WHITEHAVEN COAL

Narrabri Coal Operations Pty Ltd

ABN: 15 129 850 139

Annual Environmental Management Report (ML 1609) and Annual Review (PA 05_0102 MOD 1 & 08_0144 MOD 2)

for the

Narrabri Mine

1 April 2012 – 31 March 2013

Narrabri Coal Operations Pty Ltd

Annual Environmental Management Report (ML 1609) and Annual Review (PA 05_0102 MOD 1 & 08_0144 MOD 2) for the Narrabri Mine

Stage 1 MOP Commencement Date 08.02.2008 – MOP Completion Date 31.12.2011

Stage 2 MOP Commencement Date 08.08.2011 – MOP Completion 31.12.2017

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Narrabri Coal Operations Pty Ltd

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Date: 28/6/13

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- Department of Trade and Investment, Regional Infrastructure and Services – Division of Resources and Energy
- Department of Trade and Investment, Regional Infrastructure and Services – Agriculture
- Office of Environment and Heritage
- NSW Office of Water
- Narrabri Shire Council
- Narrabri Mine Community Consultative Committee

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ACRONYMS USED THROUGHOUT THIS DOCUMENT

AR	-	Annual Review
ACHMP	-	Aboriginal Cultural Heritage Management Plan
AQMP	-	Air Quality Management Plan
CHPP	-	Coal Handling and Preparation Plant
DP&I	-	Department of Planning and Infrastructure
DRE	-	Division of Resources and Energy
DSEWPaC	-	Commonwealth Department of Sustainability, Environment, Water, Population and Communities
EA	-	Environmental Assessment
EMS	-	Environmental Management Strategy
EPA	-	Environment Protection Authority
EPL	-	Environment Protection Licence
ESAP	-	Energy Savings Action Plan
LMP	-	Landscape Management Plan
mbgl	-	Metres below ground level
Mtpa	-	Million tonnes per annum
MCP	-	Mine Closure Plan
ML	-	Mine Lease
NCOPL	-	Narrabri Coal Operations Pty Ltd

NM - Narrabri Mine

NOW - NSW Office of Water

NSC - Narrabri Shire Council

NMP - Noise Management Plan

OEH - Office of Environment and Heritage

PA - Project Approval

RMP - Rehabilitation Management Plan

WMP - Water Management Plan

WCL - Whitehaven Coal Limited

1 INTRODUCTION AND OBJECTIVES

1.1 Scope

1.1.1 Introduction and Period of Reporting

This Annual Environmental Management Report (AEMR) is the fifth for the Narrabri Mine and has been prepared in accordance with Condition 4 of Mining Lease (ML) 1609. This report also forms the Annual Review, required by Schedule 6, Condition 6 of the Narrabri Mine Stage 2 Project Approval (PA) 08_0144 MOD 2. The mine currently operates with two approvals as the Stage 1 Project Approval (PA) 05_0102 MOD 1 was to be surrendered by July 2011 under the terms of the Stage 2 PA 08_0144, which was issued in July 2010. Narrabri Mine has applied to surrender the Stage 1 approval and this should occur during the 2013/2014 AEMR/Annual Review period. Both approvals require annual reports and where possible the requirements of both have been considered throughout this report.

The AEMR generally follows the format identified in the Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS) – Division of Resources and Energy (DRE) document entitled "*Guidelines to the Mining, Rehabilitation and Environmental Management Process*" Version 3, dated January 2006.

Though primarily covering the period from 1 April 2012 to 31 March 2013 (the reporting period), where relevant the AEMR and Annual Review provides information on historical aspects of the operations, longer term trends in environmental monitoring results, comparisons with predictions in the Environmental Assessment and provides relevant information on activities to be undertaken during the ensuing period, i.e. from 1 April 2013 to 31 March 2014, or beyond.

The Narrabri Mine is located within the Narrabri Local Government Area (LGA), approximately 30 km south-southeast of Narrabri, and 10 km north-northwest of Baan Baa (Figure 1).

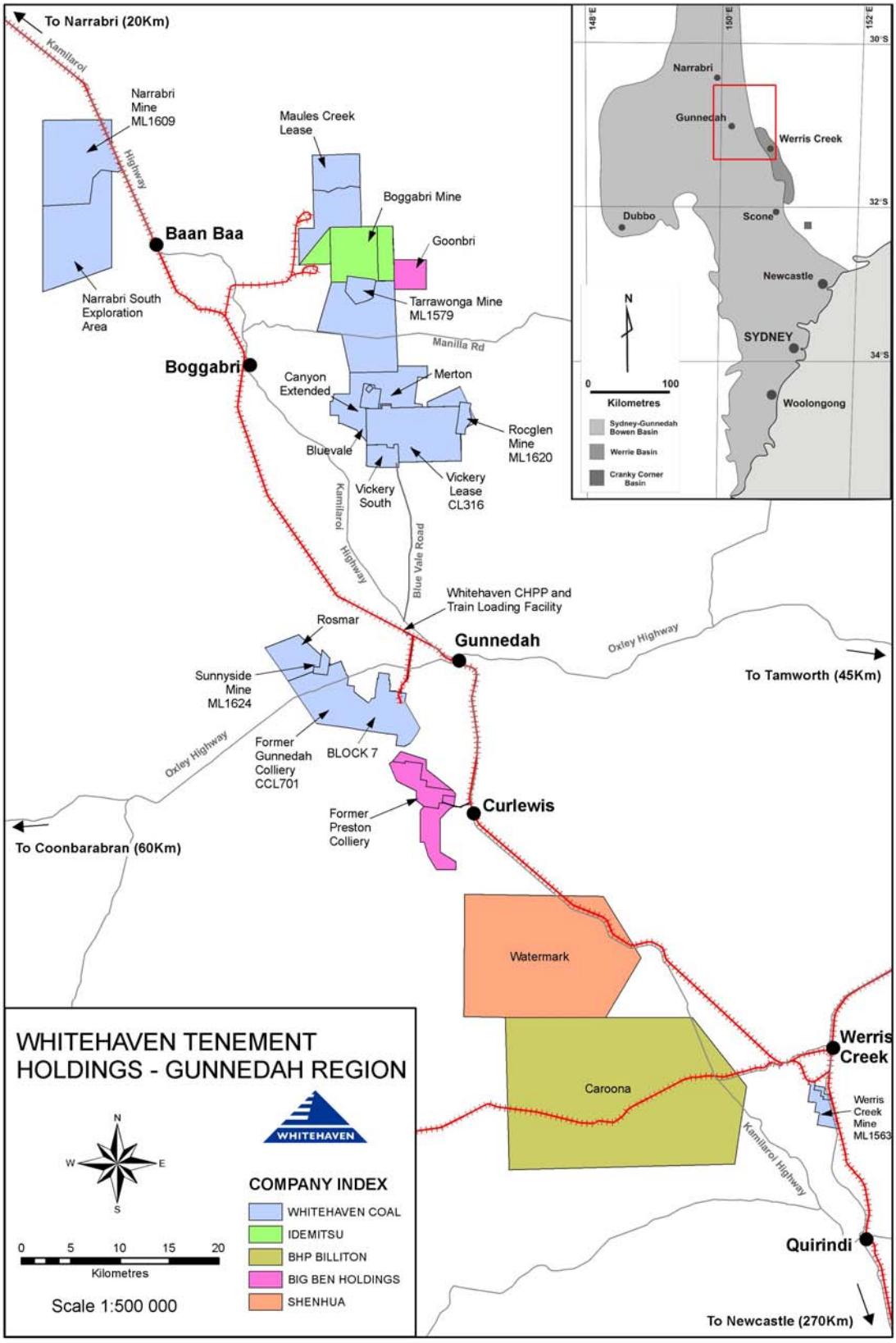

Figure 1 - Project Locality

1.1.2 The Company

The operating company for the Narrabri Mine is Narrabri Coal Operations Pty Ltd (NCOPL). The Narrabri Mine is a joint venture between Narrabri Coal Pty Ltd (NCPL) (70%), Upper Horn Investments Limited (7.5%), Electronic Power Development Co. Ltd (7.5%), EDF Trading (7.5%) and Daewoo International Corporation & Korea Resources Corporation (7.5%). NCPL is a 100% subsidiary company of Whitehaven Coal Limited (WCL), a publicly listed Company (ASX:WHC) with several mining interests in the Gunnedah-Narrabri region of NSW.

WCL owns and operates a number of open cut coal projects in the Gunnedah basin. The WCL operations comprise the Whitehaven Rail Siding and CHPP approximately 6 km west of Gunnedah, the Rocglen Open Cut Coal Mine, the Canyon (formerly Whitehaven) Open Cut Coal Mine (mining ceased mid 2009), the former Gunnedah Colliery and Sunnyside Open Cut Coal Mine, the Tarrawonga Open Cut Coal Mine (a joint venture between WCL (70%) and Idemitsu Australian Resources Pty Ltd (30%)) and Werris Creek Open Cut Coal Mine (through subsidiary company Werris Creek Coal Pty Ltd).

WCL is also in the process of gaining the necessary State and Federal Government approvals to develop to additional open cut mines; the Vickery Project and the Maules Creek Project. The Vickery Project is 100% owned by WCL and the Maules Creek Project is a joint venture between WCL (75%), J-Power (10%) and ITOCHU (15%).

1.1.3 Background and History of the Narrabri Mine

The Narrabri Mine was developed after substantial investigations were undertaken under Exploration Licence (EL) 6243, granted in May 2004. This exploration program comprised an extensive drilling campaign of 160 rotary, fully and partly cored drill holes, totalling in excess of 6000m. Following completion of relevant assessments and feasibility studies, and the determined *in-situ* coal resource of 229M tonnes, it was determined that the proposal proceed to an application under the *Environmental Planning and Assessment Act 1979* (EP&A Act). An Environmental Assessment (EA) was prepared and submitted to the Department of Planning in March 2007. Project Approval (PA) 05_0102 was subsequently granted for the Project on 13 November 2007. On approval, Mining Lease (ML) 1609 was granted on 18 January 2008 and Environment Protection Licence (EPL) 12789 was granted on 20 February 2008.

PA 05_0102 provided for the extraction of no more than 2.5 million tonnes of ROM coal per year and required all coal to be transported from the site via rail.

Since commencing Stage 1, continued geological exploration and a range of related technical studies were completed to evaluate the feasibility of converting the Stage 1 continuous mining operation to a longwall mining operation. An application for Project Approval, accompanied by an EA for the Narrabri Mine Stage 2 Longwall Project ("Stage 2 EA") was issued for public exhibition in November 2009.

In recognition of the expected approval timeframes and the long lead times for selected Stage 2 construction activities, NCOPL, the current operating company, sought approval to undertake some Stage 2 works via a modification to the Stage 1 Project Approval under Section 75W of the EP&A Act while the Stage 2 EA was being assessed.

PA 05_0102 MOD 1 was granted on the 26th March 2010 for activities including the construction and use of the West Mains Ventilation Shaft and gas pre-drainage infrastructure and the construction but not use of a Coal Handling and Preparation Plant (CHPP). Stage 2 operations were subsequently approved by the Minister for Planning on the 26th July 2010, via PA 08_0144, which provides for the extraction of up to 8Mtpa of coal utilising longwall mining methods.

Minor modifications to PA 08_0144 were approved by the Minister for Planning in March 2011 (an administrative modification in relation to the Extraction Plan – PA 08_0144 MOD 1) and December 2011 (in relation to a one off transport of coal by road for an approximate 600 tonne bulk sample – PA 08_0144 MOD 2).

