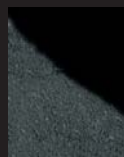


WILPINJONG COAL PROJECT

ENVIRONMENTAL MONITORING PROGRAMME

July 2006

Wilpinjong Coal Pty Limited



WILPINJONG COAL PROJECT
ENVIRONMENTAL MONITORING PROGRAMME



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1 INTRODUCTION

The Wilpinjong Coal Project (the Project) is located approximately 40 kilometres (km) north-east of Mudgee near the village of Wollar in central New South Wales (NSW) (Figure 1). The Project is owned by Wilpinjong Coal Pty Limited (WCPL), a wholly owned subsidiary of Peabody Energy Australia Coal Pty Limited.

WCPL was granted Project Approval (05-0021) on 1 February 2006 for the Project. This Environmental Monitoring Programme (EMP) has been developed in accordance with Condition 3, Schedule 5 of Project Approval (05-0021) as follows:

Schedule	Condition	Project Approval 05-0021
5	3	<i>Within 6 months of this approval, the Proponent shall prepare an Environmental Monitoring Program for the project in consultation with relevant agencies, and to the satisfaction of the Director-General. This program must consolidate the various monitoring requirements in schedule 3 of this approval into a single document.</i>

1.1 OBJECTIVES

The objective of this EMP is to consolidate the various monitoring requirements in Schedule 3 of the Project Approval into a single document. The following management plans and monitoring programmes have been used in the compilation of this EMP:

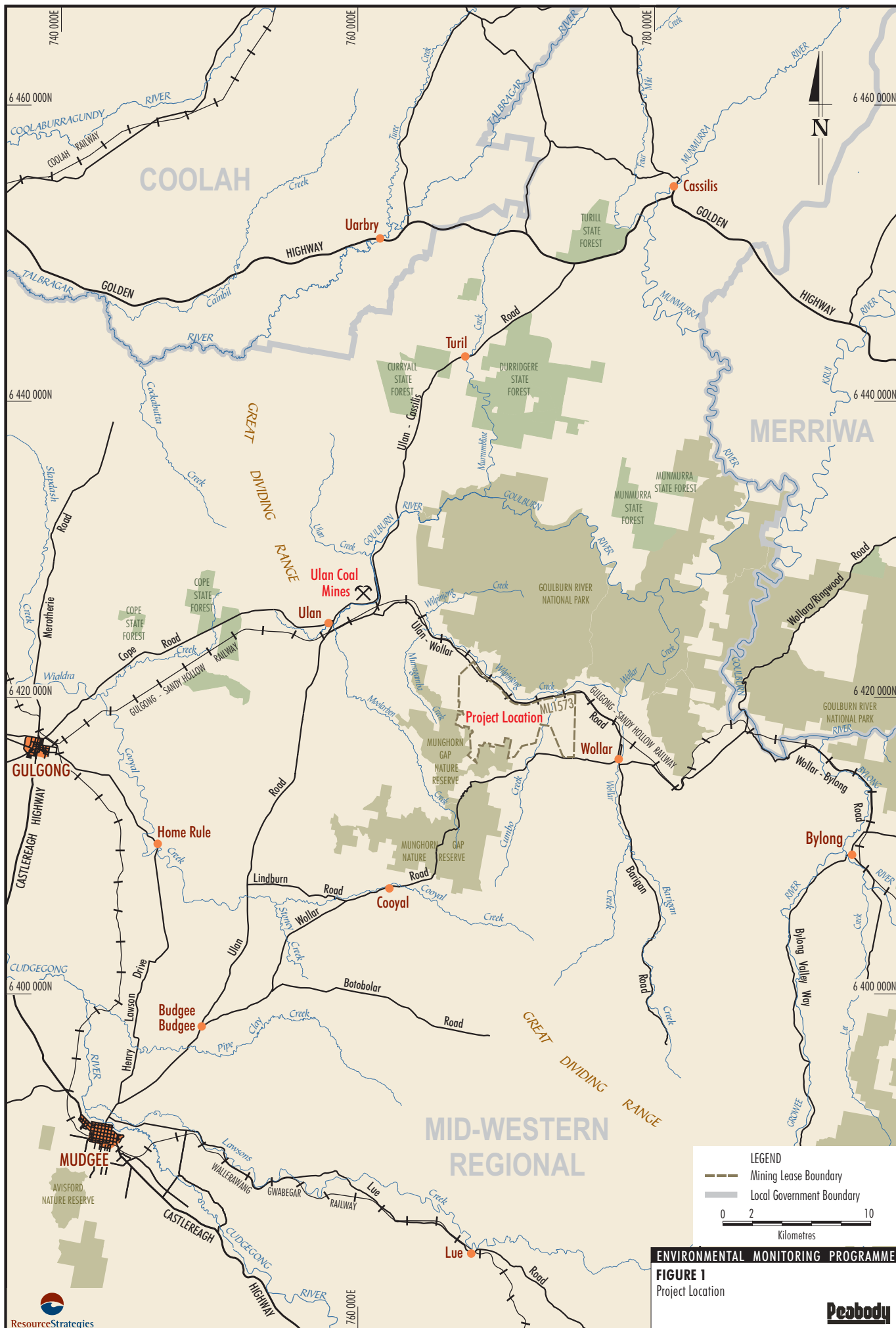
- Air Quality Monitoring Programme (AQMP);
- Noise Monitoring Programme (NMP);
- Aboriginal Cultural Heritage Management Plan (ACHMP);
- Surface Water Management and Monitoring Plan (SWMMP);
- Groundwater Monitoring Programme (GWMP);
- Rehabilitation Management Plan (RMP); and
- Blast Management Plan and Blast Monitoring Programme (BMP).

