proposed to be carried out.



BYLONG COAL PROJECT

Land Zoning

FIGURE 15

4.1.2 Development specified in Schedule 1 of the SRD SEPP

The Project is development specified in Schedule 1 of the SRD SEPP. Clause 5(1)(a) in Schedule 1 of the SRD SEPP specifies the following development:

> "***5 Mining***
>
> *(1) Development for the purpose of mining that:*
>
> *(a) is coal or mineral sands mining, or …*"

Since the Project is development for the purposes of coal mining, the Project constitutes a development specified in Schedule 1 of the SRD SEPP.

4.1.3 State Significant Development

As each of the two elements in clause 8(1) of the SRD SEPP can be satisfied (see **Section 4.1.1** and **Section 4.1.2**), the Project is deemed to be SSD. Under section 89D of the EP&A Act, the Minister for Planning and Infrastructure (the Minister) is the consent authority for SSD. The Minister has delegated his consent authority function for certain SSDs to:

- The NSW Planning Assessment Commission (PAC) for development applications made by private proponents for SSD; and
- Officers of DP&I for development applications which have attracted less than 25 public submissions objecting to the development and where the local council has not objected.

4.1.4 Need for an EIS

Section 78A(8A) of the EP&A Act states that a development application for SSD must be accompanied by an EIS in the form prescribed by the EP&A Regulation. The form and content requirements for an EIS are outlined in Schedule 2 of the EP&A Regulation.

Under Clause 3 of Schedule 2 of the EP&A Regulation, the applicant must make a written application to the Director-General for the DGRs. This document supports that application. The EIS is to be prepared in accordance with the DGRs.

4.1.5 Landowner Consent

Generally, a person who is not the owner of land can only make a development application over that land with the written consent of the owner. However, clause 49(2) of the EP&A Regulation provides that the consent of the landowner is not required for mining developments specified in Schedule 1 of the SRD SEPP.

Given that coal mining is listed under Schedule 1 of the SRD SEPP, the consent of the landowner is not required. However, the owner must be given notice of the application either:

> "*(a) by written notice to the owner of the land before the application is made, or*
>
> *(b) by advertisement published in a newspaper circulating in the area in which the development is to be carried out no later than 14 days after the application is made.*"

KEPCO will ensure that at the time of lodging the application under Division 4.1 of Part 4 that the appropriate measures are implemented to satisfy this requirement.

4.1.6 Application of Other Provisions of the EP&A Act

The other applicable provisions of the EP&A Act are described below.

Section 5 – Objects of the EP&A Act

The Bylong Coal Project EIS will outline how the Project addresses the objects of the EP&A Act, which relevantly include the:

- Encouragement of the proper management of natural resources, including minerals, for the purpose of promoting the social and economic welfare of the community;
- Promotion and co-ordination of the orderly and economic use and development of land; and
- Encouragement of ESD.

Divisions 6 and 6A

Divisions 6 and 6A of the EP&A Act relate to contributions and affordable housing provisions.

Section 89J

Developments approved under Division 4.1 of Part 4 are exempt from a number of other legislative requirements. Section 89J of the EP&A Act provides that the following authorisations are not required for approved SSD:

- The concurrence of the Minister administering Part 3 of the *Coastal Protection Act 1979*;
- A permit under sections 201, 205 or 219 of the *Fisheries Management Act 1994;*
- An approval under Part 4, or an excavation permit under section 139 of the *Heritage Act 1977;*
- An Aboriginal heritage impact permit under the *National Parks and Wildlife Act 1974;*
- An authorisation under section 12 of the *Native Vegetation Act 2003;*
- A bushfire safety authority under section 100B of the *Rural Fires Act 1997*; and
- A water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91 of the WM Act.

Section 89K

Section 89K provides that the following authorisations cannot be refused if they are necessary for the carrying out of SSD for which development consent has been granted:

- An aquaculture permit under section 144 of the *Fisheries Management Act 1994*;
- An approval under section 15 of the *Mine Subsidence Compensation Act 1961*;
- A mining lease under the Mining Act;
- A production lease under the *Petroleum (Onshore) Act 1991*;
- An Environment Protection Licence (EPL) under the *Protection of the Environment Operations Act 1997* (POEO Act);
- A consent under section 138 of the *Roads Act 1993* (Roads Act); and
- A licence under the *Pipelines Act 1967.*

4.2 NSW ENVIRONMENTAL PLANNING INSTRUMENTS

4.2.1 State Environmental Planning Policies

A number of State Environmental Planning Policies could apply to the Project as discussed further below.

SRD SEPP

The application of the SRD SEPP to the Project is discussed in **Sections 4.1.1** and **Section 4.1.2** above.

Mining SEPP

The provisions of the Mining SEPP determine the permissibility of mining activities, as discussed in **Section 4.1.1**. In addition, clauses 12, 13, 14, 15, 16 and 17 stipulate the matters that the consent authority must consider when determining a development application for a mining development. These matters will be discussed in the EIS.

State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP) imposes additional notification and consultation requirements for developments proposed near existing public infrastructure.

Clause 45 applies where a development involves the penetration of ground within 2 m of an underground electricity power line or electricity distribution pole, or within 10 m of any part of an electricity tower. Clause 45 also applies to any proposed development adjacent to an easement for electricity purposes, electricity substation or overhead electricity power line. Where clause 45 applies, the consent authority must notify the electricity supply authority of the proposed development and consider to any comments raised.

Clause 104 provides that the Roads and Maritime Service (RMS) is to be notified of certain traffic generating developments. Clause 104 applies where the traffic volumes generated by a proposed development exceed the thresholds under Schedule 3 of the SEPP. Under Schedule 3, mining developments fall under the category "*any other purpose, for which the traffic threshold is 200 motor vehicles*". Given that the Project is expected to generate in excess of 200 motor vehicles movements, RMS needs to be given notice of the development. Pursuant to clause 104, the consent authority must consider any issues raised by RMS, as well as the traffic implications resulting from the development.

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

Part 4AA of the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries)* 2007 (Mining SEPP) requires that certain mining and petroleum developments be subject to a '*Gateway Process*'. This process is to ensure a balance is achieved between potentially competing land uses of mining and important agricultural and water resources, whilst providing for the sustainable growth of these industries.

Before determining an application for Development Consent that is accompanied by a '*Gateway Certificate*', the consent authority must:

- Refer the application to the Minister for Primary Industries for advice regarding potential impacts on water resources who must have regard to the Minimal impact considerations and other provisions sets under the AIP; and
- Consider:
  - Gateway Certificate recommendations;
  - Written advice from the Minister for Primary Industries and any '*Gateway Panel*' advice in accordance with Clause 3 (4A)(b) of Schedule 2 of the EP&A Regulation; or
  - Advice from the Independent Environmental Scientific Committee (IESC); or
  - Any cost benefit analysis of the Project; and
- Consider whether Gateway Certificate recommendations have been addressed.

KEPCO has prepared and submitted a Gateway Application titled '*Bylong Coal Project Gateway Certificate Application Supporting Document*' (Hansen Bailey, 2014) in accordance with Division 4 Clause 17F of the Mining SEPP and is awaiting the determination of a Gateway Certificate in accordance with Clause 17H of the Mining SEPP. This Application has considered potential Project impacts to potential Critical Industry Clusters (CIC) and Biophysical Strategic Agricultural Land (BSAL).

State Environmental Planning Policy No 33 (Hazardous and Offensive Development)

State Environmental Planning Policy No 33 (Hazardous and Offensive Development) (SEPP 33) imposes assessment requirements for potentially hazardous industries. Clause 12 of SEPP 33 provides that a Preliminary Hazard Analysis must be prepared for a "*potentially hazardous industry*".

The process for evaluating whether a development is a "*potentially hazardous industry*" is the risk screening process prescribed by '*Hazardous and Offensive Development Application Guidelines: Applying SEPP 33*' (SEPP 33 guidelines). If the quantities of dangerous goods required for the development exceed the thresholds specified in the SEPP 33 guidelines, the development is deemed to be a "*potentially hazardous industry*".

The risk screening process prescribed by the SEPP 33 guidelines will be undertaken during the preparation of the EIS. If the screening process determines that the Project is a potentially hazardous industry, a Preliminary Hazard Analysis will be prepared.

State Environmental Planning Policy No 44 - Koala Habitat Protection

State Environmental Planning Policy No 44 - Koala Habitat Protection (SEPP 44) aims to encourage the conservation and management of koala habitat. SEPP 44 applies to the LGAs listed in Schedule 1 of the SEPP.

The MWRC LGA is not listed under Schedule 1. Therefore, SEPP 44 is not relevant to the Project.

State Environmental Planning Policy No 55 (Remediation of Land)

State Environmental Planning Policy No 55 (Remediation of Land) (SEPP 55) provides that a consent authority cannot grant development consent unless it has considered whether or not the land is contaminated.

Clause 7(2) states that where the proposed development will involve a "*change of use*" of certain land, the Minister may need to consider a preliminary investigation of the land conducted in accordance with the contaminated land planning guidelines. Clause 7(2) applies to land that has been used for any of the purposes listed in Table 1 of the contaminated land planning guidelines. Agriculture is a land use listed in Table 1.

Accordingly, a preliminary investigation of the land will be undertaken for the Project and included within the EIS.

4.2.2 Local Environmental Plans

Mid-Western Regional Local Environment Plan 2012

As discussed in **Section 4.1.1**, the Project is wholly located within the MWRC LGA. The Mid-Western Regional LEP governs land use within the MWRC LGA.

The Project is primarily located on land within zone RU1. The objectives of zone RU1 are to:

- "*Encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *Encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *Minimise the fragmentation and alienation of resource lands.*
- *Minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *Maintain the visual amenity and landscape quality of Mid-Western Regional by preserving the area's open rural landscapes and environmental and cultural heritage values.*
- *Promote the unique rural character of Mid-Western Regional and facilitate a variety of tourist land uses.*"

The Sandy Hollow–Gulgong Railway Line passes through the Project Boundary and is on land zoned as SP2 Infrastructure. As discussed in **Section 4.1.1**, the Mining SEPP prevails over the Mid-Western Regional LEP, resulting in the underground mining being a permissible land use in zone SP2. Open cut mining will not be conducted on any zone SP2 land.

4.3 STRATEGIC REGIONAL LAND USE POLICY 2012

On 11 September 2012, the NSW Government released the Strategic Regional Land Use Policy and the finalised '*Strategic Regional Land Use Plan – Upper Hunter Region*' (SRLUP) as part of a package which sets out a range of initiatives to better balance growth in the mining and coal seam gas industries with the need to protect important agricultural land and water resources.

The SRLUP provides protection for Strategic Agricultural Land (SAL), which is defined as "*highly productive land that has both unique natural resource characteristics (such as soil and water resources) as well as socio-economic value (such as high productivity, infrastructure availability and access to markets)*". The SRLUP contains preliminary maps which identify areas of SAL.

Proposed mining developments that are located on SAL must seek a Gateway Certificate. Further detail in this regard in relation to the Project is provided in **Section 4.2.1**.

4.4 OTHER RELEVANT NSW LEGISLATION

The Project may require approvals under one or more of the following NSW legislation:

- *Contaminated Land Management Act 1997*;
- *Crown Lands Act 1989*;
- *Dams Safety Act 1978*;
- *Forestry Act 2012*;
- Mining Act;
- *Mine Subsidence Compensation Act 1961;*
- *Noxious Weeds Act 1993*;
- *Roads Act 1993*;
- *POEO Act;*
- Water Act; and
- WM Act.

The likely application of the key applicable acts: Mining Act, POEO Act, Forestry Act, Water Act and the WM Act are briefly described below.

4.4.1 Mining Act 1992

The mining of coal in NSW is regulated by the Mining Act. Under Section 5 of the Mining Act, mining can only be conducted in accordance with an authorisation for that mineral. The Project will therefore require a mining lease(s) encompassing all land where open cut and underground mining and associated activities will be undertaken.

Section 89K of the EP&A Act provides that a mining lease cannot be refused for any SSD that has been given development consent.

4.4.2 Protection of the Environment Operations Act 1997

The POEO Act establishes a licensing regime for pollution generating activities in NSW. Under section 48, an EPL is required for "*scheduled activities*", which includes coal mining. Accordingly, an EPL for the Project will be sought by KEPCO.

Pursuant to Section 89K of the EP&A Act, an EPL cannot be refused for any SSD that has been granted development consent.

4.4.3 Forestry Act 2012

The Forestry Act was recently enacted, superseding the *Forestry Act 1916*. The Project will involve mining beneath the Bylong State Forest. For the aspects of the Project that occur within the Bylong State Forest, KEPCO will require a "*Forest Permit*" under section 60 of the Forestry Act.

4.4.4 Water Act 1912 and Water Management Act 2000

The Water Act and WM Act establish licensing regimes for the management of water resources in NSW. The licensing and approvals provisions of the WM Act apply to water sources that are the subject of a Water Sharing Plan (WSP). The Water Act continues to apply to water sources that are not the subject of a WSP.

Water Access Licences

The Project will require a WAL under Part 2 of Chapter 3 of the WM Act for any water taken from a water source that is the subject of a WSP. The '*Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009*' (Hunter Unregulated WSP) is applicable to the Project.

The Hunter Unregulated WSP applies to 39 water sources in the Hunter region. The Project is situated entirely within the Bylong River Water Source. Clause 4(3) of the Hunter Regulated WSP provides that the plan applies to all naturally occurring water on the ground surface and all groundwater contained in the alluvial sediments. Therefore, a WAL is required for all surface runoff taken from the natural catchment and all groundwater taken from the alluvial aquifers within this catchment.

Water Act Licences

Clause 4(4) of the Hunter Regulated WSP states that the plan does not apply to water contained within the basement rocks. As a result, the licensing regime under the Water Act applies to any water taken from the Permian bedrock strata.

A bore licence under Part 5 of the Water Act will be required for groundwater taken in the form of inflows to mining areas from the bedrock strata.

Water Approvals

As discussed in **Section 4.1.6**, the following approvals under the WM Act will not be required if the Project is granted Development Consent under Division 4.1 of Part 4 of the EP&A Act:

- Water use approvals under section 89;
- Water management approvals under section 90; and
- Controlled activity approvals under section 91 of the WM Act.