Over the life of the approved mine, the total area of native woodland vegetation that may be affected by surface disturbance for construction and operation of mine surface facilities will equate to approximately 210ha. ML 1609 covers a total area of 5,298ha.

1.1.4 Products and Markets

Coal within the Narrabri Mine coal deposit can be described as being relatively free of major structural disturbance. The basal 4-4.2m of the seam generally averages 8 to 10 % raw ash. The product for Stage 1 operations does not require a CHPP but requires general crushing and screening facilities for processing prior to despatch. Coal produced from the Stage 2 longwall operation will require processing through a CHPP which has been constructed and has now been commissioned. Coal produced at the mine is sold to the export market.

1.1.5 Operational and Environmental Management

1.1.5.1 Contacts

The management personnel responsible for operational and environmental performance at the Narrabri Mine and their relevant contact details are as follows:

- Mr Steve Bow – General Manager, retains overall responsibility for all activities and performance at the mine. Contact: (02) 6794 4755.
- Dean Lawrence – Commercial Manager, Narrabri Coal Operations Pty Ltd. Contact: (02) 6794 4755.
- Mr Shane Pegg – Mine Manager, retains statutory and mine management responsibility for all operational activities and safety performance at the mine. Contact: (02) 6794 4755.
- Mr Owen Salisbury – Technical Services Manager, retains responsibility for technical aspects of the operation. Contact (02) 6794 4755.
- Mr Danny Young – Group Environmental Manager, retains overall responsibility for the environmental and rehabilitation activities on site. Contact: (02) 6742 4337.
- Steven Farrar – Environmental Officer, oversees day to day environmental performance across the site. Contact: (02) 6794 755.

Mining operations will be undertaken by Narrabri Mine personnel with the assistance of contractors providing underground support, where required. Contractors are currently used to operate the CHPP and undertake surface civil works onsite at the direction of Narrabri Mine personnel.

1.1.5.2 Support Personnel

In addition to the personnel identified in Section 1.1.5.1, Narrabri Mine utilise specialist assistance as and when required. Specialist environmentally-based or related companies or consultants involved in activities at the mine during the reporting period included:

- ALS Coal Gunnedah;
- Eco Logical Australia Pty Ltd;
- Advitech Pty Limited;
- Novecom Pty Limited;

- WRM Water and Environment;
- Spectrum Acoustics; and
- URS Australia Pty Ltd.

All mining and environmental management activities are undertaken generally in accordance with the Mining Operations Plan (MOP), management plans and procedures prepared in satisfaction of Narrabri Mines' ML 1609, Environment Protection Licence (EPL) 12789, Project Approval's and the relevant legislation.

1.1.6 Corporate Environmental Policy

WCL has a documented Health, Safety and Environmental policy which states:

Whitehaven intends to conduct business in a way that maintains a safe and healthy workplace for its employees, contractors, visitors and the surrounding community and will protect the environment in all stages of exploration, mining, processing and train loading.

Whitehaven aims to:

- *Achieve zero injuries and occupational illnesses.*
- *Achieve zero equipment damage.*
- *Achieve zero environmental incidents.*

Whitehaven will strive to achieve these goals by:

- *Ensuring health, safety and environment is considered in all planning and work activities.*
- *Involve employees through regular communication, consultation and training.*
- *Identifying and controlling all potential hazards in the workplace through hazard identification and risk analysis.*
- *Ensuring all incidents are reported, controlled and learning's applied and shared.*
- *Providing effective injury management and rehabilitation for all employees.*
- *Seeking continuous improvement in performance by taking into account employee & community concerns and advances in health, safety and environment.*
- *Complying with legislative and other requirements and providing necessary training and resources.*

Whitehaven will ensure the availability of human, financial and physical resources to maintain and implement the Health and Safety Management System.

Responsibilities of people employed at Whitehaven Coal:

All persons employed by Whitehaven have a personal responsibility to comply with this policy and associated Health, Safety & Environment systems. No work is to be undertaken without a clear

understanding of a safe method that minimizes the risk of injury, equipment damage and environmental harm.

Whitehaven employees shall:

- *Work in a healthy, safe and environmentally responsible manner.*
- *Encourage others to work in a healthy, safe and environmentally responsible manner.*
- *Promptly report incidents, unsafe practices or conditions and environmental concerns as they become apparent.*
- *Co-operate with Management in the support of promotion of health and safety responsible environmental management in the work place.*

This policy applies to all mines operated by Whitehaven Coal Limited and its subsidiaries.

1.2 Approval Status

1.2.1 Leases, Licences, Approvals and Management Plans

Table 1 identifies the leases, licences and approvals in place for the Narrabri Mine at the end of the reporting period, the issuing / responsible Authority, dates of issue, duration (where limited) and relevant comments. The list is presented chronologically according to the date of issue.

Reviews of compliance/performance with the conditions identified in PA 05_0102 MOD 1, PA 08_0144 MOD 2, EPL 12789, and ML 1609, are presented in Appendix 3, Tables A3-1, A3-2, A3-3 and A3-4 respectively.

Table 1 - Tenements, Licences and Approvals

Issuing / Responsible Authority	Type of Lease, Licence, Approval	Date of Issue	Expiry	Comments
Division of Resources and Energy (DRE)	Exploration Licence EL 6243	21 May 2004	20 May 2014	Approval for exploration
Minister for Planning	Project Approval (PA 05_0102)	13 November 2007	18 January 2029	Project Approval for Stage 1. Request has been submitted to surrender the Stage 1 PA with no response received to date
DRE	Mining Lease (ML 1609)	18 January 2008	18 January 2029	Approval for mining
Office of Environment and Heritage (OEH)	Environment Protection Licence 12789	20 February 2008	Nil – Anniversary date: 20 February	For mining operation >5,000,000 T (handled and produced)
Narrabri Shire Council (NSC)	Construction Certificate DP 816020 Inspection Report/Permit to Occupy No 2413	17 October 2008 6 August 2009	N/A	Stage 1 Mine Surface Facilities
NSW Office of Water (NOW)	90CA811347 / WAL15922 90WA812891 / WAL20131 90WA812891 / WAL12833 90CA802130 / WAL6762 90CA802130 / WAL2671 90CA802130 / WAL2728 90CA802130 / WAL2952	Various	Various	GAB – Water supply (248ML) GW – Water supply (150ML) GW – Water supply (67ML) River – High Security (20ML) River (48ML) River (10ML) River (600ML)

Issuing / Responsible Authority	Type of Lease, Licence, Approval	Date of Issue	Expiry	Comments
	90BL254679 / WA822539 90BL254481 - 90BL254487 90BL254660 - 90BL254663 90BL254658 90BL254659 90BL254701 90BL254958 - 90BL254967 90BL255167 - 90BL255173 90BL255216 - 90BL255218 90BL255769 – 90BL255772			Mining (Low Security) (818ML) Groundwater Monitoring Purposes
Minister for Planning	Project Approval (PA 05_0102 MOD 1)	26 March 2010	18 January 2029	Notice of modification under Section 75W of the EP&A Act
Minister for Planning	Project Approval (PA 08_0144)	26 July 2010	26 July 2031	Project Approval for Stage 2
WorkCover Authority of NSW	Notification for explosives use and storage	5 August 2010	20 July 2015	Licence to store – 07-100215-001 Licence to handle – various
Narrabri Shire Council (NSC)	Construction Certificate DP 816020	23 September 2010	N/A	Stage 2 Mine Surface Facilities
Minister for Planning	Project Approval (PA 08_0144 MOD 1)	30 March 2011	26 July 2031	Notice of modification under Section 75W of the EP&A Act
	Project Approval (PA 08_0144 MOD 2)	21 December 2011	26 July 2031	Notice of modification under Section 75W of the EP&A Act

Table 2 identifies the management plans, strategies and programs in place for the Narrabri Mine at the end of the reporting period and their current status.

Table 2 - Management Plans, Strategies and Programs

Title	Status	Project Approval Condition (PA 08_0144 MOD 2)
Extraction Plans (for all second workings in the project area)	Longwall panels 101 to 105 approved by the DP&I on 27th March 2012 and DRE on 5th June 2012.	Schedule 3, Condition 3
Noise Management Plan	Stage 2 plan approved 6th December 2011	Schedule 4, Condition 4
Air Quality Monitoring Program	Stage 2 plan approved 6th December 2011	Schedule 4, Condition 7
Water Management Plan, including a: • site water balance; • erosion and sediment control plan; • surface water monitoring plan; • raffinate discharge and transfer control and monitoring plan; • groundwater monitoring program; and • surface and groundwater response plan.	Stage 2 plan approved 5th April 2013	Schedule 4, Condition 13
Aboriginal Cultural Heritage Management Plan	Stage 2 plan approved 6th December 2011	Schedule 4, Condition 23
Energy Savings Action Plan	Stage 2 plan approved 6th December 2011	Schedule 4, Condition 30
Greenhouse Gas Minimisation Plan	Stage 2 plan approved 12th June 2012	Schedule 4, Condition 32
Waste Management Plan	Stage 2 plan approved 6th December 2011	Schedule 4, Condition 33
Landscape Management Plan	Stage 2 plan approved 6th December 2011	Schedule 5, Condition 3
Environmental Management Strategy	Stage 2 plan approved 6th December 2011	Schedule 6, Condition 1
Pollution Incident Response Management Plan	Submitted August 2012	EPL12789
Major Hazard Management Plans incorporating: 1. Surface Transport Management Plan 2. Underground Transport Management Plan 3. Airborne Dust Management Plan 4. Explosives Handling Management Plan 5. Slope Stability Management Plan 6. Fire and Explosion Management Plan	All plans currently managed and implemented by Narrabri Mine	*Coal Mine Health and Safety Act 2002*

Title	Status	Project Approval Condition (PA 08_0144 MOD 2)
7. Strata Failure Management Plan 8. Inrush Management Plan 9. Dust Explosion Management Plan 10. Outburst Management Plan 11. Spontaneous Combustion Management Plan		

1.2.2 Amendments to Leases, Licences and Approvals

No modifications of PA 08_0144 occurred during the 2012/2013 AEMR period. Narrabri Mine is currently collating data and reviewing technical details to assess the viability of introducing Longwall Top Coal Caving (LTCC) to the operation. Should this be considered an option Narrabri Mine will consult with the relevant Government agencies at that time.

The Mining Operations Plan (MOP) for the Narrabri Mine was amended during the reporting period and approved on 27 November 2012. The amendment included an additional hardstand area within the infrastructure area of the mine and a variation to the 'Limit of Mining' boundary as shown on the MOP plans. The 'Limit of Mining' boundary on the previous MOP figures was inside the rib walls of the underground workings. The MOP figures were amended to allow a buffer of 20m from the rib walls. This amendment to the 'Limit of Mining' boundary did not change the planned mining activities outlined in the approved MOP nor did it change any surface disturbance activities associated with the mining area.

1.3 Actions Requested at Previous AEMR Review

No comments have been received on the 2011/2012 AEMR. In addition the site inspections have not been undertaken for the 2011/2012 or the 2010/2011 AEMR periods.

2 SUMMARY OF OPERATIONS

2.1 Exploration, Resources / Reserves and Mine Life

2.1.1 Exploration

Over 300 exploratory drill holes totalling approximately 52,000 m of drilling have been completed to date. The drilling has included cored, partly cored and open hole drilling. However, during the 2012/2013 reporting period no exploration activities were undertaken onsite.