1.2 SCOPE AND DOCUMENT STRUCTURE

The scope and structure of this EMP is as follows:

- Section 2: Describes the Project environmental monitoring programme.
- Section 3: Describes the reporting process for this EMP.
- Section 4: Outlines the review procedure for the EMP.

This EMP sets out a summary of the WCPL environmental monitoring programme to be implemented during the construction and operation of the Project. Where there is any conflict between the provisions of this EMP and any Contractors' obligations under the Contract including the various statutory requirements (i.e. licenses, permits, Project Approval conditions and relevant laws) the Contract and statutory requirements are to take precedence. In the case of any real or perceived ambiguity between elements of this EMP and the above statutory requirements the Contractor shall first request clarification from WCPL prior to implementing that element of this EMP over which the ambiguity is identified.



2 MONITORING REQUIREMENTS

This section describes the type, frequency and location of the various environmental monitoring requirements for the Project in Schedule 3 of the Project Approval. An overview of the Project environmental monitoring programme is provided in Table 1. The monitoring sites are shown on Figure 2.

Table 1
Overview of the Project Environmental Monitoring Programme

Monitoring Parameter	Monitoring Sites ¹	Frequency	Section
Meteorology			
<ul style="list-style-type: none"> Temperature at 10 m. Temperature at 2 m. Relative humidity. Net solar radiation. Rainfall. Wind speed and direction. Sigma theta. 	<ul style="list-style-type: none"> Automated meteorological station. 	<ul style="list-style-type: none"> Continuous. 	2.1
Noise			
<ul style="list-style-type: none"> Attended and unattended noise monitoring. 	<ul style="list-style-type: none"> N4, N6, N7, N9, N10, N11 and N12.² 	<ul style="list-style-type: none"> Quarterly for the first 12 months of the Project then complaint-based thereafter.³ 	2.2
<ul style="list-style-type: none"> Real time monitoring 	<ul style="list-style-type: none"> N9 and N11.² 	<ul style="list-style-type: none"> Continuous. 	2.2
Air Quality			
<ul style="list-style-type: none"> Dust deposition. 	<ul style="list-style-type: none"> DG4, DG5, DG7, DG8, DG9, DG10 and DG11. 	<ul style="list-style-type: none"> Monthly. 	2.3
	<ul style="list-style-type: none"> DG12, DG13 and DG14 (Aboriginal rock art sites). 	<ul style="list-style-type: none"> Monthly (when mining within 1 km of the rock art site). 	2.3
<ul style="list-style-type: none"> High volume sampling (PM₁₀). 	<ul style="list-style-type: none"> HV1, HV2, HV3 and HV4. 	<ul style="list-style-type: none"> Continuous six day cycle. 	2.3
<ul style="list-style-type: none"> Real time (PM₁₀). 	<ul style="list-style-type: none"> TEOM. 	<ul style="list-style-type: none"> Continuous. 	2.3
Blasting and Vibration			
<ul style="list-style-type: none"> Ground vibration. 	<ul style="list-style-type: none"> V1, V2 and V3 (Aboriginal rock art sites). 	<ul style="list-style-type: none"> Every blast within 1 km of sites. 	2.4
	<ul style="list-style-type: none"> Power poles. Railway culverts. Railway bridge. 	<ul style="list-style-type: none"> Every blast within 350 m of sites. 	2.4
	<ul style="list-style-type: none"> Private residences 	<ul style="list-style-type: none"> All blasts within 3 km of residences. 	2.4
Surface Water			
<ul style="list-style-type: none"> pH, EC, turbidity and SO₄. 	<ul style="list-style-type: none"> WIL(U), WIL(PC), WIL(NC), WIL(D), CC1 to CC3, WOL1 and WOL2. 	<ul style="list-style-type: none"> Monthly and following significant rainfall events (i.e. greater than 20 mm in 24 hours). 	2.5
<ul style="list-style-type: none"> Flow rate and EC. 	<ul style="list-style-type: none"> Wilpinjong Creek (upstream and downstream) and Cumbo Creek gauging stations. 	<ul style="list-style-type: none"> Continuous. 	2.5
<ul style="list-style-type: none"> pH, EC, turbidity and SO₄. 	<ul style="list-style-type: none"> Wilpinjong Creek (upstream and downstream) and Cumbo Creek gauging stations. Site water storages, tailings disposal storages and sediment retention dams. 	<ul style="list-style-type: none"> Monthly. 	2.5
<ul style="list-style-type: none"> Water level, pH, EC, turbidity and SO₄. 	<ul style="list-style-type: none"> Existing waterholes on the McDermott property. 	<ul style="list-style-type: none"> In consultation with individual landholder. 	2.5
<ul style="list-style-type: none"> Stream “health” monitoring 	<ul style="list-style-type: none"> Sections of Wilpinjong Creek and Cumbo Creek 	<ul style="list-style-type: none"> Annually.⁴ 	2.5
<ul style="list-style-type: none"> Channel stability monitoring 	<ul style="list-style-type: none"> Long sections of Wilpinjong Creek and Cumbo Creek will be surveyed along the creek alignment. 	<ul style="list-style-type: none"> Annually. 	2.5