However, the exemption under section 89J of the EP&A Act does not extend to aquifer interference approvals. Since the process of mining constitutes an aquifer interference activity, KEPCO will be required to obtain an aquifer interference approval under section 91 of the WM Act.

Aquifer Interference Policy

The NSW Aquifer Interference Policy (AIP) was released in September 2012. The AIP defines the requirements for obtaining aquifer interference approvals under section 91 the WM Act. The AIP applies to all land in NSW.

The AIP provides that an aquifer interference approval can only be granted if the Minister is satisfied that the activity will not cause more than minimal harm to any groundwater source. Groundwater sources are classified as either "*highly productive groundwater*" or "*less productive groundwater*". The minimal harm considerations differ for the two categories of groundwater sources. These "*minimal harm considerations*" are listed in Table 1 of the AIP.

An assessment of the Project's impacts against the minimal harm considerations will be included within the EIS. Water licensing and assessment is discussed further in **Section 7.10.3**.

4.5 RELEVANT COMMONWEALTH LEGISLATION

4.5.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) prescribes the Commonwealth's role in environmental assessment, biodiversity conservation and the management of protected areas.

The EPBC Act is administered by the Department of the Environment (DoE) (formerly Sustainability, Environment, Water, Populations and Communities (SEWPaC)) and provides protection for listed Matters of National Environmental Significance (MNES). There are currently nine MNES:

- World heritage properties;
- National heritage places;
- Wetlands of international importance;
- Listed threatened species and ecological communities;
- Listed migratory species;
- Protection of the environment from nuclear actions;
- Commonwealth marine areas;
- The Great Barrier Reef Marine Park; and
- Water Resources.

The Project is not within a World heritage property or place, does not have wetlands of international importance, does not relate to nuclear actions, and is not within either Commonwealth marine areas or the Great Barrier Reef.

The MNES of potential relevant to the Project include listed threatened species, ecological communities, migratory species and water resources.

Species and communities listed under the EPBC Act that are present or likely to be present in the vicinity of the Project must be identified. Additionally, the potential impacts upon water resources within the vicinity of the Project must be assessed.

A Referral including a supporting assessment of significance for each threatened species and community must be made to DoE to obtain confirmation of whether or not a Project constitutes a Controlled Action. Similarly, the Referral is likely to require the inclusion of information on the potential impacts that the Project may have upon water resources to confirm whether or not the Project constitutes a "*Controlled Action*".

The EPBC Act establishes an environmental assessment and approval process for "*controlled actions*". A controlled action is a proposed development or activity that will have, or is likely to have, a significant impact on MNES. The Commonwealth Minister for the Environment has the power to accredit the Environmental Impact Assessment process under the NSW EP&A Act to meet the assessment requirements of the EPBC Act.

However, the ultimate approval authority remains with the Commonwealth Minister for the Environment. The Controlled Action cannot be carried out until the Minister has granted approval under Section 133 of the EPBC Act.

5 STAKEHOLDER ENGAGEMENT

This section includes a description of the stakeholder engagement undertaken for the Project to date and a summary of the key consultation activities proposed for the EIS.

5.1 INTRODUCTION

KEPCO is strongly committed to undertaking a best-practice social impact assessment and ongoing stakeholder engagement activities with communities in which they operate. Key community, regulatory and industry stakeholders relevant to the Project have been identified by the Project team via a comprehensive Stakeholder Engagement Program to achieve these goals and will constantly endeavour to build strong and effective relationships, consistent with their policies and values.

5.2 EXISTING COMPANY ENGAGEMENT

Since acquiring A287 and A342, KEPCO has been undertaking active stakeholder engagement for the Project. This includes the appointment of a dedicated Community Liaison Officer in the Bylong area available to local residents and community groups. The intention of this accessible method of communication is to facilitate sharing of ideas and concerns in a mutually respectful way. Further, allowing the community to have an informed input into the Project will improve the relationship between the Project team and the community.

KEPCO has also been actively engaging with the immediate and wider community through the operation of a website dedicated to the Project. Regular newsletters and fact sheets which have been provided to local residents and community groups detailing information on the Project. Members of the local community, including students from the Upper Bylong School were invited to an open day on the Project site which included talks by senior staff members. KEPCO will continue to build their relationship with the local community by liaising with community groups in regard to their needs and any synergetic opportunities.

KEPCO is committed to incorporating community feedback into the refinement of the Project where economically feasible to do so. Further opportunities will be provided to stakeholders throughout the approval process to include input into the Project.

A summary of the stakeholder engagement activities undertaken to date is presented in **Table 7**.

Table 7
Stakeholder Engagement Activities to Date

Activity	Details
Stakeholder Engagement and Communications	• Project Newsletters and fact sheets • Regulatory required public notifications • State and Local Government briefings and meetings • Public Meetings • Open day (October 2011), October 2012 • Community Information Sessions (December 2013) • Community and Special Interest Groups (SIGs) presentations • Media Briefings • Website updates http://www.bylongproject.com.au/index.cfm/latest-news/latest-news/)
Stakeholder Involvement	• Individual landholder meetings / presentations • Community and NGO meetings / presentations • Website forms
Community Support and Assistance	• Bylong Mouse Race 2011 - 2013 • Rylstone Street Feast 2011 – 2013 • Rylstone Men's Shed 2012 - 2013 • Bylong Public School 2012 - 2013

5.3 EIS ENGAGEMENT

The objectives of the stakeholder engagement program for the Project are to:

- Engage with key stakeholders to identify potential issues and opportunities;
- Manage the current community awareness and expectations around the Project;
- Further develop cooperative landowner and community relationships;
- Enable stakeholders to have input to the preparation of the EIS and project planning;
- Consult proactively with stakeholders using clear and consistent key messages; and
- Facilitate the development and implementation of response and feedback strategies to address identified stakeholder concerns.

Relationships have been established and will continue to be developed with key stakeholders during the preparation of the EIS. The Project team will facilitate stakeholder feedback on the Project to ensure that stakeholder issues are adequately addressed through the Social Impact Assessment and EIS.

Relevant engagement methods which will be undertaken for different stakeholder groups are summarised in **Table 8** and discussed further below.

Table 8
Proposed Stakeholder Communication Methods

Stakeholders	Method
Government Agencies	• Briefings and Meetings • Newsletters and fact sheets
Relevant State & Federal MPs	• Briefings and Meetings • Newsletters and fact sheets
NGOs and Special Interest Groups	• Open days and public displays • Newsletters and fact sheets • Website feedback forms and Project information line (phone: 02 4033 4300) • Newspaper notices / media releases
Individual Neighbours	• Personal briefings and Interviews • Newsletters and fact sheets • Community Information Sessions, Open days and public displays • Information sessions • Website feedback forms and Project information line
Wider Community	• Newsletters and fact sheets • Open days and public displays • Website feedback forms and Project information line • Newspaper notices / media releases
Aboriginal Community	• Newspaper notices • Personal briefings • Newsletters and fact sheets • Open days and public displays • Website feedback forms and Project information line
Local Service Providers, business and industry associations	• Personal meetings • Newsletters and fact sheets • Website feedback forms and Project information line
Relevant Neighbouring mines and industry	• Producers Meeting presentations and updates • Newsletters and fact sheets

5.3.1 Regulatory Engagement

Face-to-face briefings and group presentations to State and Local Government agencies will continue to take place throughout the development of the Project. These presentations will be designed to provide Government stakeholders with an initial overview of the Project and to identify issues that will require assessment in the EIS.

5.3.2 Local Community Engagement

Engagement with the local community will continue to be undertaken for the Project during preparation of the EIS, with all relevant issues raised to be addressed, as practical. Information gathered during community engagement regarding the Project will assist in informing Project planning and developing appropriate management and mitigation strategies to address issues of concern and relevance to the local community.

Initial briefings have been undertaken with near neighbours in relation to the Project description and the intention to lodge a Gateway Application. Ongoing briefings will be offered to near neighbours to discuss the Project via a Newsletter, where information will be provided to collate issues of concern to the community. Where required, further consultation meetings will be offered to provide feedback on the EIS and to obtain additional community input.

The analysis of community issues and responses through the EIS process is essential in ensuring that relevant issues are identified and evaluated in the EIS. During this process appropriate strategies will be developed to minimise negative impacts and / or enhance the positive impacts associated with the Project.

Newsletters will be regularly distributed to stakeholders to complement the engagement program and provide regular updates on key Project and EIS milestones. Regular website updates will also be used in this regard.

6 ENVIRONMENTAL RISK ASSESSMENT

To assist in identifying the key environmental and social issues for the Project, a preliminary environmental risk assessment was completed utilising Cockatoo Coal's Risk Assessment Tools which are according to the relevant Australian Standards. This preliminary risk assessment is presented in full in **Appendix A** and a summary is provided in **Table 9**.

The potential environmental issues identified to date have been ranked in accordance with the relevant Coal Risk Matrix as either being of low, medium, high or extreme risk (in the absence of controls). The initial findings of the risk assessment will be used to prioritise and focus the Project assessments. Additionally, the findings of the risk assessment will ensure that appropriate management and mitigation options are developed and that each environmental issue is addressed to a relevant extent.

The majority of activities are rated high to moderate level risks (in the absence of controls). No extreme risks were identified. It is anticipated that with the completion of a detailed assessment in the EIS as outlined in **Section 7**, any high risks will be reduced to medium or low, due to the identification and implementation of appropriate controls and mitigation measures.

Table 9
Summary of Environment Risk Assessment

Category	Issues
Extreme	None
High	o Subsidence o Ecology o Non-Indigenous Heritage o Aboriginal Archaeology and Cultural Heritage o Air Quality o Noise and blasting o Agriculture (including impacts on SAL) o Visual and Lighting o Surface Water o Groundwater o Economics o Traffic and Transport.
Medium	o Greenhouse Gas o Social o Soils and Land Capability o Rehabilitation and Final Land Use and Closure o Geochemistry o Spontaneous Combustion o Waste and Contamination o Hazardous Analysis o Stygofauna o Bushfire o Cumulative Impacts
Low	None

7 KEY ENVIRONMENTAL AND COMMUNITY ISSUES

This section outlines the key environmental and community issues associated with the Project. Each is briefly discussed which will be subject to investigation, assessment and mitigation in the Bylong Coal Project EIS.

7.1 SUBSIDENCE

7.1.1 Background

The Project Boundary is located within the Bylong River Valley which comprises of undulating to flat valley floors, utilised largely for agricultural purposes. Towards the southern end of the Project Boundary, the terrain varies from undulating hills to very steep slopes and cliff lines in the area adjacent to the Wollemi National Park.

The mine plan for the Project was prepared in conjunction with Mine Subsidence Engineering Consultants Pty Ltd (MSEC) to ensure subsidence related impacts were minimised. Preliminary modelling works identified surface and subsurface features within the Project Boundary which are sensitive to subsidence impacts.

The design of the mine plan has been formulated to reduce the subsidence effects and the associated impacts on the identified sensitive surface features by restricting underground mining to areas outside the valley floors, areas of SAL and creek and river systems. Further, the orientation of the longwall panel layout reduces the effects of subsidence on sensitive surface features (for example cliff lines and alluvial land).

7.1.2 Potential Impacts

The preliminary environmental risk assessment (**Appendix A**) identified the key potential for subsidence impacts due to mining activity within the Project Boundary to (at least) the following features:

- Water resources (including rivers or creeks, aquifers or known groundwater resources, land prone to flooding or inundation, swamps, or water-related ecosystems);
- Natural features (including the Bylong State Forest, cliffs or natural rock formations and escarpments);
- Flora and fauna;
- Aboriginal and Non-Indigenous heritage;
- Transport infrastructure (including roads and the Sandy Hollow-Gulgong Railway Line);
- Water infrastructure (including pipelines and dams);
- Electricity and telecommunications infrastructure;
- Public amenities;
- Commercial sites;

- Rural infrastructure;
- Residences;
- National Parks and State Forests; and
- Recreational facilities.

7.1.3 Assessment Methodology

A detailed Subsidence Impact Assessment will be conducted for the Project by MSEC. The scope of assessment will include:

- Overview of the longwall extraction process;
- Consideration of the relevant geological, geotechnical and structural characteristics in the Project Boundary;
- Identification of potential risks and constraints associated with subsidence due to the Project;
- Modelling of subsidence behaviour using the empirically-based Incremental Profile Method (IPM) and numerical modelling of the specific Project geology and rock behaviour/ response in relation to subsidence;
- Consideration of and prediction of systematic (vertical subsidence, tilting and strains) and non-systematic (far field movements, upsidence and closure, rock mass disturbance) subsidence movements;
- Evaluation of alternative mine layouts in an iterative mine design process;
- Review of the relevant statutory context, including relevant Mine Subsidence Districts (MSDs), subsidence criteria and guidelines, the role of the Mine Subsidence Board (MSB) and the legislation it administers, and the Subsidence Management Plan Process;
- Consideration of subsidence effects, impacts and consequences in the overall Project environmental assessment and the integration with other key environmental assessment areas such as groundwater, flooding and ecology;
- Assessment of impacts on natural and man-made features, houses, structures, other improvements, soils, steep areas and other natural features, roads, transmission lines, communication cables, other public infrastructure, etc.;
- Mediation and other management requirements;
- Monitoring requirements, model validation and adaptive management;
- Subjected to a comprehensive independent peer review; and
- Identification of any necessary impact mitigation and management measures.

The subsidence data will be used to inform accompanying environmental assessments for the EIS, including the groundwater, surface water and flooding, Aboriginal and Non-Indigenous Heritage and Ecology Impact Assessments.

7.2 ECOLOGY

7.2.1 Background

The vegetation within the Project Boundary has been extensively modified by historic clearing and ongoing agricultural activities. Vegetation communities include intact patches of native woodland and forest, partially disturbed woodland remnants, derived native grassland with remnant trees, exotic grassland and cropland. The most extensive and highest quality native vegetation remnants occur in the Bylong State Forest and some surrounding areas on sandstone lithology. Areas within the Bylong State Forest are likely to have been selectively logged in the past for old growth timber. Other nature conservation estates occurring in proximity to the Project Boundary include Wollemi National Park to the immediate east and south and Goulburn River National Park to the immediate north.