2.1.2 Resources and Reserves

The coal resource of the Narrabri Mine is contained within the Hoskissons Coal Seam. The seam is between 8-10m thick over the western half of ML 1609. The seam strikes generally north-south, and dips gently to the west.

The Hoskissons coal seam has been modelled as a series of plies. The basal 6m section of the seam contains low ash coal suitable for thermal applications. The lower 4.0-4.2m of the seam will form the targeted working section for mining. The upper section of the seam is separated by a tuffaceous band from the basal section and contains higher ash coal that will remain in the roof where seam thickness exceeds 4.2m.

It has been estimated that approximately 230 million tonnes of coal occurs within the targeted working section, with up to 170 million tonnes recoverable by longwall mining methods.

2.1.3 Estimated Mine Life

The Stage 2 EA estimates a mine life of approximately 30 years based on 170Mt of coal recovered from 26 longwall panels and associated development roadways, at an annual production rate of up to 8.0Mt.

2.2 Land Preparation

Land preparation activities undertaken during the reporting period were conducted in accordance with commitments identified in Section 3 of the MOP and included:

- Minor clearing of previously grazed/cultivated agricultural areas for exploration and gas drainage activities; and
- Limited clearing of woodland areas in consultation with a qualified ecologist and as per the Stage 2 Environmental Assessment.

Table 3, the "Production and Waste Summary", shows that at the end of the reporting period a total of 536,308 m^3 of subsoil and topsoil had been stripped over the life of the mine, with 198,228 m^3 respread across re-profiled areas. A further 217,000 m^3 of topsoil and subsoil remains stockpiled on site for future rehabilitation purposes.

Table 3 – Cumulative Production and Waste Summary

	Cumulative Production (cubic metres)			
	Start of Reporting Period	During Reporting Period	Cumulative Total at End of Reporting Period	Cumulative Total at End of next Reporting Period (estimated)
Soil Stripped (m^3)	463,000	73,308	536,308	639,778
Soil Used/spread (m^3)	174,000	24,228	198,228	245,283
Waste Rock (m^3)	657,000	0	657,000	657,000
ROM Coal (t)*	509,132	2,986,527	3,495,659	7,845,659
Processing Waste (t)	10,112	130,698	140,810	358,310
Product (t)	482,531	2,587,459	3,069,990	7,202,490

* - ROM Coal is total production at the mine site. The difference between ROM Coal and final product is related to changes in stockpile volumes at the mine.

Soil removal activities were undertaken specific to the footprint of required surface infrastructure.

2.3 Construction

Construction activities during the reporting period included:

- Gas drainage infrastructure (Plate 1);
- Completion of the CHPP (Plate 2);
- Construction commenced on the bypass crusher (Stage 1 crusher is being enclosed); and
- Commissioning of the water treatment plant (Plate 3).

Plate 1 - Gas Drainage Infrastructure

Plate 2 - Coal Handling and Preparation Plant

Plate 3 - Water Treatment Plant

2.4 Mining

2.4.1 Mining Method

Continuous miners supported by shuttle cars and feeder breakers continue to develop the underground roadways including ventilation overcasts and belt chambers. Development currently extends into the maingate of longwall panel 103 with the roadways developed for longwall panel 102. The longwall unit was installed during April and May 2012 and commenced mining during June 2012.

The underground-in-seam (UIS) drilling program continues using contractors to undertake this work. There are currently two drill rigs operating. The gas from the drill holes is reticulated via underground pipework connected to vertical wells that are connected to the gas drainage plant on the surface.

During the reporting period the longwall and development units produced 2,986,527 t of ROM coal. Of this the longwall unit accounted for 2,542,240 t and had retreated 1,416 m along longwall panel 1 which has a total length of 1,785 m.

2.4.2 Mining Constraints

Economic factors will ultimately determine the continued viability of the operation over the proposed life of mine. Mining activities are also constrained by reducing seam thickness at the subcrop in the North East of the lease. In addition, the first three longwall panels are truncated by a large North-West trending fault at their Northern ends.

Exploration data obtained to date has identified a number of northwest, northeast and more locally north-northwest trending structural zones in the eastern portion of the mine site however these are not expected to pose any significant operational issues with regard to productivity or mine roof instability.

There have been no major igneous intrusions identified as intersecting within the Hoskissons Coal Seam to date.

The occurrence of three massive strata units, being the Garrawilla volcanics, a Basalt Sill, and the Digby Formation have been considered in the mine plan layout. This layout has been optimised for Stage 2 longwall operations. The occurrence of this strata is therefore not expected to impact on mine operations.

Groundwater inflow predictions were made for Stage 1 operations, with adequate contingencies in place for the storage and treatment of groundwater on the surface. Predictions for Stage 2 operations, as identified in the Environmental Assessment, suggest additional groundwater intersection as a consequence of longwall operations. The groundwater model will be recalibrated against actual inflows in accordance with the requirements of the consent conditions.

2.4.3 Mining Equipment

Table 4 presents a list of mining equipment in use at the mine at the end of the reporting period together with its principal function(s).

Table 4 - Mining Equipment

Item	Number in operation	Function
Longwall Unit	1	Longwall mining
Personnel Transport Units	10	Transport of personnel underground
Underground Loader	17	Transport of equipment and materials underground, loaders can also be fitted with attachments to undertake bolting, winching operations etc
Continuous Miner	3	Coal roadway development, each continuous miner serves as a bolting platform fitted with bolting rigs to support the roof and rib of underground roadways
Shuttle Car	6	Coal roadway development
Feeder Breaker	3	Sizing and loading coal onto a conveyor belt
Underground drill rig	2	U/G pre-drainage
Dozers	4	Coal handling – Komatsu 375 & 475, Caterpillar D9 & D10
Water Carts	2	Dust Suppression and drilling operations
Drill Rigs	3	Drilling operations (exploration and pre-drainage drilling)
14M Grader	1	Road maintenance, access tracks and drill pad construction
Excavators	1	Civil works and gas drainage infrastructure
Rollers	2	Civil works, access tracks and drill pad construction
Vacuum truck	1	Drilling operations
Road Registered Tippers	2	Civil works
Posi Trac Loader	1	Civil works

2.4.4 Hours of Operations

The approved hours of operation are provided in Table 5.

Table 5 - Hours of Operation

Activity	Hours / Days
Surface Facilities Construction	
Vegetation clearing / soil removal	7:00am to 10:00pm / 7 days
Surface infrastructure construction	7:00am to 10:00pm / 7 days
Reject emplacement area development	7:00am to 10:00pm / 7 days
Raw materials / supply delivery	7:00am to 10:00pm / 7 days
Ventilation shaft construction	24 hours / 7 days[1]
Gas drainage bore construction	24 hours / 7 days
Mining Operations	
Pit Bottom Area development	24 hours / 7 days
Underground mining	24 hours / 7 days
Gas drainage	24 hours / 7 days
Ventilation fan operation	24 hours / 7 days
Coal processing and handling	24 hours / 7 days
Rail loading and transportation	24 hours / 7 days
Surface maintenance	24 hours / 7 days

Activity	Hours / Days
CHPP reject disposal	24 hours / 7 days[2]
Raw materials / supply delivery	7:00am to 10:00pm / 7 days
Note 1: Operations initially for 4 months then at approximately 5 year intervals 2: Reject disposal activities will generally be restricted to 7:00am to 10:00pm, 7 days per week. However, it is possible that the proportion of reject material generated by the CHPP may exceed the predicted average 5% level for short periods. To account for these periods of elevated reject production, contingent hours of operation will be 24 hours / 7 days (when inversion conditions do not prevail).	

2.5 Processing

2.5.1 Outline

Transportation of the mined coal to the ROM coal stockpile occurs via the conveyor drift from the Pit Bottom Area to the Pit Top Area. The ROM coal is then drawn from the ROM coal stockpiles via one of two reclaim valves and tunnels from where it is fed to a rotary breaker for size reduction. The broken coal is then transferred to a dry screen with the <20mm coal transferred directly to the product coal stockpile area and the remainder transferred to the CHPP where the coal is washed. The fine and ultra-fine reject is dewatered via a belt press and added to the product stockpile. The washed coal is transferred to the product coal stockpile area as either a thermal coal or Pulverised Coal Injection (PCI) grade product.

The coal preparation process currently removes approx. 5% of the total ROM feed as reject, which is predominantly rock from the floor of the mine workings. The rejects are stockpiled adjacent to the CHPP. From the reject stockpile, the consolidated reject is transferred to a Reject Emplacement Area (REA) on the north-facing side of a low ridge immediately to the west of the box cut.

2.5.2 Changes or Additions to the Process or Facilities

Coal crushing and despatch activities have been in accordance with the commitments provided in the Mining Operations Plan and in accordance with the conditions of consent. Coal reject is produced as a result of the crushing process and a portion of the REA has been constructed in readiness for reject emplacement which will commence during the next reporting period.

The expansion to the ROM pad as outlined in the EA and MOP has been undertaken during the reporting period (refer to Plate 4). The increase has provided capacity for 400,000t of ROM coal. The Stage 1 crusher is also being enclosed to supplement

through-put at the mine. The construction of the new enclosure is expected to be completed during the 2013/2014 reporting period.

Plate 4 – ROM Pad Extension

2.6 Waste Management

2.6.1 Introduction

Wastes produced from the Narrabri Mine during the reporting period remain unchanged from those identified in the EA and MOP and comprised:

- General domestic-type wastes from onsite buildings and routine maintenance consumables;
- General underground waste;
- Recyclable (steel and paper/cardboard);
- Oil and grease; and
- Sewage.

The following sub-sections identify the management procedures adopted for each of these wastes throughout the reporting period. Management procedures, as identified in the Waste Management Plan, remain unchanged from those previously identified and will be continued for the ensuing reporting period.

2.6.2 Domestic Type Wastes

All general wastes originating from the surface facilities area have been disposed of in mobile garbage bins located adjacent to the various buildings. These bins are collected and disposed of offsite by Namoi Waste Corp on a regular basis. Approximately 727tonnes of general waste was transferred offsite during the reporting period (approximately half is transported to Namoi Waste Corp's transfer facility where it is segregated further to maximise recycling) which is approximately 10% more than the amount transferred in the previous period. This is a result of the completion of construction and the ramp up to full production.

2.6.3 Oil Containment and Disposal

The bunded permanent waste oil storage area adjacent to the washbay has three bunded 1,000L Intermediate Bulk Containers (IBC). The waste oil area also includes bunded containers for waste oil drum storage. A drum crusher was received during the reporting period and is now operational. A self bunded 4,000L waste oil tank is also located at the workshop. An oil-water separator is located at the washbay and another oil-water separator is located at the workshop. During the reporting period approximately 28,000 litres of waste oil was collected by the waste contractor, Northern Lubequip, for recycling.

2.6.4 Recycling

Approximately 51 tonnes of scrap metal has been collected for offsite recycling during the reporting period, which has decreased by approximately 33% when compared to the previous reporting period. The reduction reflects the completion of construction activities and the shift in operations to full production.

Narrabri Mine also collects waste paper, ink cartridges and cardboard for recycling. Approximately 6.8tonnes of cardboard was recycled during the reporting period.

2.6.5 Sewage Treatment and Disposal

Effluent from the sewage and ablutions facilities at the mine is managed through a Sewage Treatment Plant (STP) with a Continuous Extended Aeration Process. The plant is made up of a series of industrial plastic tanks. Each tank provides a separate function in order to treat the sewage for the required quality and quantity. The system was upgraded during the reporting period and now has a maximum capacity of 45,000L per day.