Table 1 (Continued)
Overview of the Project Environmental Monitoring Programme

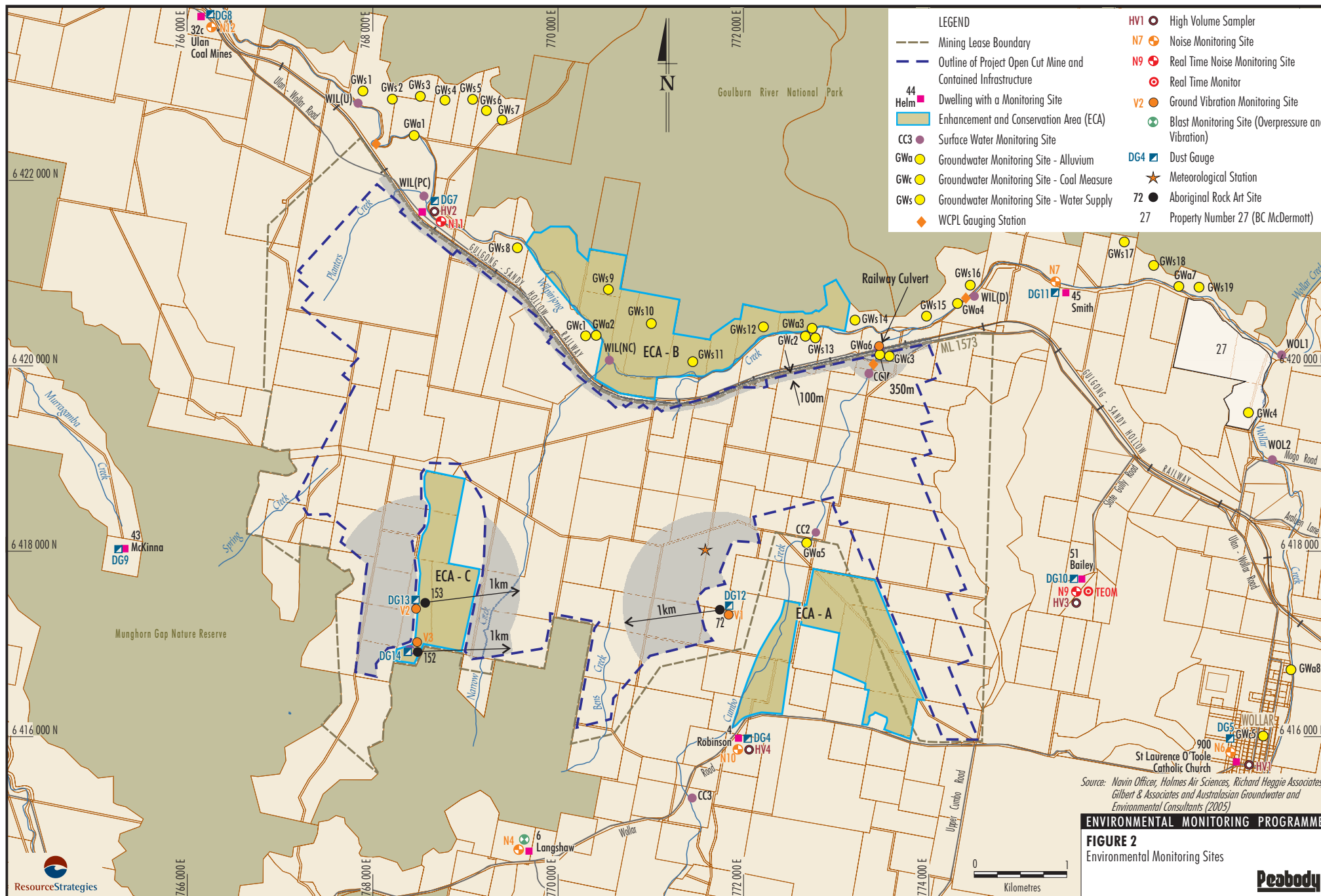
Monitoring Parameter	Monitoring Sites ¹	Frequency	Section
Groundwater			
<ul style="list-style-type: none"> Water level, field pH, EC and volume of water extracted. 	<ul style="list-style-type: none"> Open Cut Operations – Main pit sump(s). Open Cut Operations – Dewatering Bores. Water Supply Bores – GWs1 to GWs19. 	<ul style="list-style-type: none"> Monthly. 	2.6
<ul style="list-style-type: none"> Na, K, Mg, Ca, Cl, HCO₃, SO₄, total Fe. 	<ul style="list-style-type: none"> Wilpinjong Creek – GWA1 to GWA4, GWA7 (Alluvium), GWc1 and GWc2 (Coal Measures). Cumby Creek – GWA5 and GWA6 (Alluvium) and GWc3 (Coal Measure). Wollar Creek – GWc4 (Coal Measures). Wollar Village – GWA8 (Alluvium) and GWc5 (Coal Measures). 	<ul style="list-style-type: none"> Every 6 Months. 	2.6
<ul style="list-style-type: none"> Water level, field pH and EC. 	<ul style="list-style-type: none"> Wilpinjong Creek – GWA1 to GWA4 and GWA7 (Alluvium) and GWc1 and GWc2 (Coal Measures). Cumby Creek – GWA5 and GWA6 (Alluvium) and GWc3 (Coal Measure). 	<ul style="list-style-type: none"> Monthly. 	2.6
	<ul style="list-style-type: none"> Wollar Creek – GWc4 (Coal Measures). Wollar Village – GWA8 (Alluvium) and GWc5 (Coal Measures). 	<ul style="list-style-type: none"> Quarterly. 	2.6
<ul style="list-style-type: none"> Water level, field pH and EC. Na, K, Mg, Ca, Cl, HCO₃, SO₄, and total Fe. 	<ul style="list-style-type: none"> Landholder bores, wells and waterholes. 	<ul style="list-style-type: none"> In consultation with individual landholders. 	2.6