Field surveys have been undertaken by Cumberland Ecology (2012 – 2013) and Eastcoast Flora Survey (2011 – 2013). Further assessment will be completed for inclusion in the EIS to determine the impacts of the Project upon ecological communities, threatened flora and threatened fauna. A brief summary of the key findings to date is provided below.

Flora

Approximately 420 flora species have been identified within the Project Boundary to date. These comprise of 355 native flora species and 65 introduced species within the Project Boundary. The most frequently recorded canopy species were *Eucalyptus albens* (White Box) and *Eucalyptus dawsonii* (Slaty Gum). The most commonly recorded understorey species across quadrats were the shrubs *Dodonaea viscosa* (Sticky Hop-bush), *Acacia ixiophylla* (Sticky-leaved Wattle) and *Cassinia quinquefaria*, the herbs *Dichondra repens* (Kidney Weed), *Calotis lappulacea* (Yellow Burr-daisy), *Einadia hastata* (Berry Saltbush), the graminoids *Austrostipa scabra* (Speargrass), *Gahnia aspera* (Rough Saw-sedge), *Aristida ramosa* (Purple Wiregrass) and the fern *Cheilanthes sieberi*.

Table 10 lists threatened flora species which have been detected within the Project Boundary. The Project Boundary also supports suitable habitat for a suite of threatened flora species known from the locality.

Table 10
Threatened Flora Species Detected within the Project Boundary

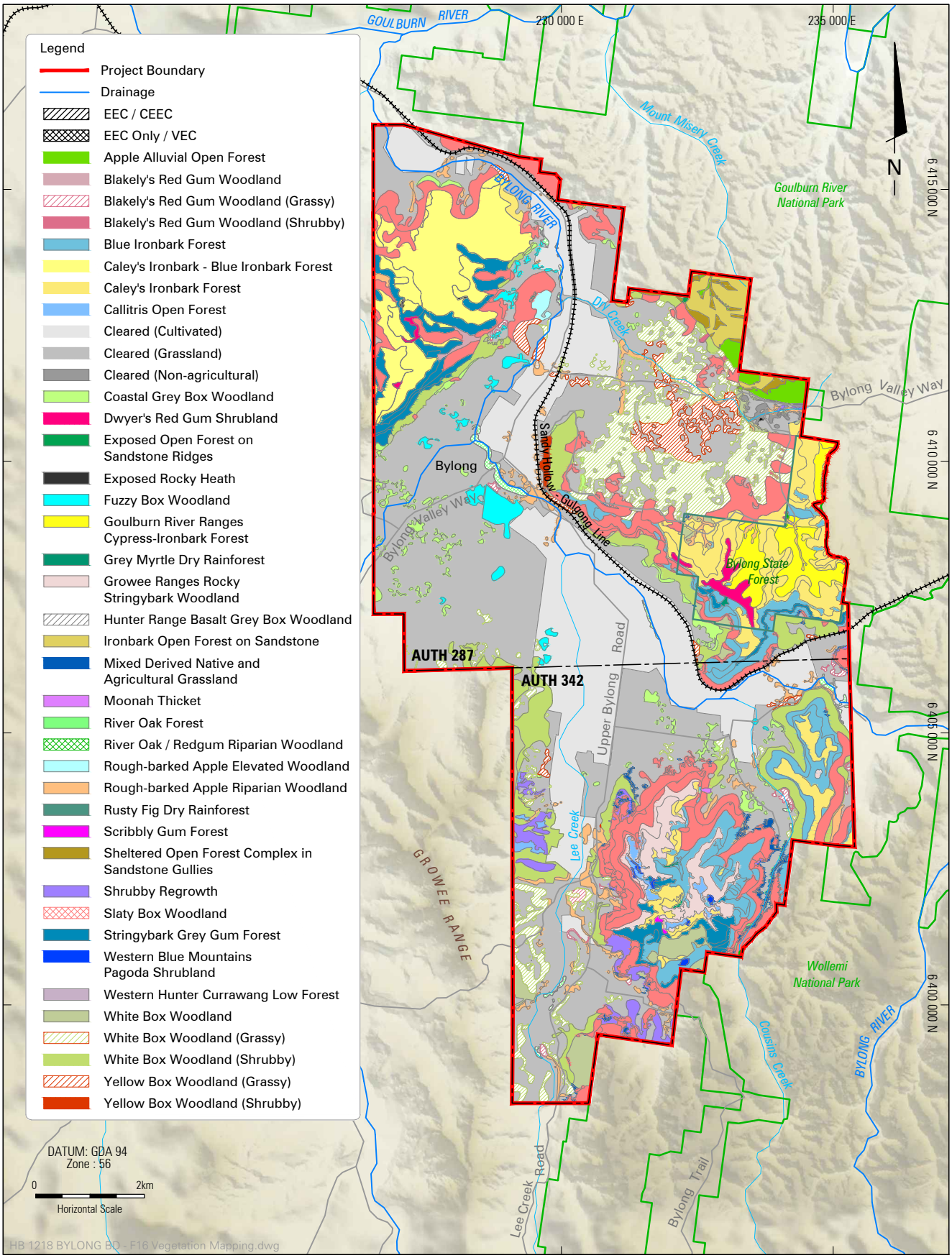
Scientific Name	Common Name	TSC Status	EPBC Status
Diuris tricolor	Pine Donkey Orchid	Vulnerable. Endangered Population in Muswellbrook LGA	None
Ozothamnus tesselatus	N/A	Vulnerable	Vulnerable
Tylophora linearis	N/A	Vulnerable	Endangered
Cymbidium canaliculatum	Tiger Orchid	Endangered Population	None
Eucalyptus camaldulensis	River Red Gum	Endangered Population	None

Vegetation Communities

Field surveys have been undertaken to preliminary identify the vegetation communities within the Project Boundary. The vegetation communities within the Project Boundary and the status of each under the *Threatened Species Conservation Act 1995* (TSC Act) or EPBC Act, respectively is presented in **Table 11**. Preliminary vegetation mapping is depicted on **Figure 16**.

Table 11
Vegetation Communities within the Project Boundary

Specific Vegetation Community Names	TSC Status	EPBC Status
Yellow Box Woodland Grassy	Endangered	Critically Endangered
White Box Woodland Grassy	Endangered	Critically Endangered
Slaty Box Woodland	Vulnerable	Not Listed
River Oak/ Red Gum Riparian Woodland	Endangered	Not Listed
Blakely's Red Gum Woodland Grassy	Endangered	Critically Endangered
Rusty Fig Dry Rainforest	Not Listed	Not Listed
Caley's Ironbark Forest	Not Listed	Not Listed
Red Ironbark / Cypress Forest	Not Listed	Not Listed
Coastal Grey Box Woodland	Not Listed	Not Listed
Moonah Thicket	Not Listed	Not Listed
Rough-barked Apple Woodland Elevated and Riparian	Not Listed	Not Listed
Callitris Open Forest	Not Listed	Not Listed
Callitris Shrubby Regrowth	Not Listed	Not Listed
Yellow Box Woodland Shrubby	Not Listed	Not Listed
White Box Woodland Shrubby	Not Listed	Not Listed
Blakely's Red Gum Woodland Shrubby	Not Listed	Not Listed



BYLONG COAL PROJECT

Preliminary Vegetation Mapping

FIGURE 16

Fauna

Current surveys within the Project Boundary have indicated a moderate diversity of fauna species including 111 bird species, five frog species, 23 mammal species and six reptile species. Results of the ongoing fauna surveys within the Project Boundary will be provided within the EIS.

Table 12 presents the threatened fauna species detected within the Project Boundary to date. Analysis of bat calls has also indicated the potential presence of the following threatened bats:

- Corben's Large-eared Bat (EPBC Act: Vulnerable; TSC Act: Vulnerable);
- Greater Broad-nosed Bat (EPBC Act: not listed; TSC Act: Vulnerable); and
- Eastern Cave Bat (EPBC Act: not listed; TSC Act: Vulnerable).

The Project Boundary also supports suitable habitat for a suite of threatened fauna species known to occur in the locality. Threatened fauna species known to occur or with the potential to occur will be the subject of detailed assessments within the EIS.

Table 12
Threatened Fauna Species within the Project Boundary

Scientific Name	Common Name	TSC Status	EPBC Status
Birds			
Chthonicola sagittata	Speckled Warbler	Vulnerable	N/A
Stagonopleura guttata	Diamond Firetail	Vulnerable	N/A
Circus assimilis	Spotted Harrier	Vulnerable	N/A
Climacteris picumnus victoriae	Brown Treecreeper	Vulnerable	N/A
Calyptorhynchus lathami	Glossy Black-cockatoo	Vulnerable	N/A
Melanodryas cucullata	Hooded Robin	Vulnerable	N/A
Melithreptus gularis	Black-chinned Honeyeater	Vulnerable	N/A
Merops ornatus	Rainbow Bee-eater	N/A	Migratory
Glossopsitta pusilla	Little Lorikeet	Vulnerable	N/A
Anthochaera phrygia	Regent Honeyeater	Critically Endangered	Endangered
Neophema pulchella	Turquoise Parrot	Vulnerable	N/A
Pomatostomus temporalis	Grey-crowned Babbler	Vulnerable	N/A
Mammals			
Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	Vulnerable
Petrogale penicillata	Brush-tailed Rock Wallaby	Endangered	Vulnerable

Scientific Name	Common Name	TSC Status	EPBC Status
Miniopterus schreibersii oceanensis	Eastern Bent-wing Bat	Vulnerable	N/A
Pseudomys novaehollandiae	New Holland Mouse	N/A	Vulnerable
Saccolaimus flaviventris	Yellow-bellied Sheathtail Bat	Vulnerable	N/A

Aquatic Species and Habitat

Freshwater habitats in the Project Boundary include ephemeral creeks, drainage lines and farm dams. The drainage lines within the Project Boundary have no visible riparian or aquatic habitat. Many of the dams observed feature little aquatic and semi-aquatic vegetation and are surrounded by cleared land. However, there are some soaks that do contain some aquatic vegetation.

An aquatic survey is proposed to be undertaken within the Project Boundary including habitat assessments, in-situ water quality measurements and macro invertebrate samples at designated sites.

7.2.2 Potential Impacts

Specific potential flora and fauna impacts identified in the preliminary environmental risk assessment (see **Appendix A**) include direct and indirect disturbance including:

- Clearance of vegetation within the proposed mining and infrastructure areas;
- The displacement and/or modification of faunal communities and therefore increased competition for habitat in the surrounding environment; and
- Modification of vegetation and habitat features resulting from subsidence.

7.2.3 Assessment Methodology

An Ecological Impact Assessment will be completed for the Project by Cumberland Ecology in accordance with Office of Environment & Heritage's (OEH) *Draft Guidelines for Threatened Species Assessment* (DEC, 2005) and various Commonwealth assessment requirements including DoE's guidelines for identifying the White box – Yellow box – Blakeley's Red Gum Grassy woodlands and Derived Native Grasslands (DEH, 2006).

Field surveys for flora and fauna have commenced across the Project Boundary. These will continue, with the detailed data presented in the EIS.

The scope of the Ecological Impact Assessment will include:

- A desktop review of relevant databases and extensive available literature to identify flora and fauna species and vegetation communities with a potential to occur within the Project Boundary;

- Seasonal field surveys of vegetation communities, flora and fauna (terrestrial and aquatic) and habitat condition across the Project Boundary to comply, where possible, with OEH's and DoE's recommendations for survey;
- Mapping the distribution of vegetation communities within the Project Boundary and provision of floristic descriptions;
- Targeted searches for threatened species, populations and communities (as listed under the schedules of the TSC Act and EPBC Act) that may potentially occur in the Project Boundary;
- Targeted habitat assessments within the Project Boundary;
- Assessment of impacts on listed vegetation communities and threatened flora and fauna species;
- Identification of any impact avoidance, mitigation and offset measures necessary for the Project; and
- Surveys of potential offset areas and development of any required offset strategy.

As described in **Section 4.5.1**, an EPBC Referral will be submitted to DoE for determination.

7.3 NON-INDIGENOUS HERITAGE

7.3.1 Background

William Lawson and James Blackman were the first Europeans to explore the Bylong District setting out from Bathurst in 1822 heading out along the Goulburn River. For much of its early history, land within the Bylong Valley was occupied by a handful of pioneering families with the two most significant being the Lee and Tindale families.

Historical land settlement throughout the Bylong Valley was dominated by pastoral activities. Initially sheep were grazed throughout the area; however the region was soon recognised for its potential for cattle and thoroughbred horses. Further the Bylong Valley is well known for its production of crops such as lucerne, rye prairie and English grasses.

Land use in the Bylong Valley has remained unchanged from the 1830s and still retains its pastoral focus. Aside for a commercial cheese factory in the early twentieth century and the various general stores, commercial developments in Bylong Valley have been limited. The construction of civic buildings has also been limited, having been confined to churches, public halls and schools.

7.3.2 Potential Impacts

Potential impacts on Non-Indigenous heritage items identified in the preliminary field works include the removal of archaeological sites and items within areas of direct and indirect disturbance within the Project Boundary.

The locations of preliminary historic items have been identified from a variety of sources including Register of the National Estate; Commonwealth Heritage List; National Heritage List; NSW State Heritage Register; NSW State Heritage Inventory; and Mid-Western LEP.

The preliminary review of available data indicates that the following known historic sites (with relevant listing) are likely to be directly and/or indirectly impacted by the Project:

- Former Bylong Catholic Church and associated Cemetery located on Upper Bylong Road which is listed under the State Heritage Register and National Trust of Australia; and
- Bylong St Stephen's Anglican Church Cemetery located on Bylong Valley Way which is listed under the State Heritage Register and National Trust of Australia.

Additional to these sites with heritage listing, the following historic heritage sites have been identified within the vicinity of the Project and may potentially be affected by the Project:

- Lee Homestead, a disused derelict brick building on Bylong Valley Way adjacent to the intersection with Upper Bylong Road which is believed to be constructed around 1830s;
- Tarwyn Park Stud located on Upper Bylong Road and is believed to have been constructed around 1915;
- Remains of the former Bylong Upper Provisional/Public School which was relocated in 1927; and
- Bylong Upper Hall which is located on Upper Bylong Road in the vicinity of the Bylong Public School and is believed to be constructed in 1920s.