2.6.6 Mine Equipment Tyres

Any tyres requiring disposal during the reporting period were transported offsite for disposal at licensed facilities.

2.6.7 Overburden and Interburden

No overburden or interburden material was developed during the reporting period as the box cut and drifts are all complete. Any remaining material obtained during drift development has been stockpiled in the north-western corner of the Pit Top Area.

2.7 Stockpile Capacity

The Stage 1 ROM Coal stockpile area was completed during the 2009/2010 reporting period. The ROM coal stockpile has been upgraded during the reporting period as identified in the Stage 2 EA and the MOP. The capacity of the ROM coal stockpile is approx. 300,000 t and the product stockpile is approx. 200,000 t with dozer push. Both were developed as per the specifications in the Mining Operations Plan (MOP).

2.8 Water Management

2.8.1 Objectives

The Narrabri Mine lies within the catchment of the Namoi River. Locally, and within proximity of the Project site, Kurrajong Creek and Pine Creek provide flows to the Namoi River during runoff events. The design of sediment detention basins within the disturbed area of the Pit Top Area limits the opportunity of discharge of runoff from mine-disturbed areas, i.e. after appropriate detention time to satisfy licensed

discharge criteria. Three discharge points (Storage Dams SD2, SD4 & SD5) (Plan 4B) have been nominated in EPL 12789, together with upstream and downstream monitoring locations within the adjacent creek systems.

The management of water at the mine is undertaken as per the Site Water Management Plan (SWMP). The Stage 2 Water Management Plan (WMP) was approved by the Department of Planning and Infrastructure on 5 April 2013. The SWMP has the following objectives:

- To ensure sufficient quantities of water can be obtained to meet the requirements for dust suppression across the site;
- To ensure segregation of “contaminated” and “dirty” water from “clean” water with “contaminated” water directed to sediment basins and “dirty” water directed to storage dams;
- To maximise the use of “contaminated” and “dirty” water for dust suppression purposes;
- To minimise the volume of water discharged from the mine site, and ensure in the event of discharge that there has been sufficient settlement time such that suspended sediment levels meet concentration limits specified in the EPL;
- To minimise erosion and sedimentation from all construction/operational activities;
- To eliminate or minimise the risk of off-site discharge of saline water;
- To monitor the effectiveness of surface water controls and ensure all relevant surface water quality criteria are met;
- To minimise cumulative impacts on water sources and dependant ecosystems; and
- To minimise impacts on the availability of surface water to surrounding residents and landholders.

2.8.2 Surface Water Management

Water within ML 1609 is nominally classified either as “clean”, “dirty or saline water”, or “contaminated” depending on the source of the flow and its potential for physical or chemical contamination.

"**Clean**" – surface runoff from the mine site areas where water quality is unaffected by mining operations. Clean water includes runoff from undisturbed areas and any fully rehabilitated areas.

Clean water flowing from upstream Kurrajong Creek Tributaries is separated from the pit top working areas by a buffer and flow is maintained within the natural watercourse.

The use of drains/contours to divert flows from working areas to treatment dams ensures separation of clean water from dirty or contaminated water. Clean water catchment areas above any area of disturbance that could generate dirty or contaminated water are directed around these areas and delivered to the natural water course.

"**Dirty or Saline water**" – comprises surface runoff from areas disturbed by construction or activities such as soil, overburden and coal stockpiling, and rehabilitation (until stabilised), all of which could contribute suspended solids to the surface water.

The storage dams (SD1-6) have a dual function: during the construction phase acting as sedimentation control dams for disturbed ground and, harvesting of surface water for use in mine operations and capture and containment of any potentially contaminated water. During the operations phase storage dams SD1, SD2, SD3, SD4, SD5 and SD6 collect water from around the disturbed or potentially contaminated areas.

A series of evaporation ponds have been constructed within the rail loop as a depository for saline water. This may be mine water pumped out from the underground operations or potentially contaminated runoff from the stockpiling and crushing/sizing area collected via SB1. During the early years of operation, when the groundwater inflows are expected to be low, the pumped out mine water would be used on site for dust suppression or processed through the Water Treatment Plant.

"**Contaminated Water Management**" – two 68,000 L self bunded diesel fuel tanks are located adjacent to the workshop and washbay facility. An additional concrete bund has been established adjacent to the fuel tank to house other oils and lubricants in a safe and efficient manner. Any associated spills within the bund then report to an oil-water separating unit for disposal by an appropriately licensed contractor. Waters potentially contaminated with hydrocarbons from the workshop area are also diverted to another oil-water separator, with clean water reporting to SB1 for later use across the site. Spill kits are maintained within the workshop area and at the waste oil area. The likelihood of localised spills of fuel or oil external to self bunded tanks or bunded areas is kept to a minimum. In the event that localised

spills do occur, immediate action would be taken to ensure appropriate clean-up and minimisation of harm. A lined cell has been established to house any contaminated soil for land-farming before it can be disposed of offsite or re-used onsite.

A 30,000 L self bunded tank is also located onsite and is used by one of the Mine's drilling contractors. Another 30,000L self bunded tank is located at the main ventilation fan site, which has not been used during this reporting period. Spill kits are available at these two sites for use in the unlikely event of a spill from the self bunded tank and any contaminated soil will be relocated to the land-farming area, thereby limiting potential environmental impacts.

2.8.3 Discharges

During the reporting period, one wet weather discharge occurred from licensed discharge point's SD2 and SD5. The results are included in Appendix 3 and each event is discussed further in Section 3.3.2.1.

2.8.4 Water Sources, Demand and Use

Within the ML 1609 area and immediate vicinity of Narrabri Mine, surface water resources are limited to a number of ephemeral drainage lines which flow for a short period after substantial rainfall, farm dams, other newly constructed water storage dams, and groundwater sources.

Water is required on the mine site primarily for dust suppression purposes, operational requirements (e.g. CHPP and longwall) and potable and toilet ablutions purposes. Where practicable, water collected on-site is retained or reused, with water for dust suppression sourced from a combination of onsite water harvesting and mine dewatering. The potable water circuit of the Water Treatment Plant (WTP) was commissioned during the reporting period and all potable water is now generated on the mine site. Water pumped from the Namoi River under licence is transferred to Dam D, which is the potable water supply for the WTP. The water captured in storage dams SD1-SD5 is also transferred to Dam D, where required.

During the reporting period, a total of approximately 78ML was used for mine site dust suppression purposes on the surface. Water used for underground purposes is recycled through Pond A1 (originating from mine dewatering and SB1 and SB2), where it is recirculated back to tanks at the box cut and then gravity fed underground, therefore resulting in relatively minor water use.

During the reporting period:

- Potable water, from NSC supplies, was stored in tanks onsite for drinking water and ablution purposes (until the WTP was commissioned); and
- Surface water was also collected in onsite storages during surface water flow events and transferred to Dam D. From Dam D it can be used to produce permeate or potable water through the WTP.

2.8.5 Stored Water

Table 6 presents an estimate of the volume of stored water at the beginning and end of the reporting period.

Table 6 - Stored Water

	Volumes Held (m^3)		Available Storage Capacity at the end of the Reporting Period (m^3)
	Start of Reporting Period	**At end of Reporting Period**	
Clean Water (in Storage Dams)*	101,490	41,710	76,090
Dirty Water (in Sediment Basins)	6,480	8,860	52,940**
Controlled Discharge Water (salinity trading schemes)	N/A	N/A	N/A
Evaporation Ponds	346,990	360,125	347,675
* = Additional 46ML of storage in containment bund in rail loop. ** = SB1 and SB2 were upgraded during the reporting period with a combined capacity of approx. 50ML			
N/A = Not applicable for the Narrabri Mine			
Note: $1m^3$ = 1,000L			

2.8.6 Groundwater Management

Inflows into the box cut are irregular and result from a combination of:

- Direct rainfall over the box cut and entrance; and
- Underground mine dewatering.

The water from the box cut is pumped directly into Pond A1 which is the raw water feed for the WTP. The filtered water resulting from this process is primarily used to supply the underground operation, including the longwall unit. Vertical Production Wells (VPW) are located over the longwall panels and they are used for pre-drainage of gas and water from the underground workings. All water removed using the VPW's is transferred to the ponds in the rail loop.

Contamination of groundwater is controlled by the management of chemical, oil and grease spills and storage, with:

- Vehicle maintenance carried out in designated areas;
- The use of non-toxic and biodegradable drilling fluids and sealing boreholes as required by DRE;
- Any spills being cleaned up; and
- Fuels, oil and greases being stored within a bunded area, constructed in accordance with AS 1240-2004 (also see Section 2.8.2) and/or OEH requirements, whichever are the more stringent.

Groundwater from surrounding bores is monitored on a regular basis to detect and assess any changes in groundwater quality or level that may be attributable to the mine (see Section 3.4.2).

2.9 Hazardous and Explosive Material Management

Two small explosives magazines (within the same compound) are currently located on the mine site to separately store explosives and detonators used for underground shot firing.

Narrabri Mine also notified WorkCover NSW in relation to the amount of diesel stored onsite. WorkCover NSW did not respond during the reporting period. Any actions required will be implemented during the next reporting period.

Materials Safety Data Sheets (MSDS) are retained on-site for all hazardous materials, independent of the quantity. Additionally, all contractors are required to supply MSDS documents for any hazardous goods they may bring onto the site.

2.10 Infrastructure Management

Management of infrastructure (i.e. buildings, roads, generators, pumps etc) and other facilities not specified elsewhere within this AEMR, is undertaken on an as-needs basis or in accordance with Statutory requirements in order to maintain them in an operationally efficient, safe, neat and tidy condition, and one which does not result in the direct or indirect generation of unacceptable environmental impacts.

3 ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

The following sub-sections document the implementation and effectiveness of the various control strategies adopted at the mine, together with monitoring data for the reporting period. Existing monitoring locations are shown in Figure 2. A risk identification matrix and the relevant Environmental Management procedures are identified in the Mine's MOP and as required by PA 05_0102 MOD 1 and PA 08_0144 MOD 2.