<ul style="list-style-type: none"> Connectivity and groundwater leakage from Cumby Creek will be monitored following its relocation and will be included in the Cumby Creek Relocation Plan (CCRP) 	<ul style="list-style-type: none"> Details of the monitoring of connectivity and groundwater leakage from Cumby Creek will be included in the Cumby Creek Relocation Plan (CCRP) 	<ul style="list-style-type: none"> Details of the monitoring of connectivity and groundwater leakage from Cumby Creek will be included in the Cumby Creek Relocation Plan (CCRP). 	2.6
Rehabilitation			
<ul style="list-style-type: none"> Rehabilitation performance will be monitored to ensure vegetation is establishing and to determine the need for any maintenance and/or contingency measures. Details of the Rehabilitation Monitoring Programme are provided in the revised RMP. 	<ul style="list-style-type: none"> Details of the Rehabilitation Monitoring Programme are provided in the revised RMP. 	<ul style="list-style-type: none"> Details of the Rehabilitation Monitoring Programme are provided in the revised RMP. 	2.7
Coal Transport			
<ul style="list-style-type: none"> Coal production and train movements. 	<ul style="list-style-type: none"> Rail loading infrastructure. 	<ul style="list-style-type: none"> Annually (coal production). Daily (train movements). 	2.8
Greenhouse Gas			
<ul style="list-style-type: none"> Diesel and electricity usage. 	<ul style="list-style-type: none"> Plant equipment. 	<ul style="list-style-type: none"> Annually. 	2.9
Waste			
<ul style="list-style-type: none"> Waste oil and scrap metal. 	<ul style="list-style-type: none"> Waste disposal areas. 	<ul style="list-style-type: none"> Annually. 	2.10