In August 2013, the National Trust listed the Bylong Valley as the Bylong Landscape Conservation Area. The listing report outlines its significance as "*prime agricultural land with a rural landscape of exceptional scenic value*". The report also notes the scientific significance resulting from the implementation of the Natural Sequence Farming (National Trust, 2013).

The effect of subsidence to the identified items and/or structures will be further assessed for inclusion within the EIS to determine the impacts of the Project on Non-Indigenous heritage.

7.3.3 Assessment Methodology

A Non-Indigenous Heritage Impact Assessment will be completed by AECOM for the Project in accordance with the relevant guidelines, Heritage Act, and other legislation (in particular the standards of the Heritage Branch of OEH). The scope of the assessment will include:

- A review of any relevant existing heritage assessment reports and other sources of information regarding heritage items in the region;
- An updated search of the following registers for heritage inventories: Register of the National Estate; Commonwealth Heritage List; National Heritage List; NSW State Heritage Register; NSW State Heritage Inventory; and Mid-Western LEP;
- A field survey of the Project Boundary, with an emphasis on sites identified during preliminary research and areas with archaeological potential and the recording of any items located;

- Field surveys to include visits to local historical societies, libraries, registered historic sites and transect surveys of direct disturbance areas and identified areas of potential archaeological sensitivity;
- Field surveys and further investigations in relation to the grounds surrounding the former Bylong Catholic Church and associated Cemetery;
- Assessment of the heritage significance of identified items within the Project Boundary;
- Preparation of a Non-Indigenous Heritage Impact Assessment for the Project which considers the potential for impacts on any significant adjacent heritage items;
- Preparation of an oral history report section, based on consultation completed with local stakeholders; and
- Identification of any necessary impact mitigation and management measures.

7.4 ABORIGINAL ARCHAEOLOGY AND CULTURAL HERITAGE

7.4.1 Background

An Aboriginal Heritage Information Management System (AHIMS) database search was undertaken for the Project Boundary and a 1 km buffer. These searches revealed 117 registered sites in the vicinity of the Project Boundary.

A desktop review of all available previous archaeological survey reports for areas within and immediately surrounding the Project Boundary revealed 61 recorded sites. The 61 sites consist of 46 artefact sites (artefact scatters and potential archaeological deposits), 14 isolated finds, 1 scar tree and 1 grinding groove as shown in **Table 13**.

Table 13
Desktop and AHIMS Search Results

Site Type	Occurrence
Potential Archaeological Deposit / Artefact Scatter	45
Isolated Find	14
Scar Tree	1
Grinding Groove	1
TOTAL	**61**

7.4.2 Potential Impacts

Potential impacts on Aboriginal Archaeology and Cultural Heritage identified in the preliminary environmental risk assessment include the removal of archaeological sites and items within the proposed direct disturbance areas and those within the zones of subsidence.

This will include those sites that have been previously identified along with those that have been identified during further surveys proposed for the Project.

7.4.3 Assessment Methodology

The Aboriginal Archaeology and Cultural Heritage Impact Assessment for the Project will be conducted by RPS Australia Asia Pacific (RPS). Consultation will be undertaken in accordance with the '*Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW*' (OEH, 2011a), the '*Code of Practice for Archaeological Investigations of Aboriginal Objects in NSW*' (OEH, 2010b) and the '*Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*' (DECCW, 2010).

The proposed scope of the Aboriginal Archaeological and Cultural Heritage Impact Assessment includes:

- Desktop review, including AHIMS database search, Native Title Search, and a review of previously completed studies conducted in the area to assist in the development of a predictive model;
- A field-based Aboriginal Archaeological and Cultural Heritage Impact Assessment with members of the local Aboriginal community. The fieldwork will focus on identifying any sites of Aboriginal Cultural Heritage within the proposed disturbance area, the zone of subsidence, and revisiting existing sites registered on the AHIMS database. All Aboriginal archaeological sites identified during the survey were recorded to the standard required by the '*Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW*' (OEH, 2010b);
- Preparation of an Aboriginal Archaeology and Cultural Heritage Impact Assessment to meet the OEH guidelines and provide to the local Aboriginal community for comment. This will include an assessment of any additional Aboriginal Cultural Heritage issues or places identified during the field work;
- Aboriginal stakeholder consultation in accordance with the OEH's '*Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*';
- Investigate and assess Aboriginal Cultural Heritage (social, historical, scientific and aesthetic values) associated with the Project Boundary, in accordance with the OEH Cultural Heritage Guidelines; and
- Development of appropriate management and mitigation strategies for any Aboriginal Archaeology and Cultural Heritage sites that are identified to be directly or indirectly disturbed.

7.5 AIR QUALITY AND GREENHOUSE GAS

7.5.1 Background

The existing air quality within and surrounding the Project Boundary is consistent with a typical rural environment dominated with grazing land. Currently contributors to the local air quality include vehicles (including agricultural plant, traffic on Bylong Valley Way and rail traffic on the Sandy Hollow-Gulgong Railway Line), agricultural activities and quarry emissions.

Baseline air quality is currently being monitored (see **Figure 5**) in accordance with the relevant NSW Environmental Protection Agency (EPA) approved method. The Project's air quality monitoring network currently consists of five deposition gauges and one TEOM. Monitoring from these sites is available from March 2012 for dust deposition and from August 2011 for PM_{10} and $PM_{2.5}$. Wind patterns are aligned along the north-west to south-east axis across all seasons which are representative of the topography of the region.

7.5.2 Potential Impacts

Potential air quality (dust and NO_X), spontaneous combustion and greenhouse gas impacts as a result of the Project include:

- Dust generation from land disturbance (vegetation clearing and topsoil stripping);
- Dust generation from mining activities (blasting, loading and movement of haul trucks, overburden emplacement, in pit activities, coal processing and transportation);
- Emissions from ventilation equipment;
- Short-term dust impacts associated with construction activities;
- Greenhouse gas emissions (Scope 1 and 2) as a result of the mining operations and the associated use of energy by mining equipment and coal processing infrastructure;
- Greenhouse gas emissions (Scope 3) as a result of non-mining activities at the site and in the combustion of product coal in the energy generation process; and
- Emissions of odorous gases from spontaneous combustion and ventilation shafts.

7.5.3 Assessment Methodology

An Air Quality and Greenhouse Gas Impact Assessment will be conducted for the Project in accordance with '*Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*' (Approved Method) (DEC, 2005b), '*International Best Practice Measures to Prevent and / or Minimise Emissions of Particulate Matter from Coal Mining*' (Katestone Environmental, 2010) and the Australian Greenhouse Office's '*Factors and Methods Workbook*' (AGO, 2005).

The scope of assessment will include:

- A review of local meteorological data (including wind speed and direction, temperature, humidity, rainfall and evaporation);
- A review of background ambient air quality monitoring data to identify representative values for existing background dust deposition, PM_{10}, $PM_{2.5}$ and Total Suspended Particulates for relevant averaging periods;
- Development of a predictive air quality model (using CALPUFF) to assess air quality impacts associated with the Project (and cumulatively with other approved and developments for which an EIS is published and available) against regulatory criteria;
- An assessment of the potential for dust generation associated with construction activities;

- An assessment of cumulative air quality impacts with surrounding (and proposed) mining operations and industry;
- Review and recommendations to enhance the existing monitoring network;
- An assessment of potential spontaneous combustion impacts and emissions, if relevant;
- An assessment of potential Scope 1, 2 and 3 greenhouse gas emissions; and
- The identification of appropriate best-practice management and mitigation measures in relation to dust, greenhouse gas and spontaneous combustion as required.

7.6 NOISE AND BLASTING

7.6.1 Background

The Project is located within the Bylong Valley which is a rural area primarily used for agricultural purposes. Industrial noise from the Bylong Quarry which operates in the north-east of the Bylong Valley can occasionally be heard.

The Sandy Hollow–Gulgong Railway Line runs through the northern part of the Project Boundary which is primarily used to carry freight trains from the mines further west to the Port of Newcastle. Bylong Valley Way and Upper Bylong Road are considered important travel routes within NSW, however neither route is a significant goods transportation route and as such truck movements along the roads are not a significant contributor to noise and vibration levels.

The Project is located adjacent to the Mt Penny Coal Project, which is proposed as an open cut mining operation. Cumulative noise impacts are expected to be minimal as a consequence of topography of the Bylong Valley and the distance between the noise sources.

A campaign of seasonal noise monitoring is currently being undertaken. Five periods of noise monitoring have occurred from autumn 2012 to autumn 2013 in five locations within the Project Boundary. This monitoring will be continued and utilised in the noise assessment for the EIS.

7.6.2 Potential Impacts

Potential noise and blasting impacts as a result of the Project (as identified in the preliminary environmental risk assessment (**Appendix A**)) include:

- Noise generated by construction and operational activities, including operation of mobile and fixed infrastructure and equipment required for the Project;
- Blasting impacts on neighbouring sensitive receivers, public infrastructure and natural features;
- Noise associated with the transport of coal along the proposed rail spur and loop;
- Traffic noise associated with the transport of construction materials, personnel, consumables, and waste materials to and from site;
- Noise generation associated with short term construction activities; and
- Cumulative noise impacts with surrounding industry.

7.6.3 Assessment Methodology

A Noise and Blasting Impact Assessment will be conducted for the Project by Pacific Environment Limited. The scope of assessment will include:

- Assessment of site meteorology and background noise levels to determine the likely criteria for the Project;
- Predictive noise modelling of the Projects infrastructure in accordance with the INP for both construction and operational activities, including sleep disturbance impacts;
- Assessment of road traffic noise in accordance with EPA's '*NSW Road Noise Policy*' (2011) and '*Rail Infrastructure Noise Guideline*' (2013);
- A qualitative assessment of rail noise from the rail spur and loop to the junction of the Sandy Hollow–Gulgong Railway Line;
- Assessment of blasting and vibration impacts at sensitive receptors, neighbouring infrastructure and sensitive natural features;
- Assessment of cumulative noise and blasting impacts;
- The identification of noise and blasting mitigation and management measures; and
- A recommended post approval management and monitoring program.

7.7 AGRICULTURE

7.7.1 Background

As described in **Section 2.5**, the Project Boundary mainly contains land that has been impacted by historical agricultural pursuits involving land clearing, with native vegetation predominately remaining within the Bylong State Forest and other Crown Lands.

As part of the NSW Government's SRLUP, all new coal applications must be accompanied by an Agricultural Impact Statement. DP&I has released the '*Strategic Regional Land Use Policy Guideline for Agricultural Impact Statement guidelines*' (Agricultural Impact Statement Guidelines) (DP&I, 2012) in this regard. The Agriculture Impact Statement for the Project is to be completed in accordance with the:

- '*Agricultural Impact Statement Guidelines*' (DP&I, 2012);
- NSW Agriculture Fact Sheet '*Agfact AC25: Agricultural Land Classification*' (NSW Agriculture); and
- SRLUP.

Consideration of the Gateway Certificate conditions will also be incorporated into the scope of the Agricultural Impact Statement as described in **Section 4.2.1**.

7.7.2 Potential Impacts

The specific impacts on agriculture productivity identified in the preliminary environmental risk assessment (see **Appendix A**) include the loss of agricultural land.

7.7.3 Assessment Methodology

An Agricultural Impact Assessment will be completed for the Project in accordance with DP&I's *Strategic Regional Land Use Policy Guideline for Agricultural Impact Statement* (DP&I, 2012).

The scope of assessment will include:

- A detailed assessment of the agricultural resources and agricultural production potential of the Project Boundary and surrounds;
- Identification of the agricultural resources and current agricultural enterprises within the surrounding locality of the Project;
- Identification and assessment of the impacts of the Project on agricultural resources and industries (including cumulative impacts);
- Accounting for any physical movement of water away from agriculture due to the Project;
- Assessment of socio-economic impacts;
- Identification of options for minimising adverse impacts on agricultural resources, including agricultural land, enterprises and infrastructure at the local and regional level;
- Consultation with adjoining land users and Government departments;
- Consideration of the Gateway Process criteria; and
- Development of appropriate management and mitigation measures particularly pertaining to BSAL and CIC.

7.8 VISUAL AND LIGHTING

7.8.1 Background

The existing visual environment of the locality is consistent with that of a rural area. The topography of the Project Boundary includes flat, alluvial floodplains along the Bylong River, surrounded by steep topography and rocky escarpments associated with the Great Dividing Range. Land within the Project Boundary contains cleared grazing areas whilst also including parcels of native vegetation.

Private residences which have been recognised as visually sensitive receivers are located in the north-west and south-east of the Project Boundary. This includes residences located within the small village of Bylong. The visual impact of the Project from a number of viewing locations will likely be decreased by the natural topography of the region, as certain sections of steep topography and rocky escarpments block views to proposed activities within the Project Boundary. The natural topography has been utilised throughout the mine planning process to limit visual impacts of the Project to sensitive viewing locations.

Potential visual impacts of the Project include development of Open Cut Mining Areas, OEAs and construction and operation of the mining related infrastructure (including lighting impacts). The OEAs and open cut mining areas have been designed to minimise visual impacts. Materials and colour schemes utilised during the construction of the infrastructure will be designed as to best replicate natural features to lessen the visual impact.

7.8.2 Potential Impacts

During the design of the Project infrastructure area, mine planners and engineers designed the infrastructure area to be as visually pleasing to sensitive receptors, as far as practicable. Despite this, some views of the infrastructure will be available from areas surrounding the Project; however, it is considered that with ongoing consultation, technical review and liaison, additional mitigation strategies can be developed and implemented to result in an acceptable visual impact.

7.8.3 Assessment Methodology

The Visual Impact Assessment will be completed for the Project by Integral. The scope of the assessment will include;

- Characterisation of the existing visual environment and landforms;
- Identification of sensitive view sheds (including nearby residences);
- Assessment of the visual sensitivity of the view sheds;
- Review of the mine plan to recommend any suggested additional mitigation measures to be incorporated into it;
- Assessment of potential impacts due to night lighting;
- Development of a 3D digital terrain model incorporating photomontages at relevant locations;
- Assessment of the degree of visual landscape alteration that the Project would have on sensitive view sheds; and
- Identification of any onsite and offsite mitigation measures necessary for the Project.