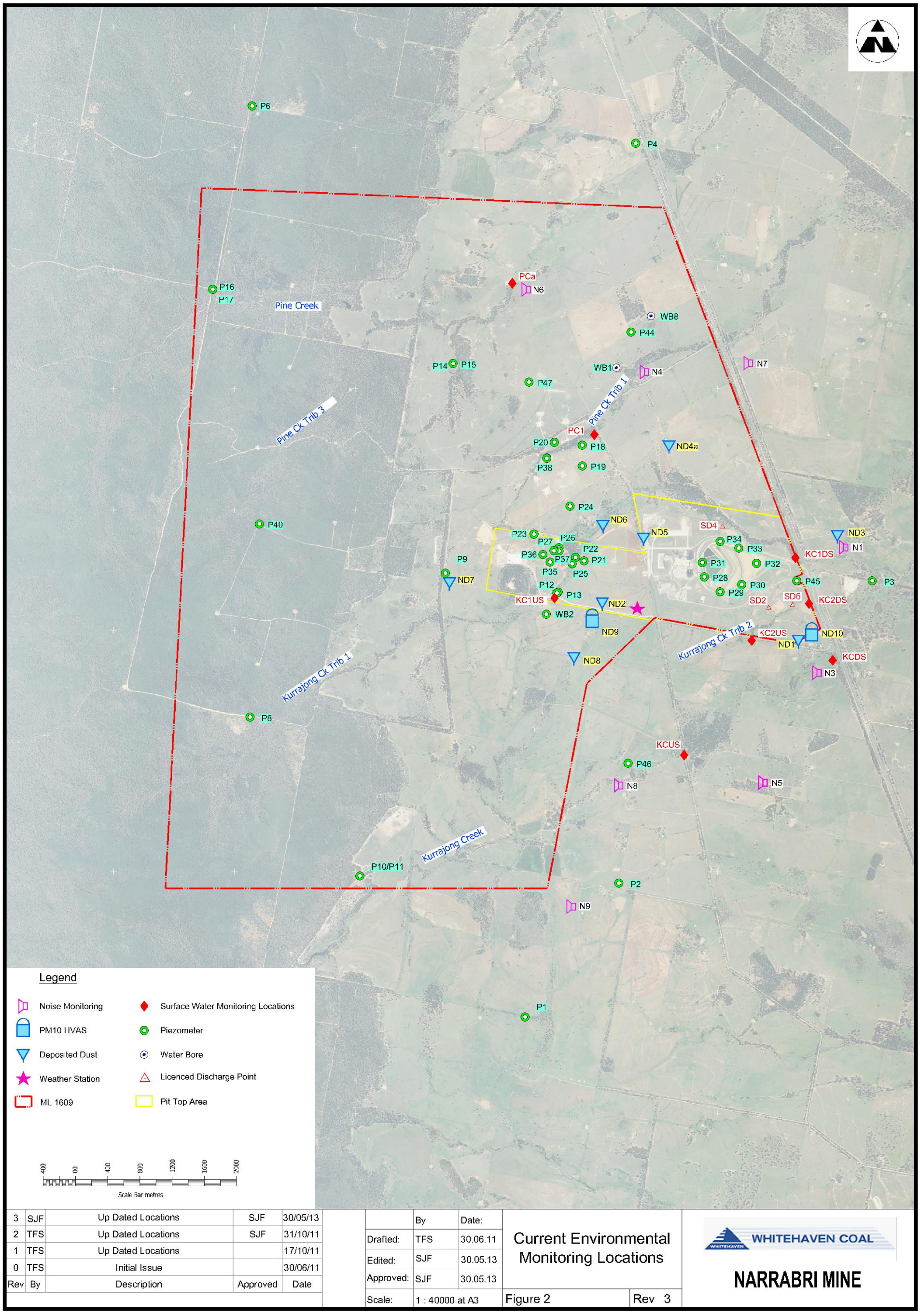

Figure 2 - Current Environmental Monitoring Locations

3.1 Air Pollution

3.1.1 Criteria

The air quality criteria applicable to the mine are specified in Schedule 3, Tables 4, 5 and 6 of PA 05_0102 MOD 1 and Schedule 4, Tables 4, 5 and 6 of PA 08_0144 MOD 2 and summarised below.

- Acceptable mean annual increase in deposited dust of 2g/m^2/month.
- Mean annual dust deposition (all sources) of 4g/m^2/month.
- Mean annual TSP (all sources) concentration of 90 µg/m^3.
- Mean annual PM_{10} particulate level of 30 µg/m^3.
- 24 hour average PM_{10} particulate level of 50 µg/m^3.

Additionally, exhaust gases on earthmoving / mining equipment should not be visible for more than 10 seconds continuously.

Notwithstanding the diversity of the criteria identified above, routine air quality monitoring at the mine is required for deposited dust and PM_{10} particulates. Monitoring of deposited dust is undertaken on a monthly basis whilst PM_{10} levels are monitored every 6 days.

3.1.2 Control Procedures

In order to satisfy the criteria identified above, Narrabri Mine employs a range of air pollution control measures including:

- No burning of materials on site. Any vegetation removal for surface infrastructure works is retained for subsequent replacement on the rehabilitated landscape;
- Limiting groundcover removal to areas required for immediate operational requirements;
- Groundcover removal as part of the topsoil removal activities;
- Where practicable, limiting soil stripping activities to periods when there is sufficient soil moisture to prevent significant dust lift-off and avoiding periods of high winds;
- Application of water to exposed surfaces, with emphasis on those areas subject to frequent vehicle / equipment movements which may cause dust generation and dispersal;

- Use of water injection on drill rigs;
- Progressive shaping and rehabilitation;
- Speed limit restrictions on all vehicles and equipment on the mine site; and
- Equipment exhaust positioning to avoid exhausts directed down towards the ground and causing dust lift-off.

3.1.3 Dust Monitoring

The Air Quality Monitoring Program (AQMP), as required by Schedule 4, Condition 7 of PA 08_0144 MOD 2 summarises the air quality monitoring requirements.

Table 7 presents a summary of the deposited dust monitoring data for the reporting period while Appendix 4 presents the results of all dust monitoring over the life of the mine to date. ND4 (Matoppo) was replaced with ND4a, which is in closer proximity to mining operations.

A graphical representation of the total insoluble solids and ash content data for each of the sites monitored during the reporting period is also included in Appendix 4.

Figure 2 identifies the locations of the various deposited dust gauges maintained during the reporting period.

Table 7 - Deposited Dust Monitoring Data

Site (see Figure 2)	Property	Total Insoluble Solids g/m^2/month		Ash Content g/m^2/month	
		Mean	Standard Deviation	Mean	Standard Deviation
ND1	Turrabaa	2.8	1.4	1.3	0.4
ND2	Claremont	3.2	2.9	2.6	2.6
ND3	Bow Hills	1.4	0.6	0.8	0.4
ND4a	Matoppo	1.5	2.0	0.8	2.0
ND5	Claremont	4.5	3.0	3.3	2.8
ND6	Willarah	1.6	2.4	0.7	0.5
ND7	Claremont	2.1	1.2	1.6	0.8
ND8	Claremont	1.7	1.7	0.9	0.6

A review of Table 7 and Appendix 4 shows that:

- The mean annual total insoluble solids (deposited dust) criterion was satisfied during the reporting period at all monitoring locations excluding ND5.
- The elevated results at ND5 are not unexpected as the monitor is adjacent to an unsealed road that is frequently used as well as the northern section of the

amenity bund and the Reject Emplacement Area where earthworks were completed during the reporting period. The high annual average is generally the result of 2 or 3 high monthly results during the reporting year which affects the annual average. The ash content analysis, which indicates mineral type contamination, was below the relevant criteria indicating that the high results are affected by organic matter, which is not attributable to site operations.

- Long term trends show that deposited dust levels have remained relatively consistent since monitoring commenced. The exception to this is ND5, which is located on the project-related "Claremont" property in close proximity to site earthworks.

Narrabri Mine also has High Volume Air Samplers (HVAS) (PM_{10}) located on the project-related properties "Claremont" and "Turrabaa" located to the south-east and south-west of the Pit Top Area. The samplers run for 24 hours every 6 days, with filter papers sent to an accredited laboratory for analysis.

Results during the reporting period indicate compliance with the 24-hour criteria and annual average (Figure 3 and Figure 4). The annual average at both HVAS locations remained well below the annual average criteria (30 µg/m^3) throughout the reporting period. At the end of the reporting period the annual average was 10.52 µg/m^3 at "Claremont" and 9.91 µg/m^3 at "Turrabaa".

The full data set for PM_{10} monitoring is contained within Appendix 4.

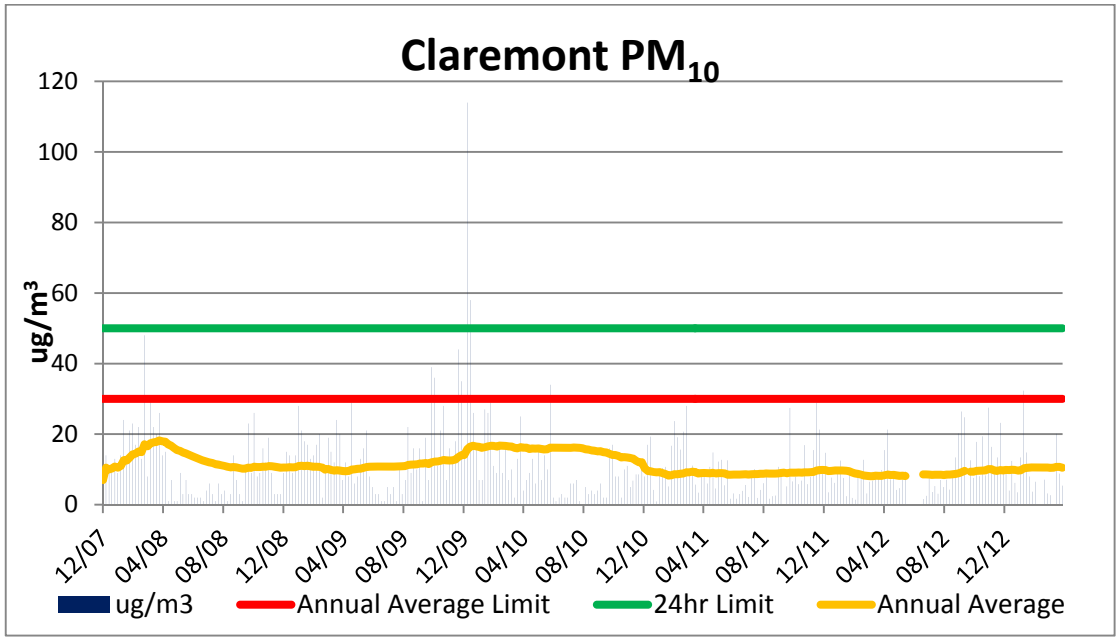

Figure 3 - HVAS PM_{10} data – Claremont

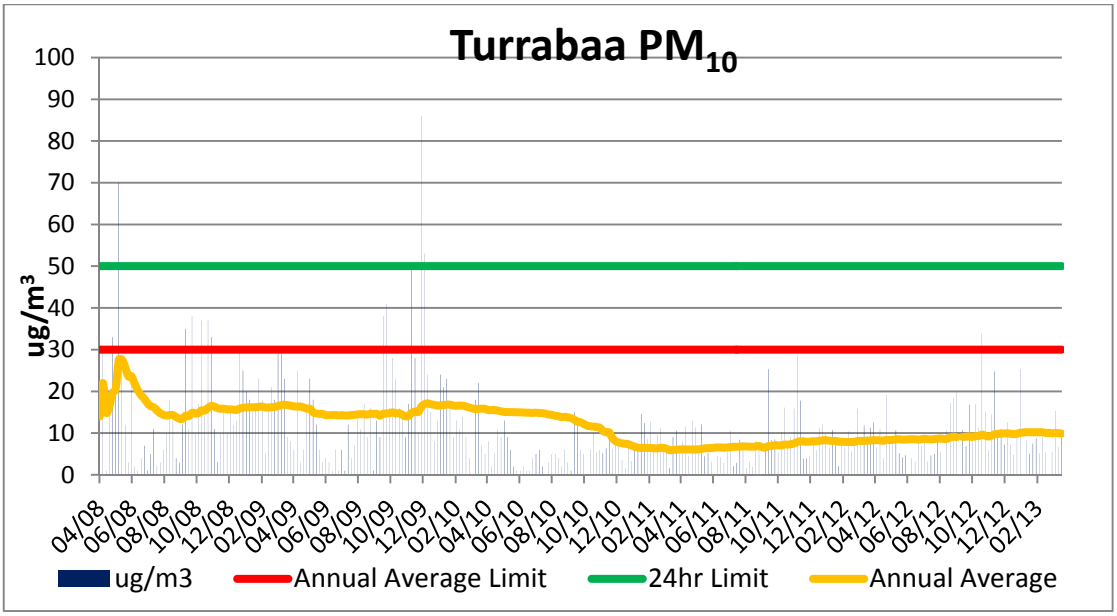

Figure 4 - HVAS PM_{10} Data – Turrabaa

3.1.4 Comparisons with EA Predictions

The Air Quality Assessment (AQA) undertaken as part of the Environmental Assessment for the Stage 2 longwall operation (*Environmental Assessment for the Narrabri Coal Mine Stage 2 Longwall Project, Specialist Consultant Studies Compendium, Volume 2, Part 7, November 2009*) predicted the air quality impacts associated with two scenarios: Scenario 1 involved construction activities; and Scenario 2 involved operational activities. The predicted levels and comparisons with actual monitoring data are included below for both dust deposition and PM_{10}.