¹ Monitoring locations are shown on Figure 2.

² Noise monitoring locations will be subject to landowner consent at the time of monitoring. In the event of a landowner not consenting to the noise monitoring, monitoring will be conducted at an alternative appropriate location (e.g. a nearby dwelling).

³ Monitoring frequency to be updated in the next revision of the NMP, subject to approval.

⁴ Monitoring frequency to be updated in the next revision of the SWMMP, subject to approval.



Source: Navin Officer, Holmes Air Sciences, Richard Haggie Associates, Gilbert & Associates and Australasian Groundwater and Environmental Consultants (2005)

ENVIRONMENTAL MONITORING PROGRAMME

FIGURE 2
Environmental Monitoring Sites

Peabody

2.1 METEOROLOGY

An automated meteorological station at the Project currently records temperature (at heights of 2 m and 10 m above ground level), relative humidity, net solar radiation, rainfall, wind speed, wind direction and sigma theta (the rate of change of wind direction). The meteorological station is operated in accordance with the requirements in the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (EPA, 2001). Meteorological data is continuously monitored and the data averaged over 10 minute periods. The meteorological station will continue to be utilised for the life of the Project.

2.2 NOISE

A NMP has been developed for the Project. Noise monitoring will be conducted at the following locations¹ proximal to the Project (Figure 2):

- N4 – Langshaw dwelling;
- N6 – St Laurence O’Toole Catholic Church;
- N7 – Smith dwelling;
- N9 – Bailey dwelling;
- N10 – Robinson dwelling;
- N11 – Reid dwelling²; and
- N12 – Ulan Coal Mines-owned dwelling.

Unattended and attended noise monitoring will be conducted on a quarterly basis for the first 12 months of the Project and then on an as needed basis (i.e. complaints-based), thereafter at the above sites and will be conducted in accordance with AS 1055-1997 *Acoustics – Description and Measurement of Environmental Noise* and the NSW Industrial Noise Policy (INP) (EPA, 2000).

Operator-attended noise measurements will be conducted during normal operations to quantify the intrusive noise emissions from the Project as well as the overall level of ambient noise.

The intrusive noise level (L_{Amax} , L_{A1} , L_{A10} and L_{Aeq}) contribution from construction and operation activities will be quantified over a 15 minute measurement period. In addition, the overall levels of ambient noise (i.e. L_{Amax} , L_{A1} , L_{A10} , L_{A50} , L_{A90} , L_{Amin} and L_{Aeq}) over the 15 minute period will be quantified and characterised.

Unattended continuous noise logging will be conducted for a minimum period of one week on an as needed basis to supplement the operator-attended measurements to quantify the overall ambient noise amenity levels resulting from the Project.

In addition, real time noise monitoring will be conducted at two locations (i.e. N9 – Bailey dwelling and N11 – Reid dwelling).^{1,2}

¹ Noise monitoring locations will be subject to landowner consent at the time of monitoring. In the event of a landowner not consenting to the noise monitoring, monitoring will be conducted at an alternative appropriate location (e.g. a nearby dwelling).

² The NMP lists the Helm dwelling as a proposed noise monitoring location. Due to site logistical constraints and restricted electricity supply the Reid dwelling has been chosen as the most appropriate alternative location. The monitoring location will be updated in the next revision of the NMP, subject to approval.

2.3 AIR QUALITY

An AQMP has been developed for the Project. The AQMP will monitor dust deposition and concentrations of PM₁₀ (particulate matter less than 10 µm in size) utilising a network of dust deposition gauges, four high volume samplers (measuring PM₁₀) and a real-time monitor. The monitoring programme will incorporate mechanisms for responding to dust-related complaints.

2.3.1 Dust Deposition

The following dust deposition monitoring sites will be monitored on a monthly basis (Figure 2). Dust deposition gauges will be placed as close as possible to the following premises:

- DG4 – Robinson dwelling;
- DG5 – St Laurence O'Toole Catholic Church;
- DG7 – Reid dwelling³;
- DG8 – Ulan Coal Mines-owned dwelling;
- DG9 – McKinna dwelling;
- DG10 – Bailey dwelling; and
- DG11 – Smith dwelling.

It should be noted that DG4 and DG5 have already been installed as part of the Project's baseline air quality monitoring programme. The remaining dust deposition gauges will be installed and commissioned within three months of the approval of the AQMP.

In addition, dust deposition levels will be monitored at rock art sites 72, 152, and 153 (dust deposition gauges DG12, DG14 and DG13, respectively to be installed adjacent to each site). Dust gauges will be monitored monthly when mining operations are conducted within 1 km of these rock art sites.

Dust deposition gauges will be analysed monthly for ash content and insoluble solids and will be installed and operated in accordance with AS/NZS 3580.10.1-2003 *Methods for sampling and analysis of ambient air - Determination of particulate matter - Deposited matter - Gravimetric method*.

2.3.2 Particulate Matter - PM₁₀

Four high volume samplers will be used to monitor particulate matter in the vicinity of the Project (Figure 2):

- HV1 – St Laurence O'Toole Catholic Church;
- HV2 – Reid dwelling³;
- HV3 – Bailey dwelling; and
- HV4 – Robinson dwelling.

³ The AQMP lists the Helm dwelling as a proposed air quality monitoring location. Due to site logistical constraints and restricted electricity supply the Reid dwelling has been chosen as the most appropriate alternative location. The monitoring location will be updated in the next revision of the AQMP, subject to approval.

The high volume samplers will monitor PM₁₀ over a six day continuous cycle in accordance with the procedure AM-18 in *Approved Methods for the Sampling and Analysis of Air Pollution in New South Wales* (EPA, 2001). AM-18 (EPA, 2001) requires that PM₁₀ monitoring be conducted in accordance with AS 3580.9-6-1990 *Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM₁₀ high volume sampler with size-selective inlet - Gravimetric method*. It should be noted that AS 3580.9-6-1990 has been revised and superseded by AS/NZS 3580.9.6-2003 *Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - PM₁₀ high volume sampler with size-selective inlet - Gravimetric method* and therefore monitoring will be conducted in accordance with AS/NZS 3580.9.6-2003.