7.9 SURFACE WATER AND FLOODING

7.9.1 Background

The Project is located within the Bylong River catchment, part of the Goulburn River sub-catchment of the larger Hunter River catchment. The Bylong River drains generally northwards, from the south-east, through the Project Boundary before meeting with the Goulburn River approximately 2.5 km to the north of the Project Boundary. The Goulburn River flows towards the east into the Hunter River approximately 3 km to the south of Denman which is approximately 50 km east of the Project Boundary (see **Figure 2**).

A number of smaller tributaries feed the Bylong River within the Project Boundary as illustrated on **Figure 6**, including:

- Wattle Creek;
- Cousins Creek;
- Lee Creek;
- Growee River;
- Dry Creek; and
- Coggan Creek.

The drainage network within the Project Boundary varies from the steep headwater gullies to wide, flat, alluvial floodplains.

As explained in **Section 2.9**, surface water monitoring has been undertaken at a number of locations since early 2012. The surface water monitoring program has recorded salinity, pH, temperature, dissolved oxygen, turbidity, alkalinity as well as a number of metals and organic compounds. The monitoring has shown that the Bylong River is slightly alkaline, with electrical conductivity (salinity) ranging from fresh to brackish, with the fresher water within the upper reaches.

Similarly, Lee Creek and Dry Creek are slightly alkaline with generally fresh water. The Growee River sampling location has been dry for samples.

Streamflow monitoring data for the Bylong River is available at the Bylong No.2 Stream Gauge (Station No. 210062) (see **Figure 6**) for the period between November 1969 and April 1979. This stream gauge is located within the Project Boundary, approximately 8.5 km upstream of the confluence of the Bylong River with Goulburn River and has a catchment area of approximately 660 km^2. This data shows that the Bylong River contained some flow for 98% of the time, with a flow of more than 1 ML/day for around 89% of the time.

Since the Bylong River and associated tributaries flow through the Project Boundary, there is the potential for flooding impacts with the Project following periods of significant regional and local rainfall events.

7.9.2 Potential Impacts

Potential impacts in relation to surface water resulting from the Project have been identified through the risk assessment and generally relate to the onsite management of surface water, sediment and erosion control and the potential for flooding impacts. Due to the close proximity of the Project to the Bylong River and associated tributaries, there is potential for the Project to impact upon flow volumes and water quality within these systems.

The surface water impacts that have been identified within the preliminary environmental risk assessment (**Appendix A**) include:

- Potential for increased turbidity and sedimentation resulting in impacts to water quality downstream;
- Potential for additional demands on existing water sources;

- Changes to the catchment areas, with consequent impacts on catchment yields and drainage downstream of the site;
- Potential impacts to other licensed users of surface water sources;
- Any requirement for discharge of surplus water, with potential consequent impacts on downstream water quality and quantities; and
- Post-mining surface water impacts on catchment yields, water quality and quantity.

7.9.3 Assessment Methodology

A relevant Surface Water and Flooding Impact Assessment will be completed for the Project by WRM Water and Environment. The scope of this assessment will include:

- Assessment of the existing surface water environment including major flow paths, drainage, water storage locations, water quality and downstream water usage;
- Preparation of a site water balance and the identification of preliminary water demands and management requirements;
- Development of a mine water management system (including the consideration of a range of water management scenarios);
- Assessment of impacts on downstream catchment yields and drainage structures;
- Assessment of the potential for any other surface water impacts and potential for flooding;
- Identification of any necessary impact mitigation measures; and
- A recommended post approval groundwater management and monitoring program.

7.10 GROUNDWATER

7.10.1 Background

Hydrological investigations and monitoring of the Project Boundary have occurred since December 2011. The monitoring program shown on **Figure 6** was developed in consultation with NSW Office of Water (NOW) to obtain a detailed understanding of the hydrogeological environment to simulate possible groundwater impacts due to the Project.

The fieldwork that has been completed to date has indicated that the alluvium in the valley floors is predominately permeable sand and gravel that provide a source of water for the majority of registered groundwater bores in the region. Hydraulic testing suggests that the permeability of the alluvium is high.

The groundwater regime at Bylong has been identified to consist of the following aquifer systems:

- Weathered Permian formation aquifer which ranges across the Project Boundary from 5 m to 30 m in thickness. This zone of weathering has the potential to act as a conduit for groundwater depressurisation, a consequence of the increased permeability of the weathered rock matrix;

- There are several coal seams overlying the target Coggan and Ulan coal seams, which could potentially contain water in the lower reaches further to the north-east. Hydraulic testing indicates that the permeability of the coal seams can be high with a median hydraulic conductivity of 0.05 m/day; and
- The presence of the Marangaroo Sandstone Aquifer is yet to be confirmed which is currently being explored.

There are 23 groundwater licences present within the Project Boundary, which are primarily extracted from the Quaternary Alluvium and used for agricultural purposes.

There is a potential for Groundwater Dependant Ecosystems (GDEs) proximal to and along the waterways to the east of the Project.

7.10.2 Potential Impacts

Potential groundwater impacts identified in the preliminary environmental risk assessment (**Appendix A**) include:

- Acceleration of groundwater drawdown effects, changes to groundwater flow directions and changes to groundwater quality;
- Potential for further depressurisation of aquifer systems' in the area through the mine void and underground dewatering;
- Increased groundwater seepage in the underground mine workings;
- Impacts of subsidence on the alluvial groundwater systems;
- Acceleration of loss of groundwater yield at existing bore locations; and
- Long term changes (post mine closure) to groundwater levels, groundwater quality and flow direction.

7.10.3 Assessment Methodology

A Groundwater Impact Assessment will be conducted for the Project by Australasian Groundwater and Environmental Consultants (AGE). The scope of assessment will include:

- Definition of the groundwater systems within and adjacent to the Project Boundary and identification of water bearing formations classifiable as aquifers;
- Identification of groundwater resources (including the location of all privately owned groundwater bores) in the vicinity of the site which could be impacted by the Project;
- Location of recharge zones to aquifers and groundwater systems, and estimates of local and regional water balance;
- Assessment of the potential for any groundwater impacts resulting from the Project (including predicted impacts on each identified privately owned bore), including modelling the cumulative groundwater impacts from existing stock, domestic and industrial bores or approved and proposed mining project influences;

- An assessment of the potential for the contamination of the local and regional groundwater system from the disposal of coarse and fine reject materials;
- Estimation of mine groundwater inflow rates suitable for input into the water balance for the Project;
- Assessment of post-mine groundwater impacts;
- Work in collaboration with the Geochemical consultant to confirm the quality of leachate from overburden and coarse and fine rejects material to enable the assessments of potential impacts on the groundwater regime post mining;
- Work in collaboration with the Soils and Land Capability consultant to confirm the limits of alluvium to enable the assessments of potential impacts;
- Work in collaboration with the Ecological consultant to identify any potential impacts on GDEs, if present;
- The development of groundwater mitigation and management strategies necessary for the Project; and
- A recommended post approval groundwater management and monitoring program.

Information that has been collected during exploration, geological modelling and field survey will be used to assign geographic and geological parameters such as seam depths, special geological anomalies and river bed heights. Coal seam geometry, other smaller drainages, alluvial lands and adjacent proposed mining activities will also be considered in the model.

7.11 ECONOMICS

7.11.1 Background

The commencement of mining within the Project Boundary will involve significant capital investment, ongoing operational expenditure and the direct employment of up to 1,000 full-time equivalent construction workers and 550 full-time equivalent employees during the operation of the Project at full production. Both construction and long term mine employees will be sourced locally, where possible.

The total revenue to Government will be significant over the Project life and substantial indirect economic benefits will arise from ongoing expenditure on services, maintenance, plant and equipment and flow-on employment effects. As well as the direct employment of 550 full-time equivalent employees, additional new jobs are expected to be supported in the local and regional economy stemming from the indirect effects of the Project.

Whilst the Project will provide material economic benefits for the economy of NSW over at least a 27 year period, it must be recognised that the considerable environmental and community constraints incorporated into the Project mine plan have resulted in the net present value of the Project to its investors being greatly diminished making an ultimate investment decision far more difficult in a deteriorating energy market outlook.

7.11.2 Potential Impacts

The Project will secure and maintain up to 1,000 full-time equivalent jobs over a two year construction and initial operation period and 550 over a 27 year operation period, further strengthen the local economy and create significant revenue at Local, State and Federal levels.

The Project will provide revenue to the State government through the payment of royalties and taxes contributing to the NSW economy.

The Project will have positive impacts on the local and regional economy through capital costs of the Project, contractor and employee salaries, associated local spending and contributions to community enhancement programs. The commencement of operations will also result in an increase in Government revenue.

The Project will also result in additional and ongoing demands on community infrastructure and services (such as skill levels, trade, health and educational opportunities and population demographics) and impacts to the immediate environment.

The Project will also temporarily transfer land use within the Project Boundary from agricultural activity to mining purposes and result in the transfer of some water entitlement units from stock and domestic purposes and irrigation to mining purposes.

7.11.3 Assessment Methodology

The Economics Impact Assessment will be completed for the Project in accordance with DP&I's '*Guideline for Economic Effects and Evaluation in EIA*' (2002) and DP&I's '*Guideline for the Use of Cost Benefit Analysis in Mining and Coal Seam Gas Proposals*' (DP&I, 2012).

The scope of assessment will include:

- A cost benefit analysis (threshold value analysis) of the Project;
- A regional economic impact assessment of construction and operation of the Project;
- Quantification of the economic cost, benefits and impacts of the Project, considering competing land and water uses in the region for different land uses;
- Undertake an Agricultural Productivity Impact Assessment; and
- Identification of any necessary mitigation and management measures, as required.

The economic analysis will assess the potential incremental economic costs and benefits of the Project to the community (i.e. consideration of economic efficiency). This will not only include a consideration of the regional economic impact or economic activity generated by the Project but also any incremental costs and benefits to the environment.

7.13 TRAFFIC & TRANSPORT

7.13.1 Background

The Bylong Valley is primarily accessed via the Bylong Valley Way which generally runs through the centre of the Project Boundary (see **Figure 2**). The Bylong Valley Way connects to Golden Highway to the north and the Castlereagh Highway to the south. The primary access to the Project will be via Bylong Valley Way and Upper Bylong Road, which a Mine Access Road is be constructed providing access to the MIA. Project related traffic will also utilise Wollar Road, a unsealed road travelling from Bylong Valley Way to Mudgee.

Direct access to the Project Boundary from Upper Bylong Road will be via the construction of a two-lane two-way road east of the rail crossing. All design and construction work associated with the Project will be undertaken in accordance with applicable design guidelines, standards and consultation with the MWRC and RMS (as the relevant road authorities).

All coal produced will be transported by rail to either the Port of Newcastle or to domestic power stations. The Sandy Hollow-Gulgong Railway Line currently passes to the south-east of the Project Boundary, a single line track with numerous passing loops. Although the line is predominately used by coal trains, it is also accessed by one or two country ore and grain trains daily and less frequently interstate freight trains which are bypassing Sydney during possessions.

The ARTC has forecast tonnage of coal transported along the Bylong - Mangoola Section (including the Project). The forecast demonstrates that current infrastructure is capable of additional rail traffic as a result of mining projects presently under consideration in the area. ARTC has identified methods in which to improve efficiency along the Sandy Hollow-Gulgong Railway Line including improving tunnel ventilation currently restricting trains to a 30 minute frequency, increasing train speed and construction of a bypass of Denman.

It is proposed that a rail spur and loading loop are constructed to meet the needs of the Project along the Sandy Hollow-Gulgong Railway Line. The rail loop (and train load-out bin) will be provided on the northern side of the main line.

7.13.2 Potential Impacts

The Project will increase traffic movements on local infrastructure surrounding the Project Boundary including Bylong Valley Way, Wollar Road and Upper Bylong Road. The potential impact will vary during the course of the Project with demand for both workforce and materials differing in relation to the construction and operational phases of the Project.

An active low level rail crossing is located on the Bylong Valley Way (see **Figure 7**) where existing public road traffic may be affected. The Project's rail movements are unlikely to result in any additional rail movements at this low level rail crossing (since Project related train movements will be on the south-east of this crossing), however increased road traffic resulting from the Project will require consideration.

Local tracks and unnamed roads within the Project Boundary will be closed as a result of associated mining activities. Road relocations will be undertaken to ensure properties (whilst privately owned) will retain access (these are generally shown on **Figure 7**).

The development of the open cut mining areas will require the closure and relocation of a section of the Upper Bylong Road. The EIS will outline the management of the traffic that currently utilise this public road.

Cracking and displacement of traffic and transport infrastructure as a result of subsidence is recognised as a potential impact of the Project.

Increased pressure on the Sandy Hollow-Gulgong Railway Line will likely occur as a result of the Project. ARTC has identified the need for improvements to this portion of railway line and have discussed various methods of improvement in the '*Hunter Valley Corridor 2012-2021 Capacity Strategy*' (ARTC, 2012).

The construction of the rail spur and loading loop has potential to interrupt current train movements along the Sandy Hollow-Gulgong Railway Line during the construction phase of the Project. Consultation with ARTC and relevant stakeholders will be completed in order to derive appropriate times when track works can be completed.

7.13.3 Assessment Methodology

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

- Review of any previous traffic impact assessments undertaken for the surrounding area;
- Traffic counts as required;
- Assessment of likely traffic impacts during the construction and operational phases of the Project, as well as cumulative impacts due to future proposed changes in the region;
- Assessment of the increase in demand for rail movements due to increased coal production;
- Identification of impacts of the Project relating to works on the public road and rail network; and
- Identification of any mitigation and management measures necessary.

7.14 SOCIAL

7.14.1 Background

Bylong is supported by numerous enterprises and is known for its agriculture, equine industry and more recently mining developments. According to the Australian Bureau of Statistics (ABS) 2011 Census, the MWRC had a population of approximately 22,318. A diverse range of sporting, cultural and recreational activities (including wineries and national parks) are located within the MWRC LGA. A number of establishments which provide temporary and long term accommodation are also located within the MWRC LGA.

Mining is the highest employment generating industry within the MWRC LGA with 14% of people employed in this sector in 2011. Other major industry sectors include: retail trade (11.3%), agriculture (9.5%), health care and social assistance (9.2%), and accommodation and hospitality (8.2%). The MWRC LGA had an unemployment rate of 7.9% in 2012, which is greater than the NSW average of 5.6% (DEEWR, 2013).