3.1.4.1 Dust Deposition

As most of the properties surrounding the site are now mine owned, only Bow Hills is included for both offsite impacts in the AQA and current monitoring, as outlined in Narrabri Mines' AQMP. The predicted dust levels as outlined in the AQA under both scenarios has dust levels at Bow Hills increasing by 0.1 g/m^2/month above the back ground level of 1.6 g/m^2/month. The reporting period average for Bow Hills is 1.4 g/m^2/month and the long-term average is 1.7 g/m^2/month. The results indicate that the dust deposition levels for this reporting period are below the predicted levels and the long term average level is as predicted. It should also be noted that a quarry is in operation on the Bow Hills property which may contribute to deposited dust on the site.

3.1.4.2 PM_{10}

Although PM_{10} is not monitored at the properties modelled in the AQA but on properties closer to mining operations as outlined in the Narrabri Mine AQMP, the lowest predicted annual average under both scenarios in the AQA is 15.9 µg/m^3. The highest annual average results for the Narrabri Mine monitoring program is 10.52 µg/m^3. In addition, the highest 24-hour average recorded during the reporting period was 33.9 µg/m^3. The highest predicted 24-hour level in the AQA for residences further away from the mine then the monitored locations was 69.7 µg/m^3. No exceedances of the 24-hour criteria (i.e. 50 µg/m^3) occurred during the reporting period.

3.2 Erosion and Sedimentation

3.2.1 Management

Methods for the management of erosion and sediment control at the mine are presented in the MOP and the Site Water Management Plan (SWMP) prepared in accordance with PA 05_0102 MOD 1. As required by PA 08_0144 MOD 2 the SWMP has been reviewed and was approved outside of this reporting period, i.e. 5 April 2013.

Control of erosion and sediment generation is achieved on the mine site primarily through the implementation of water management controls identified in Section 2.8.2 and shown on Plans 4, and water usage for dust suppression which ensures adequate storage capacity is available within the various water containment structures to receive inflows. Additional measures which assist in the control of erosion and sedimentation include:

- Minimising the extent of disturbance consistent with operational and construction requirements;
- Revegetation of long-term subsoil and topsoil stockpiles, and establishment of cover crops across areas of disturbance post construction activity; and
- Undertaking soil management activities generally in accordance with the recommendations from Geoff Cunningham Natural Resource Consultants.

Soil stockpiles have been placed in gently sloping or near flat areas surrounded by grassland which effectively reduces the runoff velocity, and hence erosive potential, from any run-on waters. However, Narrabri Mine is cognizant of the potential for stockpile erosion and will adopt stockpile protective procedures to minimise impacts as required over the remaining life of the mine. Establishment of cover crops and pasture grasses across rehabilitated areas will be monitored over the life of the mine

and additional works undertaken as required to ensure appropriate cover at all times.

3.2.2 Performance

The effectiveness of the procedures for erosion and sedimentation management are assessed visually as part of routine mine operations and supervision undertaken by Narrabri Mine, with any ameliorative works initiated as and when required.

During the reporting period, all necessary controls were in place and operating as per design. The well-established cover in the Pit Top Area (including along drainage lines, on the banks of water management structures and on soil stockpiles) has resulted in only isolated, minor occurrences of erosion.

3.2.3 Comparisons with EA Measures

The Soils and Land Capability Assessment undertaken as part of the Environmental Assessment for the Stage 2 longwall operation (*Environmental Assessment for the Narrabri Coal Mine Stage 2 Longwall Project, Specialist Consultant Studies Compendium, Volume 2, Parts 9a and 9b, November 2009*) outlined the measures recommended to be implemented onsite to minimise impacts to soils in the ML 1609 area. As outlined in the assessment: topsoil stockpiles are limited to a maximum of 2 m in height and subsoil stockpiles are limited to 3 m in height; material is also handled as little as possible to minimise compaction and destruction of relatively weak structured soils as exist at the site; and hay bales/sediment fences are used to contain sediment-laden runoff.

The possible effects of longwall mining subsidence on the mine site soils, as outlined in the assessment, has been considered in the Extraction Plan developed for Narrabri Mine which has been approved by DP&I and DRE. The assessment outlined potential impacts associated with longwall mining as outlined below with management measures included:

- *Water ponding and erosion associated with increased bed gradient*: Water ponding has been observed in longwall panel 1 and the tributary of Pine Creek (Plate 5). The amount of ponding was more than what was predicted in the Stage 2 Surface Water Assessment that outlined that this area would be subject to the greatest level of ponding onsite. To date the ponded water has been drained via a pump and fed back into the creek downstream of the ponding area. An expert has been engaged to assess options for this area and

this will be reported during the next reporting period. To date the sandy nature of the creek bed has meant that any flows are assisting in filling cracks within the creek bed and no significant erosion has been identified to date (Plate 6).

- *Subsidence cracks draining an unknown amount of water from the drainage line to the sub-surface area, which are expected to fill and seal over*: The observations of water flows to date indicate that while runoff is ponding in longwall panel 1 as identified above the flows within the creek are generally consistent with surrounding creeks indicating no significant losses of water from the drainage lines.
- *Possible impacts on trees and shrubs by disturbing their root systems*: The larger trees within longwall panel 1 at Greylands Road and in the tributary of Pine Creek have been affected by subsidence and many of these trees have subsequently died (Plate 7 and 8). The less mature regrowth and smaller trees remain relatively unaffected by subsidence as predicted. The Spring 2013 ecological survey required by the approved Extraction Plan will assist in identifying management measures for the larger trees in subsequent panels.
- *Possible impact on native pasture species growth by disturbing their root systems and drying out of the upper soil*: The area subject to subsidence during this reporting period consisted of previously farmed paddocks with little or no native pasture species. Cracking in the centre of the longwall panel generally closes up once the longwall unit has retreated and areas along the goaf edge have been ploughed to aid in filling cracks and to retain soil moisture (Plate 9).
- *Possible impacts on grain crops and forage growth by disturbing their root systems and drying out of the upper soil*: The area subject to subsidence impacts is not currently farmed so no crops are grown. Cracking in the centre of the longwall panel generally closes up once the longwall unit has retreated and areas along the goaf edge have been ploughed to aid in filling cracks and to retain soil moisture.
- *Possible impacts on sown pasture growth by disturbing their root systems and drying out of the upper soil*: As above, areas subject to subsidence have not been farmed so no pastures have been sown. Cracking in the centre of the longwall panel generally closes up once the longwall unit has retreated and areas along the goaf edge have been ploughed to aid in filling cracks and to retain soil moisture.

- *Impact to soil erosion by changes in slope gradient and moderate to highly erodible soils forming subsidence cracks*: Significant soil erosion within the first longwall panel associated with subsidence has not been observed to date. Cracking in the centre of the longwall panel generally closes up once the longwall unit has retreated and areas along the goaf edge have been ploughed to aid in filling cracks and reducing the potential for erosion.
- *Impact to stream banks and waterways with subsidence cracks making the system ineffective*: To date, the impact to stream banks has been relatively minor and the system, while ponding water, remains effective at draining water from the catchment.
- *Possible impacts to soil salinity*: Any impacts to soil salinity will be identified in subsequent surveys undertaken as required by the approved Extraction Plan. Should any salinity issues be identified in subsequent monitoring then the management actions outlined in the Extraction Plan will be implemented.
- *Possible impacts to farms dams*: No farm dams were undermined during the reporting period.
- *Possible impacts to roads and tracks*: All roads and access tracks were inspected and any necessary remedial impacts undertaken. Narrabri Mine developed and implemented a management plan for the Narrabri Shire Council (NSC) owned Greylands Road, which required the mine to remediate any impacts associated with subsidence. Narrabri Mine was subsequently authorised to re-open the road following remedial actions being undertaken to the satisfaction of NSC. Plate 7 illustrates Greylands Road following remediation works and Plate 8 is Greylands Road prior to remediation works.

It is also important to note that the majority of land purchased for the Narrabri Mine is being farmed by the original owners or others under lease agreements to secure the long-term viability of farming land.

Plate 5 – Ponding in Longwall Panel 1

Plate 6 – Pine Creek Tributary Upstream Side of Subsidence

Plate 7 – Impacted Trees and Remediated Greylands Road

Plate 8 – Greylands Road Prior to Remediation Works

Plate 9 – Ploughing of Cracks in Longwall Panel 1

3.3 Surface Water Pollution

3.3.1 Management

The prevention of surface water pollution is achieved through the management of surface water as presented in Section 2.8.2.

3.3.2 Performance

3.3.2.1 Wet Weather Discharges

Surface water management controls have operated effectively throughout the reporting period, with water management controls operating in accordance with the SWMP.

Above average rainfall was received during May and July 2012 and January to March 2013. One discharge occurred from the EPL discharge points during the reporting period and the surrounding creeks were sampled up to four times during the

reporting period. During the discharge event, the discharge was sampled in accordance with the requirements of EPL 12879, with the results provided in Appendix 5. Rainfall records are shown in Appendix 8. This section provides discussion on all wet weather discharges during the reporting period.

4 June 2012

As a result of rainfall in June 2012, the surrounding creeks were sampled as required by the Narrabri Mine SWMP. The results are included in Appendix 5. The results for TSS ranged from 20 mg/L to 52 mg/L in the upstream samples, and between 8 mg/L to 108 mg/L in the downstream samples. The highest result in the downstream sample was collected at the Kurrajong Creek Tributary 2 downstream sample (KC2DS) which does not include water flowing through any current active areas of the mine and is an indication in the variability of TSS in the surrounding water ways.

12 and 13 July 2012

As a result of rainfall in July 2012, discharges from SD2 and SD5 were triggered after receiving 59 mm of rain over the preceding five days. This amount of rainfall exceeds the 5 day 90%ile dam design criteria of 38.4 mm, as outlined in EPL 12789. Under these conditions the criteria for total suspended solids (TSS), of 50 mg/L, can be exceeded.

SD2 and SD5 reported TSS concentrations of 20 mg/L and 122 mg/L, respectively. As outlined above, under these conditions the TSS limit of 50 mg/L can be exceeded and all other parameters with criteria specified in the EPL were within the required limits.

During the July discharge upstream and downstream samples were collected from the surrounding creeks as required by the SWMP. The results are included in Appendix 5.

29 January 2013

As a result of rainfall in January 2013, the surrounding creeks were sampled as required by the Narrabri Mine SWMP. The results are included in Appendix 5. The results for TSS ranged from 7 mg/L to 72 mg/L in the upstream samples, and between 23 mg/L to 90 mg/L in the downstream samples.