In addition, real time PM₁₀ monitoring will be conducted at the Bailey dwelling (TEOM, Figure 2). A tapered element oscillating microbalance analyser will be used to monitor PM₁₀ in accordance with AS 3580.9.8-2001 *Determination of suspended particulate matter - PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser*.

2.4 BLASTING AND VIBRATION

A BMP has been developed for the Project, which includes monitoring of airblast overpressure and ground vibration for all blasts at private residences within 3 km of the blast. Additional monitoring will also be conducted to ascertain local topographical influences on overpressure during early stages of operations. The objective of the monitoring is to obtain assurance that amenity overpressure and vibration limits are being achieved at private residences and that damage criteria are being achieved for public infrastructure.

Monitoring locations will vary according to the location of blasting operations. In the first 12 months of operations the only private residence within 3 km of a blast is the Langshaw residence on Wollar Road (Figure 2).

In addition, monitoring shall be conducted when blasting is within:

- 350 m of concrete power poles;
- 350 m of railway culverts;
- 100 m of railway lines; and
- 1 km of Aboriginal rock art sites 72, 152 and 153 in accordance with the ACHMP.

The blast monitoring programme will be reviewed and where necessary modified over the life of the operations, according to physical changes in mining operations, following the acquisition of private property by WCPL, or as a result of complaints.

2.5 SURFACE WATER

The SWMMP for the Project involves the monitoring (water quality, flow and impact on users) of various surface water bodies upstream and downstream from the Project, and existing waterholes on the McDermott property (27). Locations where surface water monitoring will be undertaken are shown on Figure 2. An overview of the Project surface water monitoring programme is provided below in Table 2.

Table 2
Overview of the Project Surface Water Monitoring Programme

Monitoring Locations ¹	Frequency	Parameters
WIL(U), WIL(PC), WIL(NC), WIL(D), CC1 to CC3, WOL1 and WOL2	Monthly and following significant rainfall events (i.e. greater than 20 mm in 24 hours)	pH, EC, Turbidity and SO ₄
Wilpinjong Creek (upstream and downstream) and Cumbo Creek gauging stations	Continuous	Flow rate and EC
	Monthly	pH, EC, Turbidity and SO ₄
Site water storages, tailings disposal storages and sediment retention dams	Monthly	pH, EC, Turbidity and SO ₄
Existing waterholes on the McDermott property	In consultation with individual landholder	Water level, pH, EC, Turbidity and SO ₄

¹ Monitoring locations are shown on Figure 2.

Surface water quality monitoring and sample collection, storage and transportation will be undertaken in accordance with the procedures outlined in the relevant parts of AS/NZS 5667 - 1998 (AS 5677) *Water quality – Sampling*.

Laboratory analysis for turbidity and sulphate will be undertaken by a laboratory which has relevant accreditation by the National Association of Testing Authorities, Australia (NATA).

2.5.1 Stream “Health” Monitoring Programme

The stream “health” monitoring programme has been developed for the Project and is described in the SWMMP. A stream “health” monitoring programme will be implemented for Wilpinjong Creek and Cumbo Creek to assist in determining the need for any maintenance and/or contingency measures. The routine monitoring of sections of Wilpinjong Creek and Cumbo Creek will include the following components:

- Monitoring of aquatic macroinvertebrate assemblages annually⁴. *In situ* surface water quality sampling (pH, EC, temperature, dissolved oxygen, salinity and turbidity) will also be conducted at each macroinvertebrate sampling site.
- Visual monitoring (e.g. photographic) will be conducted annually⁴ to detect a potential change in the quality and quantity of riparian vegetation.
- Monitoring of the rehabilitation of riparian vegetation.
- Channel stability monitoring (Section 2.5.2).

The macroinvertebrate assemblages in Wilpinjong Creek and Cumbo Creek will be monitored to provide an indication of potential long-term impacts at the ecosystem level using either or both of the following methods (both described in Bately *et al.*, 2003):

- Quantitative method - samples would be taken using timed 1-minute sweeps of habitats (e.g. edge, riffle and pools) using a dip net, then preserved and sorted to family level to allow abundance and taxa richness to be determined. Baseline samples and samples from control sites would be taken to allow temporal and spatial comparison. The SIGNAL biotic index (Chessman, 1995; Chessman *et al.*, 1997, Chessman, 2003) would also be used to assign average pollution sensitivity grades to each of the sites.
- Australian River Assessment System (AUSRIVAS) rapid biological assessment for macroinvertebrates.

⁴ Monitoring frequency to be updated in the next revision of the SWMMP, subject to approval.

2.5.2 Channel Stability Monitoring Programme

The channel stability monitoring programme has been developed for the Project and is described in the SWMMP. The channel stability monitoring programme aims to provide qualitative measures of stream bed and bank erosion and channel instability along Wilpinjong and Cumbo Creeks. The monitoring programme involves both pre-mining and during mining surveys. Initial surveys will be conducted to establish baseline conditions with subsequent surveys being conducted annually. The details of the channel stability monitoring programme are outlined in Table 3.