As a method to reduce the initial stress on the local areas accommodation services and housing market, it is proposed that an Accommodation Facility will be developed on the northern side of Bylong Valley Way, near the intersection with Wollar Road. The Facility is anticipated to be temporary and is likely to be utilised for approximately the first 10 years of the Project. Further consultation will occur with the local community and MWRC throughout the planning approval's process in an attempt to establish strategies to facilitate alternate opportunities to accommodate Project employees within the local community.

Once local infrastructure has been upgraded and or developed, the workforce will be encouraged to reside in local population centres including Rylstone, Kandos, Sandy Hollow, Denman and Mudgee.

KEPCO will continue consultation with the local community and MWRC to develop an employment strategy which will aim to employ locally in preference to seeking employees external to the MWRC LGA, were practical.

7.14.2 Potential Impacts

The Project has the potential to contribute to an increase in the population base of the local and regional area, as well as increase the demand for housing, community, infrastructure and services.

As the Project will require a peak operational workforce of approximately 550 full-time equivalent employees, and approximately 1,000 full-time equivalent employees for construction, it is expected that social impacts such as additional demand for housing, community, services and social infrastructure will occur.

Preliminary discussions were held with the NSW Department of Education regarding the proposed mine plan as the Project proposes mining within the area where the current Upper Bylong Public School is located. Ongoing discussions with the Department of Education and the local community will continue to occur throughout the planning approval's process to determine the most suitable solution.

7.14.3 Assessment Methodology

A detailed Social Impact Assessment (SIA) will be undertaken by Hansen Bailey which will identify potential social impacts of the Project on the local and regional community, paying particular attention to the demand it may generate for the provision of additional housing, community, infrastructure and services. An analysis of local services providers will be undertaken with local health care services, child care, education and local businesses.

Due to the potential increases in demand for community services as a result of the Project, a Voluntary Planning Agreement (VPA) will be developed under Section 93F of the EP&A Act with MWRC. The SIA will also identify key issues to assist in directing the VPA with MWRC.

The SIA will also identify the beneficial and potential adverse impacts of the Project on social values. The assessment of impacts will take into account the relevant demographic, social, cultural and economic profiles and social values of the community. It will include an estimation and analysis of the Projects economic parameters and will identify any mitigation and management measures required for the Project.

7.15 SOILS AND LAND CAPABILITY

7.15.1 Background

The soil types within the Project Boundary have been mapped at a regional scale within the '*Soil Landscapes of the Singleton 1:250 000 Sheet*' (Kovac and Lawrie, 1991). The mapping demonstrates that the soil types are highly variable over short distances within the Project Boundary. The following soil types were identified to be present within the Project Boundary:

- Bald Hill;
- Benjang;
- Bylong;
- Growee;
- Lees Pinch;
- Ogilvie; and
- Sandy Hollow.

The broad scale mapping shows that the major soil landscape units in the Project Boundary are Growee, Lees Pinch and Bylong units.

The geology and the topography of the Bylong Valley have greatly influenced the soils within the Project Boundary. The steeper slopes within the elevated areas of the Project Boundary contain limited topsoil and soil resources. Areas in the lower parts of the valley comprise of deeper soil resources that may be utilised for rehabilitation.

Extensive soils sampling and mapping that has been completed within the Project Boundary for inclusion within the *Gateway Certificate Application Supporting Document* (Hansen Bailey, 2014). This mapping has identified approximately 2,366 ha of land that conforms to the definition of BSAL that requires separate consideration.

Consistent with regulatory requirements, land to be directly disturbed as a result of the Project will be rehabilitated to a stable, self-sustaining condition. At a minimum, rehabilitation will plan to achieve a similar rural land capability and agricultural suitability classification as that which existed prior to mining operations. In order to achieve this level of rehabilitation, effective management of the existing soil resources will be facilitated so as to ensure its effectiveness as rehabilitation media.

7.15.2 Potential Impacts

Potential impacts on soil structure, integrity, and fertility may occur as a consequence of extended periods of the storage of suitable soil resources. This would potentially effect the rehabilitation success and the long term sustainability of rehabilitated areas should it not be managed appropriately.

The post mining land capability of the Project will be modified from its existing state prior to mining operations and these changes will need to be addressed as part of the assessment. The post mining land capability will be largely determined by the mine plan, post mining land use plans and the final landform designs. The availability of soil resources suitable for using as topdressing material on rehabilitation will be a dominant factor in achieving particular final land uses.

7.15.3 Assessment Methodology

A Soils and Land Capability Impact Assessment will be completed for the Project by SLR Consulting Australia Pty Limited (SLR). The scope of assessment generally includes:

- Review of previous relevant assessments;
- Use of existing data resulting from soil test pit excavations and other site investigations that have been undertaken to determine soil types, nominal depths, land suitability and land capability classifications;
- Soils assessment of areas to be disturbed in accordance with the requirements of the DTIRIS Guidelines;
- Pre and post mining rural land capability and classification in accordance with latest Government guidelines;
- Pre and post mining agricultural suitability classification in accordance with DTIRIS Agriculture guidelines;
- Assessment of available topsoil resources for mining and infrastructure area rehabilitation;
- A description of the proposed mine rehabilitation process proposed for the Project, with particular consideration of the use of the soil resources from land classified as BSAL;
- Assessment of suitable post-mining land uses for the open cut operations; and
- Identification of any impact mitigation measures as necessary.

7.16 REHABILITATION, FINAL LAND USE AND CLOSURE

7.16.1 Background

Rehabilitation planning for the Project will be undertaken progressively to ensure the total area of disturbance at any one time is minimised to reduce the potential for wind-blown dust, visual impacts and sediment-laden runoff.

KEPCO will aim to restore land disturbed by the Project to a condition similar to that which existed prior to the development. Subsidence has been identified as a potential impact of the Project with preliminary modelling identifying areas sensitive to subsidence. However rehabilitation techniques which would be employed should subsidence occur (may) include filling of cracks, revegetation and erosion control measures. Disturbance to large areas of grassland and some small patches of woodland will occur during the life of the Project, this will be followed by progressive rehabilitation.

On the completion of underground mining, the final use of surface facilities and associated infrastructure of the Project will need to be considered.

A Preliminary BSAL Rehabilitation Strategy has been prepared for inclusion within the Gateway Document, which provides a preliminary overview of the rehabilitation objectives and methodology that is proposed to occur for the reinstatement and rehabilitation of BSAL. This will be updated for inclusion within the EIS.

7.16.2 Potential Impacts

The Project will require the disturbance of large areas of grassland and some small patches of open woodland. As such the requirement for progressive and expedient rehabilitation across the Project Boundary will be employed throughout the life of the Project.

Regular subsidence monitoring will occur during the life of the Project and should subsidence occur, necessary rehabilitation strategies will be enacted. In this regard, the mine plan has been specifically designed to minimise both the area of disturbance at any one time and the potential for subsidence.

A long term rehabilitation strategy will be developed within the EIS to ensure that the disturbed land is returned to as close as possible to its original state once mining operations have ceased.

7.16.3 Assessment Methodology

The proposed mine plan and ultimate final landform for the Project will maintain the development of an undulating, largely free-draining and stable landform consistent with the surrounding environment. Further planning and detail will be provided in the EIS with regard to the re-establishment of BSAL, existing vegetation communities and the final landform.

The Preliminary BSAL Rehabilitation Strategy will be updated for inclusion within the EIS and will include further detail on the management of soil resources and the procedures to be implemented to maintain agricultural productivity of these soil resources within the longer term.

The EIS will include a description of the proposed rehabilitation strategy for the Project Boundary, having regard to the key principles in the '*Strategic Framework for Mine Closure*' (ANZMEC-MCA). Descriptions of the following will be included in the EIS:

- Rehabilitation objectives, methodology and conceptual completion criteria;
- Nominated final land use, having regard to any strategic land use planning or resource management plans or policies; and

- The potential for integrating this strategy with any other rehabilitation and ecological offset strategies in the immediate vicinity.

7.17 GEOCHEMISTRY

7.17.1 Background & Potential Impacts

The salinity, sodicity, acid forming potential, metal enrichment and metal solubility of the overburden, interburden and coal rejects of the Project indicates the manner in which overburden and coal reject materials are handled and stored throughout the Project Boundary.

Potentially Acid Forming (PAF) material needs to be identified and appropriately managed so as to prevent impacts on the surface and groundwater environment. Soil salinity and sodicity also control the success of rehabilitation and types of overburden material and topsoil to be used in this regard.

The emplacement of coal reject materials will include disposal of PAF and Non-Acid Forming (NAF) coal reject materials in the open cut mining areas and / or co-disposal with overburden.

7.17.2 Assessment Methodology

A Geochemical Assessment will be completed for the Project by RGS Environmental Pty Limited (RGS). The scope of assessment will include:

- The review of existing geological data and any prior geochemical assessments/data gathered in the vicinity of the Project;
- The design of a suitable geochemical sampling and testing program/protocol for overburden and potential reject material within the Project Boundary and laboratory analysis of these samples. The assessment will include characterisation of standard soil parameters including salinity, cation exchange capacity, potential nutrients and metal compositions;
- A site visit to ensure that final conclusions are robust and based on a sound sampling and testing methodology; and
- Identification of any impact mitigation and management measures, as necessary.

7.18 HAZARD ANALYSIS

7.18.1 Background

A relevant hazard assessment will be completed for the Project which will aim to identify any potential hazards associated with the Project and develop possible management and control procedures as specified in the relevant legislation.

A number of potential hazards were identified and assessed utilising the SEPP 33 Guidelines screening procedure. It is unlikely that any aspect of the Project is likely to be considered to be hazardous or offensive. Despite this, the risk assessment process will be undertaken to identify typical management measures that will be implemented to ensure operations are undertaken safely.

The Project will require the transport and storage of diesel, materials for explosives and other substances which may be considered to be potentially hazardous.

7.18.2 Potential Impacts

Hazardous materials and processes will be utilised during both the construction and operation phases of the Project. The key potentially hazardous materials identified include explosives, diesel, oils, coolant and necessary chemicals. Potentially hazardous material processes identified include:

- Transportation of explosives, fuel and chemicals;
- Delivery of fuel and chemicals;
- Prescribed dams; and
- Storage of fuel, explosives and chemicals.

7.18.3 Assessment Methodology

This assessment will follow '*SEPP 33 – Hazardous and Offensive Development Application Guidelines*' (DUAP 1994) (SEPP 33 Guidelines), and the '*Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis*' (Planning NSW, 1997).

A risk assessment will be undertaken to identify typical management measures that will be implemented to ensure operations are undertaken safely.

The hazard assessment will require the key components of the Project to be reviewed against the threshold values and screening procedure as provided within the SEPP 33 Guidelines. The key components of the Project will also be risk assessed and relevant controls developed in order to keep risk to a minimum.

7.19 BUSHFIRE

7.19.1 Background

The Project Boundary is partly located within the Bylong State Forest and shares boundaries with both the Goulburn River National Park and Wollemi National Park (see **Figure 2**). The listed conservation areas are dominated by dry eucalypt woodlands and open forests.

Due to the potential for build-up of high fuel loads (leaf drop and tinder) over time, a risk of bushfire presents itself to the land within the Project Boundary. The bushfire season experienced in the Bylong Valley occurs predominantly during the hotter months from September to April. Depending on factors such as temperature, available fuel loads and rainfall, the frequency and intensity of bushfires will vary.

The area surrounding the Bylong State Forest within the Project Boundary includes both cleared rural land dominated by grazing activities and native vegetation over steep topography which presents a significant bushfire hazard. The Goulburn River National Park and Wollemi National Park located to the north-east and south-east respectively, presents a bushfire hazard due to both the size and potential for large fuel loads.

7.19.2 Potential Impacts

During construction and operation of the Project, a combination of select activities, equipment and fuel sources could lead to the ignition and heightened risk of a bushfire. Identified potential impacts of bushfire associated with the Project include:

- Reduced access to forestry tracks utilised for bush fire management purposes as a result of the development of the mining area;
- Infrastructure requiring electricity within the Bylong State Forest and vegetated areas potentially resulting in bushfire;
- Use of access tracks to monitor subsidence effects; and
- Increased activity within the area.

7.19.3 Assessment Methodology

The bushfire risk assessment will be undertaken in accordance with the '*Guideline for Bush Fire Prone Land Mapping*' (NSW Rural Fire Service, 2006) (Bushfire Guideline). A Bushfire Prone Area is defined as "*an area that can support a bushfire or is likely to be subject to bushfire attack*". Onsite bushfires and potential bushfire hazards will be assessed and managed in accordance with the *Rural Fires Act 1999* and regulated by the NSW Rural Fire Service.

Fire controls and emergency systems will be put in place in accordance with the *Coal Mines Health and Safety Act 2002*.

8 PRELIMINARY PROJECT JUSTIFICATION

In December 2010, KEPCO acquired A287 and A342. Cockatoo Coal was appointed by KEPCO as the managers of exploring the opportunities for developing a coal mine within the Authorisations, which was subsequently named the Bylong Coal Project.

The Project team has undertaken additional exploration throughout A287 and A342 focused on defining the potential open cut and underground coal resources in the prospective areas of the two Authorisations. This work has resulted in the confirmation over the significance of the coal resource to the State of NSW and the development of a feasible mine plan within the Project Boundary.

The proposed mine plan will facilitate the extraction of approximately 121 Mt of ROM coal via both open cut and underground mining methods over 29 years. Additional coal resources are known to exist beyond this and may be subject to future mine planning feasibility studies.

Following an extended analyses of various options, two open cut mining areas have been identified to develop a coal resource that is only able to be recovered by open cut mining methods. The open cut mining proposed during the initial years of the Project are essential for the economic viability of the Project, whilst also providing an essential component for the management of fine and coarse reject material for the more extensive underground operations. The open cut mining areas have been constrained to the elevated valley areas (remote from the floodplains of Lee Creek and the Bylong River) in areas selected to minimise the impacts to alluvial soils and land classed as BSAL. Due to the shallow nature of the coal resource, there is a need to develop OEAs external to the open cut mining areas whilst the initial box cut areas are being developed. These OEAs have been strategically designed in locations beyond the floodplain and main drainage lines, whilst also minimising potential amenity impacts (visual, noise and air quality) to neighbouring sensitive receivers.