1 March 2013

As a result of rainfall in late February and early March 2013, the surrounding creeks were sampled as required by the Narrabri Mine SWMP. The results are included in Appendix 5. The results for TSS ranged from 36 mg/L to 750 mg/L in the upstream samples, and between 27 mg/L to 358 mg/L in the downstream samples.

3.3.2.2 Mine Water Pipe Leak

During May 2012, approximately 10,000 to 15,000 L of water from the pre-drainage water pipe network leaked as it was being transferred to the Pit Top Area. The leak occurred in two places, one contained by a contour bank, the other and most significant leak occurred in a previously farmed paddock. The leak was contained within the paddock and prevented from entering any nearby creeks. Narrabri Mine notified the EPA and the impacted area was immediately cleaned by stripping the impacted soil after the leaked water was recovered via vacuum truck. Within a week the stripped area was remediated with new topsoil and seeded. The leak occurred at a coupling which has now been replaced. All of the remaining couplings on the pipe network of similar type have also been replaced. Narrabri Mine notified the EPA. No further action was required by the EPA and no infringement notices were issued for breaching conditions of EPL 12789.

3.3.2.3 Surface Water Storages

In addition to monitoring the surface water discharge events, Narrabri Mine undertakes sampling of surface waters, with samples during the reporting period collected and analysed by Australian laboratory Services (ALS). The results of analysis are presented in Appendix 5.

Whilst there are no criteria or concentration limits specified for the surface water samples, the results do provide an indication as to the quality of waters on-site. Samples taken during the reporting period indicate water quality similar to that recorded since monitoring commenced, which includes slightly alkaline pH, elevated electrical conductivity (EC) in a number of dams and elevated TSS levels.

3.3.3 Comparisons with EA Predictions

The Surface Water Assessment undertaken as part of the Environmental Assessment for the Stage 2 longwall operation (*Environmental Assessment for the Narrabri Coal Mine Stage 2 Longwall Project, Specialist Consultant Studies Compendium, Volume 1, Part 3, November 2009*) outlines management strategies and the predicted water volumes to be stored onsite. The general surface water management strategies are also outlined in the SWMP. The Surface Water Assessment management strategies include the following: runoff from potentially contaminated areas to be contained onsite; runoff from the dirty water catchment to be contained in sediment dams

sized for the 95%ile five day storm event; saline water to be contained onsite; and brine to be stored onsite.

Narrabri Mines' intention is to have the runoff from potentially contaminated areas and saline water contained onsite. However, as outlined in the approved SWMP, under certain conditions there may be a requirement for SB1 and SB2 to overflow. As such the water management system has been designed so that if these two dams overflow, the water will mix with dirty water and enter SD1, overflowing to SD2 before being discharged offsite at this licensed point.

As longwall mining commenced in June 2012, the performance against the surface water management strategy as outlined in the Stage 2 Longwall Project Surface Water Assessment (*Narrabri Coal Mine Environmental Assessment, Specialist Consultant Studies Compendium, Volume 1, Part 3, November 2009*) can be summarised as follows:

Pit Top Surface Water Management Strategy

- *Runoff from potentially contaminated catchments would be collected in storage basins and not released off-site. Water collected in the storage basins would be pumped to Dam A1 for processing in the water conditioning plant*: All runoff that falls within the Pit Top Area, which includes the workshop/administration building/fuel bay/coal processing area, is collected in Dam SB1 and transferred to Dam A1 to be reused onsite. Runoff from the Reject Emplacement Area is transferred from Dam SB3 to Dam A1.
- *Runoff from the potentially dirty catchments would be collected in the existing sediment dams. The sediment dams would be sized to achieve required stormwater quality for storms greater than the 95%ile five day storm event. Water collected in the sediment dams would be used during the construction phase of the Longwall Project, as well as to augment shortfalls in supplies expected in the first few years of mining. After this time, the water collected in the dams would be released to the downstream receiving water within 5 days of a runoff event*: All runoff from the previously disturbed area of the Pit Top Area is directed to Dams SD1 to SD5 which is then transferred to Dam D for reuse onsite. Dam SD6 currently contains the runoff from the main ventilation shaft site.
- *All saline water dewatered from the underground workings would be contained within water storages of the Pit Top Area without releasing it to the natural watercourses. The saline water would be treated through a water conditioning plant for use in coal processing and underground dust*

suppression. Treated water in excess of Mine Site requirements would be piped to the Namoi River at the adopted water quality compliance criteria: Mine dewatering is done via the box cut where it is transferred to Dam A1 for reuse onsite. All pre-drainage water is transferred from the Vertical Production Wells (VPW's) in the field to Dam A1 for reuse onsite via a dedicated pipeline.

- *The concentrated brine by-product of the water conditioning plant would be stored and evaporated in brine storage ponds without releasing it to the environment. Concentrated brine solution retained within the brine storage ponds at the completion of the Longwall Project would be re-injected back into the underground void when longwall mining is completed*: The brine produced by the WTP is currently being stored in the lined Dam A2.

Mine Subsidence Management Strategy

- *Visible cracks in the bed of the creek would be filled in where necessary*: The creek bed in longwall panel 1 is sandy and when cracks appear they generally heal themselves when the creek is flowing (Plate 6).
- *Contour banks that cross chain pillars would be removed. An assessment on the need to replace the contour banks would be made. Given that the Proponent owns the majority of the land over the mine subsidence zone, lower stocking rates and higher vegetation covers are expected*: No contour banks over chain pillars have been impacted to date.
- *Estimates of the extent of over bank ponding would be made:*
    - *If little vegetation of significance is impacted and minimal salt producing soils are evident, the ponding would be left as is:* No vegetation of significance has been impacted to date by ponding as the Stage 2 EA Ecological Assessment indicates the vegetation in the creek is riparian vegetation which does not comprise an Endangered Ecological Community. Salt loading will be determined in subsequent monitoring rounds.
    - *If vegetation of significance is to be impacted or salt producing soils are evident within the ponded area, the channel across the chain pillars may be excavated to reduce the extent of ponding. Care would be taken to ensure that Aboriginal sites or significant vegetation is not impacted by the excavation*: See above.
- *The creek channels draining into the mine subsidence zone and on the downstream side of the chain pillars would be monitored for erosion following*

each runoff-producing storm event. Any erosion would be repaired and remedial measures, such as check dams or drop structures, would be constructed if necessary: Visual inspections are undertaken following flow events and annual monitoring is undertaken as required by the approved Extraction Plan.

The Stage 2 Surface Water Assessment also outlined in the Base Case Annual Water Balance that during the initial years there would be insufficient water generated from the underground. Although the groundwater outflow is less than predicted, see below, the amount of water pumped from the Namoi River during the reporting period was 27.29 ML and most of this water is being held in storage in Dam D. The reduced volume of water required is mainly due to the utilisation of sediment dam water onsite as well lower than predicted production levels.

3.4 Groundwater Pollution

3.4.1 Management

With the exception of fuels and oils, no materials occur or are retained on the mine site which is likely to be a source of groundwater pollution.

The methods for management of potential pollutants are summarised in Section 2.8.6. Ongoing monitoring to assess trends in groundwater chemistry will enable assessment of potential contaminants to groundwater.

3.4.2 Performance

Narrabri Mine's performance with respect to groundwater management, the prevention of pollution and the assessment of impacts on groundwater availability to other surrounding users has been assessed through groundwater level and chemistry monitoring undertaken at a series of operating and monitoring bores within the mining lease area, on properties adjacent to the mining lease and in the alluvial system adjacent to the Namoi River. The frequency of monitoring and the parameters monitored, as defined in the SWMP, are identified in Table 8.

Appendix 6 presents the results of the groundwater monitoring undertaken since commencement of the mine. Monitoring sites are shown on Figure 2.

Table 8 - Groundwater Monitoring Schedule

Location	Parameters	Frequency
All Standpipes P1,P2, P3, P4, P5, P6,P7,P8, P9, P10, P11,P12, P13, P14, P15, P16,P17,P18, P19, P20, P28, P29, P30, P31, P32, P33, P34, P47, WB1, WB2, WB3a, WB3b, WB4, WB5a, WB5b, WB6a, WB6b, WB7 and WB8	Water level EC pH TDS Metals Anions and Cations	Quarterly (water level, pH and EC) Annually (full water quality)
Vibrating Wire Piezometers P21,P22, P25 ,P26 and P27	Water Level	Daily (Data Logger)
Multi-Level Vibrating Wire Piezometers P23, P24, P35, P36, P37, P38, P40, P44, P45 and P46	Water Level	Daily (Data Logger)
Mine water pumped into and out of the mine.	EC pH TDS Metals Anion and Cations Discharge Rate	Daily (flow rate) Monthly (EC pH,) Quarterly (Full water quality)

A review of the groundwater monitoring results presented in Appendix 6 shows that standing water levels (SWL) have remained relatively consistent in the monitored bores throughout the reporting period. Bores P11 and P13 have shown slight recharge during the reporting period. The groundwater monitoring network has been expanded in accordance with discussions held with the NSW Office of Water during the development of the Stage 2 SWMP (refer to Figure 2). Five additional life-of-mine groundwater monitoring bores have been installed (P40, P44, P45, P46 and P47) and are currently undergoing commissioning. P40, P44, P45 and P46 are nested vibrating wire piezometers and P47 is a standpipe piezometer. The locations of these bores are based on the drawdown contours as presented in the Stage 2 Hydrogeological Assessment. Results from the expanded network will be reported during the next reporting period.

A review of the data presented in Appendix 6 indicates that groundwater quality has remained relatively consistent throughout the reporting period, with the exception of lead concentrations detected in P10 that exceed the ANZECC Water Quality Guidelines for Stock Drinking Water (*Australian and New Zealand Environment and Conservation Council (ANZECC), Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000*). Lead concentrations have fallen below the ANZECC limit in bores P2, P3, P8, P9, P11, P12, P16 and P19 during this reporting period indicating the natural variability of dissolved metals in the groundwater surrounding the site. It should be noted that the majority of these wells are located in the coal

seam and therefore would not be used for stock water due to the elevated salinity levels. Monitoring wells P2, P8, P10, P11 and P16 are all located at least 3 km from the active mining area and the results in water quality are unlikely to be attributable to mining activities.

Aluminium results for P4 exceeded the Stock Drinking Water guidelines in March 2013 but were within these limits in the sample collected during September 2012. P4 is located to the north of the mining lease approximately 3 km from the active mining area.

As outlined in the Trigger Action Response Plan (TARP) included in the approved Stage 1 SWMP, if the water quality is impacted by operations an investigation will be undertaken. However, as the increase in metal concentrations are occurring in monitoring bores away from active mining areas these increases are considered to be an indication of background level variation. Narrabri Mine will continue to monitor the levels and review following subsequent sampling events and report through the AEMR/Annual Review as required by the TARP. The results will also be considered in future reviews of the groundwater model and calibration works. It is also noteworthy that there has been no suggestion from local landowners that Narrabri Mine's activities are adversely affecting groundwater availability or quality.

Three of the seven bores installed around the rail loop water storages have recorded water levels ranging from 7.15 mbgl to 15.47 mbgl. Narrabri Mine has engaged an expert to determine the source of the water and any remedial actions that may be required. The results of this investigation will be reported during the next reporting period.

3.4.3 Comparisons with EA Predictions

The Hydrogeological Assessment undertaken as part of the Environmental Assessment for the Stage 2 longwall operation (*Environmental Assessment for the Narrabri Coal Mine Stage 2 Longwall Project, Specialist Consultant Studies Compendium, Volume 1, Part 2, November 2009*) outlines the potential impacts on water sources as a result of the longwall mining operation.