Table 3
Channel Stability Monitoring Programme

Creek	Timing of Initial Survey	Reach Condition Survey	Long Sections	Frequency
Wilpinjong Creek	Prior to mining.	Condition of bed and banks on reach by reach basis between the upstream gauging station and Wollar Creek confluence (subject to landowner agreement). Select reaches of the stream will be photographed and dimensioned by survey. Representative cross-sections will be surveyed.	A long section will be surveyed along the creek alignment.	Annually
Cumbo Creek	Prior to mining.	Condition of bed and banks on reach by reach basis from upstream the Cumbo Creek relocation (once developed) to the Wilpinjong Creek confluence. Select reaches of the stream will be photographed and dimensioned by survey. Representative cross-sections will be surveyed.	A long section will be surveyed along the creek alignment.	Annually.

Channel stability monitoring will include the following:

- Initial surveys will include the establishment of reference cross-sections and long-sections in Wilpinjong Creek and Cumbo Creek.
- Cross-sectional and longitudinal surveys will be undertaken to enable any flow induced change to be quantified.
- Photographs and written descriptions of each selected reach of the stream will be undertaken.

2.6 GROUNDWATER

The GWMP will involve the monitoring of water levels and water quality from the Project water supply bores, dewatering bores, and groundwater seepage and surface water runoff which collect in pit sumps during mining operations. The GWMP will also involve the monitoring of groundwater levels in alluvium associated with Wilpinjong, Wollar and Cumbo Creeks, selected landholder bores, wells and waterholes and selected/relevant Landcare bores on WCPL-owned land.

2.6.1 Open Cut Operations – Dewatering Bores and Groundwater Seepage

Water level, field pH and field electrical conductivity (EC) will be monitored on a monthly basis at all dewatering bores. The volume of water extracted from individual dewatering bores will also be recorded monthly.

Groundwater seepage and surface water runoff will collect in pit sumps. Water level, field pH and field EC of the collected water will be monitored on a monthly basis. The volumes of water transferred from the pit sumps will also be recorded.

During mining operations the extent of alluvium materials in the immediate vicinity of the Project open cuts will be mapped by Project geological staff and used for the purposes of contingency measure planning if necessary.

2.6.2 Water Supply Borefield Monitoring Programme

The water supply borefield monitoring programme will include:

- monitoring of water levels, pH and EC on a monthly basis at all water supply bores (GWs1 to GWs19); and
- recording of the volume of water extracted from individual water supply bores on a monthly basis.

Data from the water supply borefield monitoring programme will be used to help monitor the groundwater yield from the borefield and determine the extent of the effect of groundwater extractions on the existing groundwater regime.

2.6.3 Wilpinjong Creek

Five alluvium bores will be monitored along Wilpinjong Creek (GWA1 to GWA4 and GWA7). Water level, field pH and field EC will be monitored on a monthly basis. Laboratory analyses for Sodium (Na), Potassium (K), Magnesium (Mg), Calcium (Ca), Chloride (Cl), Carbonate (HCO_3), Sulphate (SO_4) and Total Iron (Fe) will also be undertaken every six months.

Two coal measure bores will be monitored along Wilpinjong Creek (GWc1 and GWc2). Water level, field pH and field EC will be monitored on a monthly basis. Laboratory analyses for Na, K, Mg, Ca, Cl, HCO_3 , SO_4 and Total Fe will also be undertaken every six months.

2.6.4 Cumbo Creek

Two alluvium bores will be monitored along Cumbo Creek (GWA5 and GWA6). The groundwater monitoring locations are shown on Figure 2. Water level, field pH and field EC will be monitored on a monthly basis. Laboratory analyses for Na, K, Mg, Ca, Cl, HCO_3 , SO_4 and Total Fe will also be undertaken every six months.

One coal measure bore will be monitored along Cumbo Creek (GWc3). Water level (i.e. groundwater pressure), field pH and field EC will be monitored on a monthly basis. Laboratory analyses for Na, K, Mg, Ca, Cl, HCO_3 , SO_4 and Total Fe will also be undertaken every six months.

2.6.5 Wollar Creek

One coal measure bore will be monitored along Wollar Creek (GWc4). Water level, field pH and field EC will be monitored on a quarterly basis. Laboratory analyses for Na, K, Mg, Ca, Cl, HCO_3 , SO_4 and Total Fe will also be undertaken every six months.

2.6.6 Wollar Village

One alluvium bore along Wollar Creek will be monitored in Wollar Village (GWA8). Water level (i.e. groundwater pressure), field pH and field EC will be monitored on a quarterly basis. Laboratory analyses for Na, K, Mg, Ca, Cl, HCO_3 , SO_4 and Total Fe will also be undertaken every six months.