The more extensive underground mining operations are proposed to take place within the more elevated areas of the Bylong Valley, where the depth of the coal resource makes it most suitable for recovery utilising underground mining methods. An area which provides approximately 23 years of underground mining operations has been identified to be included as part of the Project. The conceptual underground mine plan has been and will continue to be refined to minimise potential impacts on sensitive surface features.

The Project Boundary occurs entirely on land zoned under the Mid-Western Regional LEP as zone RU1 (Primary Production) and SP2 (Infrastructure). Subject to the provisions of the Mining SEPP, open cut and underground mining operations are permitted with development consent within the Project Boundary.

Since KEPCO's acquisition of the Project, Cockatoo Coal has been undertaking active stakeholder engagement over the Project. This has included the recruitment of a site based Community Liaison Officer. Numerous meetings have been held with stakeholders including immediate local landholders, Government Agencies, MWRC, Indigenous groups and catchment management groups over the Project. Early consultation with stakeholders has been positive in developing constructive ongoing relationships.

KEPCO, Cockatoo Coal and Hansen Bailey will continue with this to facilitate stakeholder feedback on the Project in order to ensure that stakeholder issues are adequately addressed through the SIA and EIS.

The Project has been designed in consideration of initial environmental and social concerns, substantially incorporating stakeholder feedback. The open cut mining areas have been designed to minimise the extent and number of a final void(s) only providing sufficient capacity for the storage of coal processing waste for the ongoing underground longwall mining operations. The conceptual final landform has also been designed to blend in with the neighbouring topography, as far as practical.

Approval of the Project will provide KEPCO with a Development Consent that will enable maximum coal recovery from Project in the most efficient manner utilising current leading practice operational and environmental standards. The Project will provide KEPCO with the flexibility required to ensure that mining is undertaken efficiently whilst also implementing a range of management and mitigation measures to ensure that social and environmental impacts on sensitive receivers are minimised.

The Project will secure and maintain up to 1,000 full-time equivalent construction jobs and up to 550 full-time equivalent jobs over approximately 29 years of construction and mining operations. The Project will strengthen the local economy and create significant revenue at a local, State and Federal levels. The Project will also provide revenue to the State Government through the payment of royalties and taxes contributing very positively to the NSW economy.

Whilst the Project will provide material economic benefits for the economy of NSW over at least a 27 year period, it must be recognised that the considerable environmental and community constraints incorporated into the Project mine plan have resulted in the net present value of the Project to its investors being greatly diminished making an ultimate investment decision far more difficult in a deteriorating energy market outlook.

* * *

for
HANSEN BAILEY





Nathan Cooper
Senior Environmental Scientist

James Bailey
Director

9 ABBREVIATIONS

Abbreviation	Description
A	Authorisation
AHIMS	Aboriginal Heritage Information Management System
Approved Method	OEH '*Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*'
BoM	Bureau of Meteorology
BSAL	Biophysical Strategic Agricultural Land
CHPP	Coal Handling and Preparation Plant
CIC	Critical Industry Cluster
DGRs	Director Generals Requirements
DP&I	Department of Planning and Infrastructure
DRE	Department of Trade, industry Regional Investment and Services – Division of Resources and Energy
DTIRIS	Department of Trade, industry Regional Investment and Services
EMP	Environmental Monitoring Program
EP&A ACT	*Environmental Planning & Assessment Act 1979*
EPBC Act	*Environmental Protection & Biodiversity Conservation Act 1999*
ESD	Ecologically Sustainable Development
GDEs	Groundwater Dependent Ecosystems
Infrastructure SEPP	*State Environmental Planning Policy (Infrastructure) 2007*
LGA	Local Government Area
Mining SEPP	*State Environmental Planning Policy (Mining, Petroleum Production and Extraction) 2007*
MNES	Matters of National Environmental Significance
Mt	Million tonnes
Mtpa	Million tonnes per annum
MWRC	Mid-Western Regional Council
NOW	NSW Office of Water
OEH	Office of Environment & Heritage
PFM	Planning Focus Meeting
PM_{10}	Particulate Matter of 10 micrometers or less
$PM_{2.5}$	Particulate Matter of 2.5 micrometers or less
POEO Act	*Protection of the Environment Operations Act 1997*
Project Boundary	Boundary within which the Project subject of the Development Application applies
Roads Act	*Roads Act 1993*
ROM	Run of Mine
RMS	Roads and Maritime Services
SRD SEPP	*State Environmental Planning Policy (State and Regional Development) 2011*
DoE	Federal Department of the Environment
The Project	Project as described in **Section 3** of this Background Document

Abbreviation	Description
TSC Act	*Threatened Species Conservation Act 1995*
VPA	Voluntary Planning Agreement
WAL	Water Access Licence
WM Act	*Water Management Act 2000*

10 REFERENCES

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APPENDIX A

Preliminary Environmental Risk Assessment

BYLONG COAL PROJECT
PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT
for
Cockatoo Coal Limited

Issue	Aspect	Impact	Preliminary Risk Assessment			Environmental Impact Statement Scope
			C	L	R	
Subsidence	Surface disturbance associated with the subsidence of the land immediately above and adjacent the underground mining areas.	Disturbance of the natural environment	High	4	16, High	A Subsidence Impact Assessment will be carried out for the Project which will entail: • Identification of the potential risks and constraints associated with the Projects longwall and bord and pillar coal mining operations; • Overview of the extraction process for underground mining operations; • Consideration of the relevant geological, geotechnical and structural characteristics within the underground mining area; • Modelling of subsidence behaviour using the empirical modelling methodology; • Consideration of and modelling predictions of systematic (vertical subsidence, tilting and strains) and non-systematic (far field movements, upsidence and closure, rock mass disturbance) subsidence movements as appropriate; and • Evaluation of alternative mine layouts.
		Disturbance of the built environment	Mod.	5	15, High	
	Underground mining resulting in subsidence.	Unplanned movement of land resulting in environmental effects.	High	4	16, High	• Review of the relevant statutory context for the Project; • Consideration of the subsidence effects, impacts and consequences in the context of the overall Project environmental impact statement. • The assessment will include integration with other key environmental assessment areas such as surface water, groundwater, flooding, hydrogeomorphology, geology, ecology, Aboriginal archaeology, Non-Indigenous heritage, etc;

Issue	Aspect	Impact	Preliminary Risk Assessment			Environmental Impact Statement Scope
						• Assessment of impacts on houses, structures, other improvements, soils, steep areas and other natural features, roads transmission lines, communication cables, other public infrastructure, etc; • Rehabilitation and other management requirements; and • Monitoring requirements, model validation and adaptive management.
Ecology	Vegetation clearing, drilling, blasting and topsoil stripping	Loss of biodiversity and disruption to threatened flora and fauna or likely habitats	High	4	16, High	An Ecological Impact Assessment (including terrestrial and aquatic) will be completed for the Project in accordance with the relevant Government guidelines including (at least): • *Threatened Biodiversity Survey and Assessment Guidelines* for Development and Activities – Working Draft (DECCW, 2004); • *Threatened Species Assessment Guidelines – the Assessment of Significance* (DECC, 2007); • SEWPaC's guidelines for identifying the EPBC Act listed CEEC Box Gum Woodland (DEH, 2006); and • *Environmental Offsets Policy* (SEWPaC, 2012).
		Disturbance to State and Federally listed species, communities or habitat for species	High	4	16, High	A referral will be compiled at the relevant time in the Planning Approvals process to fulfil requirements of the *Environment Protection and Biodiversity Conservation Act 1999*. • Database analysis, literature review and field surveys will identify threatened flora and fauna which may be impacted by the Project. • Mitigation measures will be determined as necessary for the Project including the development of a comprehensive biodiversity offset strategy (as required).
Non Indigenous Heritage	Vegetation clearing, drilling, blasting and topsoil stripping	Disturbance /indirect impacts to non-Indigenous heritage sites	Mod.	4	12, High	A Non-Indigenous Heritage Assessment will be conducted for the Project in accordance with the standards required by the Heritage Office of NSW. The Assessment will include a review of existing heritage assessment reports and a field survey of the Project area. Heritage significance will be assessed. Mitigation measures will be identified as appropriate.

Issue	Aspect	Impact	Preliminary Risk Assessment			Environmental Impact Statement Scope
Aboriginal Archaeology and Cultural Heritage	Vegetation clearing, drilling, blasting and topsoil stripping	Disturbance of Aboriginal artefacts, sites or places of cultural heritage significance	Mod.	5	15, High	An Aboriginal Archaeological and Cultural Heritage Impact Assessment for the Project will be undertaken in accordance with *National Parks & Wildlife Act 1974: Part 6 Approvals Interim Community Consultation Requirements for Applicants (ICCRs)* (NPWS 2004) and DECCWs *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*. The Assessment will include a desktop review, database, literature search of previously recorded Cultural Heritage information. In addition, a relevant level of field survey assessment will be conducted with members of the local Aboriginal community. Mitigation and management strategies will be developed in consultation with Registered Aboriginal Parties as required.
Air Quality	Vegetation clearing, drilling and topsoil stripping	Wind-blown dust, machinery exhaust fumes and ventilation exhaust contributing to elevated dust levels	Mod.	4	12, High	An Air Quality Impact Assessment will be conducted for the Project in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (DEC, 2005). The Assessment will include confirmation of background levels, determination of site criteria, air quality impacts for the construction and operational phases, calculation of likely greenhouse gas emissions, cumulative impacts and a literature review. The assessment will consider emissions of dust, odours, NOx and other potential gases. The Assessment will also develop any suitable mitigation and management measures needed utilising the *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and / or Minimise Emissions of Particulate Matter from Coal Mining* (Katestone Environmental, 2010).
	Overburden Emplacement		Mod.	4	12, High	
	Uncovering of Coal		Mod.	4	12, High	
	Coal, overburden and reject haulage		Mod.	4	12, High	
	Coal stockpiles		Mod.	4	12, High	
	Coal processing and transport		Mod.	4	12, High	

Issue	Aspect	Impact	Preliminary Risk Assessment			Environmental Impact Statement Scope
Greenhouse Gas	Combustion of diesel	Greenhouse gas emissions	Minor	5	10, Moderate	The Air Quality Impact Assessment will include an assessment of greenhouse gas Scope 1, 2 and 3 emissions in accordance with the Australian Greenhouse Office's (AGO) *Factors and Methods Workbook* (AGO, 2006) as part of the Air Quality and Greenhouse Gas Impact Assessment described above. The Assessment will also develop any suitable mitigation and management measures as needed.
	Electricity Use		Minor	5	10, Moderate	
	Emissions from burning coal (external to the Project)		Mod.	5	15, High	
Noise	Coal, overburden and reject haulage	Excessive noise generation at sensitive receivers	Mod.	4	12, High	A Noise Impact Assessment will be conducted for the Project in accordance with (at least) the *Industrial Noise Policy 2000*. The Assessment will determine likely criteria for the Project and include an assessment of construction and operational noise impacts, a blasting assessment (including consideration of heritage items), assessment of train movements, low frequency vibration and cumulative noise impacts with other approved industry in the vicinity. The Noise Impact Assessment will also develop appropriate mitigation and management measures.
	Machinery operating in-pit and on overburden emplacement areas		Mod.	4	12, High	
	CHPP operation and stockpiles		Mod.	4	12, High	
	Coal loading at rail loop		Mod.	4	12, High	
	Train movements on the rail loop and spur		Mod.	4	12, High	
	Increased traffic movements		Minor	5	10, Moderate	
Blasting	Coal and overburden blasting	Overpressure and ground vibration impacts at sensitive receivers	Mod.	4	12, High	A Blasting Impact Assessment will be conducted for the Project as part of the Noise Impact Assessment as described above. Mitigation measures will be developed for blasting adjacent to sensitive receivers and heritage properties, as required.

Issue	Aspect	Impact	Preliminary Risk Assessment			Environmental Impact Statement Scope
Agricultural Productivity & Land Use	Vegetation clearing and topsoil stripping	Loss of agricultural land	Mod.	5	15, High	An Agriculture Impact Statement will be completed for the Project in accordance with the: • *Agricultural Impact Statement Guidelines* (DP&I 2012); • NSW Agriculture fact sheet, *Agfact AC25: Agricultural Land Classification* (NSW Agriculture); and • Relevant Strategic Regional Landuse Plan (*Upper Hunter Strategic Regional Landuse Plan* (DP&I 2012)). Consideration of the Gateway Process criteria (not yet legislated) will also be incorporated into the scope of the Agricultural Impact Statement as required. The assessment will determine the existing agricultural domains associated with the Project along with an assessment of the highest potential agricultural value and the impact the Project may have on agricultural resources or industries. The Assessment will also develop any suitable mitigation and management measures as necessary.
Visual and Lighting	Infrastructure	Visual impact to surrounding receivers	Mod.	4	12, High	A Visual Impact Assessment will be completed for the Project to assess the visual impacts of the Project and identify mitigation and management measures, as appropriate. The Assessment will include analysis of the existing visual setting, definition of the visual impacts and comment on the potential for cumulative impacts with neighbouring mines. The Assessment will also develop any suitable mitigation and management measures as necessary.
	Overburden emplacement areas		Mod.	4	12, High	
	Exposed earthworks		Mod.	4	12, High	
	Lighting from fixed and mobile equipment		Mod.	2	6, Moderate	

Issue	Aspect	Impact	Preliminary Risk Assessment			Environmental Impact Statement Scope
Surface Water	Topsoil stripping, haul roads, un-rehabilitated spoil	Dirty water runoff entering local waterways	Mod.	2	6, Moderate	A Surface Water and Flooding Impact Assessment will be conducted for the Project. This Assessment will include a review of existing surface water assessment reports, the identification of surface water resources, assessment of existing surface water hydrology, assessment of potential surface water impacts on and offsite, assessment of post-mine surface water impacts and predicted final void water levels (if required). The Surface Water Impact Assessment will also include the development of surface water management strategies, mitigation measures and development of a high level water balance model for the life of the Project. The assessment will investigate the water requirements in relation to the relevant Water Sharing Plans for the region (*Water Sharing Plan for the Hunter Regulated River Water Source 2003*, *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009*) and other requirements under the *Water Act 1912*.
	Coal processing and production	Water demand for dust suppression and coal washing	Minor	6	12, High	
	Water take from or discharges into local waterways	Surface water contamination	Mod.	5	15, High	
		Water take from the catchment	Minor	5	10, Moderate	
		Contaminated water from mining and infrastructure areas	Mod.	3	9, Moderate	
	Flooding	Flooding impact on mining operations, infrastructure	Mod.	4	12, High	
Groundwater	Coal extraction and overburden removal	Groundwater inflow into mining areas (underground and open cut)	Mod.	5	15, High	The Groundwater Impact Assessment will be conducted for the Project and will consider in relation to the relevant Water Sharing Plans for the region (*Water Sharing Plan for the Hunter Regulated River Water Source 2003*, *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009*) and other requirements under the *Water Act 1912*.

Issue	Aspect	Impact	Preliminary Risk Assessment			Environmental Impact Statement Scope
						The assessment will include a finite 3D, numerical simulation package (FEEFLOW OR SURFACT MODFLOW), which will be utilised to simulate the likely impacts of the Project on groundwater (including groundwater impacts on each identified privately owned bore), an analysis of cumulative assessment of adjacent mining impacts, contaminant potential from co-disposed materials, assessment of post-mine groundwater impacts, confirmation of alluvium impacts and extent of mining impacts, as relevant. The Groundwater Impact Assessment will also propose groundwater mitigation and management strategies as required.
Socio-economics	Social	Demands on local infrastructure and services, impacts to demographics	Minor	5	10, Moderate	The Social Impact Assessment for the Project will be prepared considering the issues raised during the stakeholder engagement program and predicted impacts for the Project relevant to social matters. Mitigation measures will be determined as required.
	Economic	Increased employees residing in the local area Increasing demands for services within the local area	Mod.	4	12, High	An Economics Impact Assessment will be completed for the Project in accordance with *Guideline for economic effects and evaluation in EIA (DoP 2002)*.
Soils and Land Capability	Topsoil stripping and land preparation	Loss of productive topsoil	Mod.	2	6, Moderate	A Soils and Land Capability Impact Assessment will be completed for the Project according to the relevant Government guidelines and standards. The assessment will include a desktop review of previous relevant assessments, field surveys involving soil test pit excavations, soils assessments, pre and post mining land capability and classes assessment, pre and post mining agricultural suitability assessment, assessment of available topsoil resources, a description of the proposed mine rehabilitation process and suitable post-mining land uses.
		Deterioration of land capability	Mod.	2	6, Moderate	

Issue	Aspect	Impact	Preliminary Risk Assessment			Environmental Impact Statement Scope
						The assessment will also suggest any required impact mitigation measures.
Rehabilitation and Final Landform	Rehabilitation	Erosion	Mod.	2	6, Moderate	The proposed mine plan and ultimate final landform for the Project is planned to maintain an undulating, free-draining and stable landform consistent with the surrounding environment, as far as practical. Rehabilitation will be undertaken progressively to ensure the total area of disturbance at any one time is minimised to reduce the potential for wind-blown dust, visual impacts and increased sediment-laden runoff. Final rehabilitation objectives and quality will also be assessed in the EIS, including a consideration of the post mining land use (biodiversity, agriculture etc).
		Weed and feral animal invasion	Mod.	2	6, Moderate	
	Final Landform	Unstable landform	Mod.	2	6, Moderate	
		Poor drainage	Mod.	2	6, Moderate	
		Erosion	Mod.	2	6, Moderate	
Geochemistry	Overburden emplacement	Potentially acid forming materials affecting soil and water resources	Mod.	2	6, Moderate	A Geochemical Impact Assessment on the material to be exposed during open cut and underground mining will be undertaken for the Project. The assessment will comprise of desktop studies; field sampling program during the exploration phase, laboratory analysis and reporting. Management and mitigation measures to handle any potentially acid forming materials will be determined as required.
		Acid Rock Drainage	High	2	8, Moderate	
Spontaneous Combustion	Spontaneous combustion	Release of harmful emissions Visual impact associated with the release of gases	Minor	2	4, Moderate	The potential impacts arising from spontaneous combustion will be addressed in the Air Quality Impact Assessment. Mitigation measures will be identified as appropriate for potential impacts.

Issue	Aspect	Impact	Preliminary Risk Assessment			Environmental Impact Statement Scope
Road & Rail Traffic and Transport	Increased vehicle movements from employees, deliveries and train loading	Increased traffic movements	Mod	4	12, High	A Traffic and Transport Impact Assessment will be completed for the Project in accordance with (at least) the *'Guide to Traffic Generating Developments'* (RTA 2002). The Assessment will include a review of previous traffic impact assessments undertaken for the surrounding area, determination of likely criteria for the Project, design of a traffic counts program, assessment of existing, construction and operational traffic impacts and assessment of traffic movements on existing road and rail (level crossings, coal chain etc) networks. Mitigation measures will be identified as appropriate for potential impacts.
	Road Upgrades, closure, realignment, impacts to level crossing etc	Public Perception	Mod.	3	9, Moderate	
Waste & Contamination Management	Generation of General waste	Land contamination	Neg.	2	2, Low	A relevant waste assessment will be undertaken for the Project and Waste Management System described which shall provide management procedures to ensure the environmentally responsible disposal, tracking and reporting of all relevant waste generated at the Bylong Coal Project.
	Generation of Sewage	Water contamination	Mod.	2	6, Moderate	
	Rejects Management		Mod.	2	6, Moderate	
Hazardous materials	Storage and Handling	Soil and water contamination	Mod.	2	6, Moderate	A relevant level of hazard assessment in accordance with SEPP 33 will be undertaken for the Project, although it is not anticipated that large quantities of hazardous materials will be required for storage at the Project.
	Bushfire	Fire Hazard	High	2	8, Moderate	A relevant bushfire hazard assessment will be undertaken for the Project with relevant mitigation defined as required.
Cumulative Impacts			High	2	8, Moderate	All studies will incorporate cumulative impacts assessments with approved mining operations and other industry in the vicinity of the Project, where sufficient information is available.

BYLONG COAL PROJECT

Cockatoo Coal Risk Assessment Tools

Risk Assessment Matrix

Likelihood	Consequence					
	Negligible	Minor	Moderate	High	Critical	Catastrophic
6 – Certain	6	12	18	24	30	36
5 – Very Likely	5	10	15	20	25	30
4 – Likely	4	8	12	16	20	24
3 – Unlikely	3	6	9	12	15	18
2 – Possible	2	4	6	8	10	12
1 - Almost Impossible	1	2	3	4	5	6

Risk Scores: 1 - 3 = LOW; 4 - 10 = MODERATE; 12 - 16 = HIGH; 18 - 24 = VERY HIGH; 25 - 36 = EXTREME

Likelihood Classification Used for the Risk Framework

Likelihood	Description	Frequency
Almost Certain	Common Occurrence	At least daily
Likely	Expected to occur in most circumstances	Once per week
Possible	Probably will occur or ha happened in the past	Once per month
Unlikely	Occurs Infrequently	Less than once per year
Rare	Could happen at some time	Less than once per 10 years
	Not Likely to Occur	Less than 1 per 100 years

APPENDIX B

Bylong Coal Water Licences

Approval	Licence	Auth.	Dates
WAL (486 units from Bylong River Water Source - aquifer)	17731 (20AL206647)	NOW	1 August 2009 to 24 August 2022
WAL (248 units from Bylong River Water Source - aquifer)	17711 (20AL206637)	NOW	1 August 2009 to 31 July 2022
WAL (240 units from Bylong River Water Source - aquifer)	17716 (20AL206649)	NOW	1 August 2009 to 31 July 2022
WAL (494 units from Bylong River Water Source - aquifer)	17709 (20AL206625)	NOW	1 August 2012 to 31 July 2022
WAL (486 units from Bylong River Water Source - aquifer)	17729 (20AL206629)	NOW	1 August 2012 to 31 July 2022
WAL (5 units from Bylong River Water Source - aquifer)	17732 (20AL206665)	NOW	13 December 2012 to 13 December 2022
Water Licence (Stock and Domestic)	20BL172351	NOW	Issued 22 October 2009 for perpetuity
Water Licence (Stock and Domestic)	20BL011904	NOW	Issued 18 August 1961 for perpetuity
Water Licence (Stock and Domestic)	20BL171117	NOW	Issued 14 February 2007 for perpetuity
Water Licence (Stock and Domestic)	20BL132415	NOW	Issued 30 April 1985 for perpetuity
Water Licence (Stock and Domestic)	20BL167074	NOW	Issued 21 September 1999 for perpetuity
Water Licence (Stock and Domestic)	20BL172347	NOW	Issued 22 October 2009 for perpetuity
Water Licence (Stock and Domestic)	20BL010344	NOW	Issued 30 March 1960 for perpetuity
Water Licence (Stock and Domestic)	20BL010345	NOW	Issued 1 April 1960 for perpetuity
Water Licence (Stock and Domestic)	20BL010347	NOW	Issued 1 April 1960 for perpetuity
Water Licence (Stock and Domestic)	20BL168984	NOW	Issued 19 November 2003 for perpetuity
Water Licence (Stock and Domestic)	20BL171047	NOW	Issued 25 January 2007 for perpetuity
Water Licence (Stock and Domestic)	80BL241093	NOW	Issued 6 November 2002 for perpetuity
Water Licence (Stock and Domestic)	20BL168981	NOW	19 November 2003 to 18 November 2013
Water Licence (Stock and Domestic)	20BL168989	NOW	Issued 19 November 2003 for perpetuity
Water Licence (Stock and Domestic)	20BL172420	NOW	Issued 19 February 2010 for perpetuity
Water Licence (Stock and Domestic)	20BL172419	NOW	Issued 19 February 2010 for perpetuity
Water Licence (Stock and Domestic)	20BL172430	NOW	Issued 19 February 2010 for perpetuity
Water Licence (Stock and Domestic)	20BL173016	NOW	Issued 27 October 2010 for perpetuity

Approval	Licence	Auth.	Dates
Water Licence (Stock and Domestic)	20BL172426	NOW	Issued 19 February 2010 for perpetuity
Water Licence (Stock and Domestic)	20BL172422	NOW	Issued 19 February 2010 for perpetuity
Water Licence (Stock and Domestic)	20BL169847	NOW	Issued 13 September 2005 for perpetuity
Water Licence (Stock and Domestic)	20BL167073	NOW	Issued 22 September 1999 for perpetuity
Water Licence (Monitoring)	20BL172958	NOW	Issued 17 August 2011 for perpetuity
Water Licence (Monitoring)	20BL172959	NOW	Issued 17 August 2011 for perpetuity
Water Licence (Monitoring)	20BL172960	NOW	Issued 17 August 2011 for perpetuity
Water Licence (Monitoring)	20BL172961	NOW	Issued 17 August 2011 for perpetuity
Water Licence (Monitoring)	20BL172962	NOW	Issued 17 August 2011 for perpetuity
Water Licence (Monitoring)	20BL172963	NOW	Issued 17 August 2011 for perpetuity
Water Licence (Monitoring)	20BL173166	NOW	Issued 30 April 2012 for perpetuity
Water Licence (Monitoring)	20BL173183	NOW	Issued 15 May 2012 for perpetuity
Water Licence (Monitoring)	20BL173184	NOW	Issued 15 May 2012 for perpetuity
Water Licence (Monitoring)	20BL173211	NOW	Issued 13 July 2012 for perpetuity
Water Licence (Monitoring)	20BL173212	NOW	Issued 13 July 2012 for perpetuity
Water Licence (Monitoring)	20BL173213	NOW	Issued 13 July 2012 for perpetuity
Water Licence (Monitoring)	20BL173214	NOW	Issued 13 July 2012 for perpetuity
Water Licence (Monitoring)	20BL173215	NOW	Issued 13 July 2012 for perpetuity
Water Licence (Monitoring)	20BL173216	NOW	Issued 13 July 2012 for perpetuity
Water Licence (Monitoring)	20BL173217	NOW	Issued 13 July 2012 for perpetuity
Water Licence (Monitoring)	20BL173218	NOW	Issued 13 July 2012 for perpetuity
Water Licence (Monitoring)	20BL173219	NOW	Issued 13 July 2012 for perpetuity
Water Licence (Monitoring)	20BL173222	NOW	Issued 13 July 2012 for perpetuity
Water Licence (Monitoring)	20BL173223	NOW	Issued 13 July 2012 for perpetuity
Water Licence (Monitoring)	20BL173224	NOW	Issued 13 July 2012 for perpetuity
Water Licence (Monitoring)	20BL173225	NOW	Issued 13 July 2012 for perpetuity
Water Licence (Monitoring)	20BL173243	NOW	Issued 4 September 2012 for perpetuity

Approval	Licence	Auth.	Dates
Water Licence (Monitoring)	20BL173298	NOW	Issued 4 September 2012 for perpetuity
Water Licence (Monitoring)	20BL173299	NOW	Issued 4 September 2012 for perpetuity
Water Licence (Monitoring)	20BL173300	NOW	Issued 4 September 2012 for perpetuity
Water Licence (Monitoring)	20BL173301	NOW	Issued 4 September 2012 for perpetuity
Water Licence (Monitoring)	20BL173419	NOW	Issued 4 February 2013 for perpetuity
Water Licence (Monitoring)	20BL173420	NOW	Issued 5 February 2013 for perpetuity
Water Licence (Monitoring)	20BL173421	NOW	Issued 4 February 2013 for perpetuity
Water Licence (Monitoring)	20BL173422	NOW	Issued 4 February 2013 for perpetuity
Water Licence (Monitoring)	20BL173423	NOW	Issued 4 February 2013 for perpetuity
Water Licence (Monitoring)	20BL173424	NOW	Issued 4 February 2013 for perpetuity
Water Licence (Monitoring)	20BL173425	NOW	Issued 4 February 2013 for perpetuity
Water Licence (Monitoring)	20BL173426	NOW	Issued 4 February 2013 for perpetuity
Water Licence (Monitoring)	20BL173427	NOW	Issued 4 February 2013 for perpetuity
Water Licence (Monitoring)	20BL173428	NOW	Issued 4 February 2013 for perpetuity
Water Licence (Monitoring)	20BL173429	NOW	Issued 4 February 2013 for perpetuity
Water Licence (Monitoring)	20BL173430	NOW	Issued 4 February 2013 for perpetuity
Water Licence (Monitoring)	20BL173441	NOW	Issued 13 February 2013 for perpetuity

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