One coal measure bore will be monitored in Wollar Village (GWc5). Water level, field pH and field EC will be monitored on a quarterly basis. Laboratory analyses for Na, K, Mg, Ca, Cl, HCO₃, SO₄ and Total Fe will also be undertaken every six months.

2.6.7 Landholder Bores, Wells and Waterholes

Groundwater monitoring will be undertaken at selected existing bores, wells and waterholes surrounding the Project area, in consultation with relevant landholders. This will include quantitative monitoring of water levels at existing waterholes on the McDermott property (27) (Figure 2) downstream of the Project.

Water level, field pH and field EC, or other water quality parameters (e.g. Na, K, Mg, Ca, Cl, HCO₃, SO₄ and Total Fe) will be monitored in consultation with individual landholders.

2.6.8 Connectivity and Groundwater Leakage from Cumbo Creek

A monitoring programme to monitor the connectivity and groundwater leakage from Cumbo Creek following its relocation will be included in the Cumbo Creek Relocation Plan, to be prepared in accordance with Condition 30, Schedule 3 of the Project Approval. The revised timing for preparation of the Cumbo Creek Relocation Plan within 24 months of the Project Approval was approved by the Director-General in a letter dated 3 February 2006.

2.6.9 Groundwater Dependant Ecosystems and Riparian Vegetation

The stream “health” monitoring programme described in Section 2.5.1 will be used to detect any potential changes in aquatic biology, the quantity and quality of riparian vegetation along Wilpinjong Creek and Cumbo Creek and to determine the need for any maintenance and/or contingency measures.

2.7 REHABILITATION

Rehabilitation performance will be monitored to ensure vegetation is establishing and to determine the need for any maintenance and/or contingency measures. Details of the rehabilitation monitoring programme are provided in the revised RMP and will be included in the next revision of the EMP.

2.8 COAL TRANSPORT

Records will be kept with respect to the amount of coal transported from the site on an annual basis. This will include the number of coal haulage train movements generated by the project on a daily basis. This information will be recorded in the Annual Environmental Management Report (AEMR).

2.9 GREENHOUSE GAS

Diesel and electricity usage will be recorded on an annual basis from which carbon dioxide (CO₂) equivalent emissions will be calculated. CO₂ equivalent greenhouse gas emissions will be reported in the AEMR.

2.10 WASTE

The amount of waste oil generated by the Project will be recorded at the time of collection. Records regarding the quantity of scrap metal transported off-site will be kept. The amount of waste material generated by the Project will be monitored and reported in the AEMR.

3 REPORTING

WCPL will prepare an AEMR as part of the Department of Primary Industries – Mineral Resources' Mining, Rehabilitation and Environmental Management Process (MREMP) framework. The AEMR will be prepared to satisfy Condition 6, Schedule 5 of the Project Approval, as follows:

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

In accordance with Condition 12(a), Schedule 5 of the Project Approval, a copy of this EMP will be made available to the Project Community Consultative Committee (CCC) and the Mid-Western Regional Council. In addition, a copy will be made available for viewing to members of the public at the mine and on a website in accordance with Conditions 12(b) and 12(c), Schedule 5 of the Project Approval.

In accordance with Condition 13, Schedule 5 of the Project Approval, a summary of the environmental monitoring results will be made publicly available at the mine and on its website and updated every three months.

4 REVIEW

The EMP will be reviewed, and if necessary updated, by the Environmental Manager:

- on an annual basis;
- following any independent environmental audit;
- in response to a change in any monitoring programme relevant to this EMP;
- when there are changes to Project Approval or licence conditions relating to aspects of this EMP;
or
- in response to a relevant change in technology or legislation.

5 REFERENCES

- Batley, G. E., Humphrey, C. L., Apte, S. C. and Stauber, J. L. (2003) *A Guide to the Application of the ANZECC/ARMCANZ Water Quality Guidelines in the Minerals Industry*. Australian Centre for Mining Environmental Research (ACMER).
- Chessman, B. C. (1995). Rapid assessment of rivers using macroinvertebrates: a procedure based on habitat-specific sampling, family level identification, and a biotic index. *Aust. J. Ecol.*, 20: 122-129.
- Chessman, B. C., Growns, J. E., Kotlash, A. R. (1997) Objective derivation of macroinvertebrate family sensitivity grade numbers for the SIGNAL biotic index: application to the Hunter River system, New South Wales. *Mar. Freshwater Res.*, 48: 159-172.
- Chessman, B. C. (2003) New sensitivity grades for Australian river macroinvertebrates. *Mar. Freshwater Res.*, 54: 95-103.
- Environmental Protection Authority (EPA) (2000) *Acoustics – Description and Measurement of Environmental Noise*.
- Environmental Protection Authority (EPA) (2001) *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW*.
- Wilpinjong Coal Pty Limited (WCPL) (2005) *Wilpinjong Coal Project Environmental Impact Statement*.