The Stage 2 assessment outlines that the groundwater outflows are expected to vary from 0.22ML/day in the first year to approx. 3.83 ML/day in year 18. The outflow rate encountered during the reporting period as a result of underground development and the commencement of longwall mining has been calculated to be 0.625 ML/day (comprising on average 0.455 ML/day of mine dewatering and 0.170 ML/day of pre-drainage water). It should be noted that although 0.455 ML/day is

removed from the mine the operation consumes on average 0.603 ML/day of permeate.

The Stage 2 Groundwater Assessment predicted drawdowns in the Hoskissons Coal Seam of over 100 m restricted to within 1 to 2 km of the underground workings after 15 years but recovering to within the mining lease boundary after 29 years. While some wells have shown reductions in water levels in close proximity to the underground workings, water levels have not declined significantly in the surrounding monitoring wells as illustrated in Appendix 6. The assessment also predicted that the groundwater inflows should gradually increase to a peak rate of 3.89 ML/day in about year 18. As outlined above the current amount of water pumped from the underground workings equates to 0.455 ML/day during the reporting period. Coupled with the pre-drainage of gas and water at the surface, the total outflows from the underground workings for the reporting period equates to 0.625 ML/day.

3.5 Contaminated or Polluted Land

Prior to mining, the area was a green-fields site, utilised for grazing and agriculture. Discussion with landowners during the preparation of the Environmental Assessment for Stage 1 revealed that no environmentally harmful products had been used on their landholding nor had there been any disposal of contaminated material. This situation has remained unchanged throughout surface construction activities and operations. Consequently there is no reason to expect that contaminated lands would be present within the site.

3.6 Threatened Flora

During specialist studies undertaken by Ecotone Ecological Consultants Pty Ltd in 2009 as part of the Stage 2 EA, a total of seven vegetation communities were identified within the mine site and along the route of the water pipeline to the Namoi River, six of which are native vegetation communities.

No threatened or rare flora species were detected within the mine site. However, one species, *Bertya opponens*, was assessed as having a high likelihood of occurring. Its occurrence on site and adjacent to site was confirmed during additional flora survey work conducted to develop an appropriate biodiversity offset strategy. A second species, *Cadellia pentastylis*, was assessed as having a moderate likelihood of occurring and a third species, *Lepidium aschersonii*, a low to moderate likelihood of

occurring. *Lepidium aschersonii* was observed during the spring survey undertaken over longwall panels 101 to 105, as required by the Extraction Plan.

All activities onsite have been undertaken to minimise the impact on flora species. This has been achieved by limiting areas of surface disturbance to those areas specifically required, as approved by the Environmental Officer through the Narrabri Mine 'Permit to Disturb' process. As the majority of activities to date have occurred in areas comprising predominantly open pasture and previously cultivated areas, only isolated timber removal occurred during the period. This clearing was only undertaken following pre-disturbance inspections by a qualified ecologist. Any large trees, particularly hollow bearing trees, were avoided where possible. If avoidance was not possible, the trees were inspected for habitation by fauna, felled as instructed by the ecologist and inspected for fauna following felling.

In addition to pre-clearance surveys undertaken by suitably qualified ecologists, spring flora surveys were undertaken during the reporting period as required by the Extraction Plan. The spring survey will be used to determine the effectiveness of management measures when compared to the results of the baseline surveys and future annual spring surveys. Any flora management conducted on site will be reported in future AEMRs/Annual Reviews. The *Lepidium aschersonii* identified onsite has been managed by creating an exclusion zone for surface works in the area they are located. As grinding grooves sites were also discovered in the same stand of trees this exclusion zone serves a dual purpose.

The Biodiversity Offset Strategy was submitted to the Department of Planning and Infrastructure (DP&I), Office of Environment and Heritage (OEH) and the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) in accordance with the requirements of the Project Approval. Subsequent revisions were made to the Offset Strategy following comments received from these agencies. Narrabri Mine are currently investigating mechanisms for securing the offsets based on comments received by DP&I. Baseline spring surveys of the offset areas was undertaken during the reporting period to assist in managing the offset areas when final approval has been granted and the associated management plans are implemented.

3.6.1 Comparisons with EA Predictions

The Ecological Assessment undertaken as part of the Environmental Assessment for the Stage 2 longwall operation (*Environmental Assessment for the Narrabri Coal Mine Stage 2 Longwall Project, Specialist Consultant Studies Compendium, Volume 1, Part 2, November 2009*) outlines the disturbance areas that have been assessed as

part of the EA. The disturbance is broken down into the different vegetation communities present on the site. During the reporting period Narrabri Mine disturbed approximately 18.5 ha, the majority was in previously cleared farm paddocks, associated with surface activities including: gas drainage infrastructure works; drilling operations; access tracks and existing road maintenance across longwall panels 101 to 105. With the disturbance reported in the previous reporting period over longwall panels 101 to 105, this totals approx. 47.5 ha. The Stage 2 EA has a total area of disturbance of approximately 76 ha for longwall panels 101 to 105. The disturbance areas for these panels have been used as the gas drainage infrastructure has been installed over the first 5 longwall panels.

3.7 Threatened Fauna

During specialist studies undertaken by Ecotone Ecological Consultants Pty Ltd in 2009 as part of the Stage 2 EA, sixteen threatened fauna species were recorded with potentially suitable habitat present for a further 20 threatened or migratory species that were not identified during field surveys.

Based on the proposed mine design, the Narrabri Mine estimates that up to approximately 210ha of native woodland vegetation could be disturbed, which will be offset by an identified Biodiversity Offset Area, with management measures specified in a Biodiversity Offset Management Plan being developed as part of the over-arching offset strategy. As discussed above, the completion of the management plan is still pending.

Other operational safeguards to minimise impacts to fauna include undertaking pre-clearing surveys (as detailed in Section 3.6), relocating and re-erecting (where practicable) felled hollow bearing trees and control of feral animals.

In addition to pre-clearance surveys undertaken by suitably qualified ecologists, spring fauna surveys were undertaken during the reporting period as required by the Extraction Plan and baseline spring surveys of the offset areas, although not finalised, was also undertaken. The spring surveys will be used to determine the effectiveness of management measures when compared to the results of the baseline survey and future annual spring surveys. Any fauna management conducted on site will be reported in future AEMRs/Annual Reviews. Except for feral pig trapping on leased land and wild dog baiting on neighbouring properties, no fauna management activities were required to be undertaken onsite during the reporting period.

3.8 Weeds

3.8.1 Management

Weed management within ML 1609 involves regular inspections by a Narrabri Mine employee who has Chemcert accreditation for weed control via chemical applications. The Stage 2 Landscape Management Plan, approved by the Director-General in December 2011, specifies weed management measurements undertaken on the mine site.

3.8.2 Performance

During the reporting period, weed control measures continued to focus on the control of the noxious weed “Mother of Millions”, which was located within the tributaries of Kurrajong Creek. Whilst this area has not been subject to any surface disturbance activity during the previous or current reporting period, it is clear that under previous land ownerships, little had been done to control this weed.

Other weed control comprised spot spraying of Noogoora Burr and Prickly Pear, as required.

In addition, Cochineal Beetles have been harvested from infested Prickly Pear plants and re-distributed to non-infested plants. This management measure has proved successful in assisting with the control of Prickly Pear across the site.

3.9 Blasting

As there has not been any surface or near-surface blasting at the site during the reporting period, no blast monitoring has been required or conducted.

3.10 Operational Noise

3.10.1 Criteria

3.10.1.1 EPA Criteria

The EPA-nominated noise emission criteria, identified in EPL 12789 as applicable to the mine, are as follows.

L3.1 Noise generated at the premises must not exceed the noise limits below:

35dB(A)L_{Aeq}(15 minute) during the day, evening and night.

45dB(A)L_{Aeq}(1 minute) during the night.

where L_{Aeq} means the equivalent continuous noise level – the level of noise equivalent to the energy-average of noise levels occurring over a measurement period.

L3.2 For the purpose of L3.1:

a) Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays;
b) Evening is defined as the period from 6pm to 10pm;
c) Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

L3.3 Determining Compliance

To determine compliance:

a) with the L_{eq}(15 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located:

i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or

ii) within 30 metres of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable

iii) within approximately 50 metres of the boundary of a National Park or a Nature Reserve.

b) with the LA1(1 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located within 1 metre of a dwelling façade.

c) with the noise limits in the Noise Limits table, the noise measurement equipment must be located:

i) at the most affected point at a location where there is no dwelling at the location; or

ii) at the most affected point within an area at a location prescribed by part (a) or part (b) of this condition.

L3.4 The noise limits set out in the Noise Limits table apply under all meteorological conditions except for the following:

a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or

b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or

c) Stability category G temperature inversion conditions.

For the purposes of this condition:

a) Data recorded by the meteorological station identified as EPA Identification Point(s) W1 must be used to determine meteorological conditions; and

b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

L3.5 For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

M7.1 To assess compliance with the noise limits presented in the Noise Limits table, attended noise monitoring must be undertaken in accordance with the condition titled Determining Compliance, outlined above, and:

a) at each one of the locations listed in the Noise Limits table;

b) occur quarterly in a reporting period;

c) occur during each day, evening and night period as defined in the NSW Industrial Noise Policy for a minimum of:

i) 1.5 hours during the day;

ii 30 minutes during the evening; and

iii 1 hour during the night.

d) occur for three consecutive operating days.

3.10.1.2 Consent Criteria

Noise emission criteria nominated in PA 05_0102 MOD 1 (Schedule 3, Condition 12) and PA 08_0144 MOD 2 (Schedule 4, Condition 1) is as follows:

PA 05_0102 MOD 1: The Proponent shall ensure that the noise generated by the project does not exceed the levels set out in Table 1 at any privately owned residence.

Table 1: Impact Assessment Criteria dB(A)

Location	Day $L_{Aeq(15\ minute)}$	Evening $L_{Aeq(15\ minute)}$	Night	
			$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All privately-owned residences	35	35	35	45

PA 08_0144 MOD 2: *The Proponent shall ensure that the noise generated by the project does not exceed the levels set out in Table 1 at any privately owned residence.*

Table 1: Impact Assessment Criteria dB(A)

Location	Day $L_{Aeq(15\ minute)}$	Evening $L_{Aeq(15\ minute)}$	Night	
			$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All privately-owned residences	35	35	35	45

3.10.2 Control Procedures

Under some meteorological conditions, it is acknowledged that some activities may generate noise levels above the noise impact assessment criteria. In order to minimise this potential for exceedance, the following controls will be adopted:

- Prior to being brought onto site, or upon commissioning, all additional plant and equipment will be required to exhibit sound power levels consistent with those levels specified in the Noise Management Plan (NMP);
- High frequency reversing alarms will not be permitted on any equipment brought onto site. Rather, all reversing alarms should be of the broadband frequency type;
- Ensure specific noise attenuation is provided to surface drills when operating over LW1 to LW3 and LW24 to LW26 to achieve a sound power level of 109dB(A);
- The approved hours of operation will be adhered to;
- Site personnel will be required to pay due attention to site weather conditions and modify or stand down from operational activities if directed by mine management; and
- Monitoring of emitted noise levels will be undertaken during mining operations to verify compliance with noise criteria and to assess the need, if any, for additional noise attenuation measures.

Transport and other noise controls, as specified in the NMP, comprise:

- Regular maintenance of the sealed site access road;
- Strict adherence to the approved hours of operation for transport activities will be enforced by mine management;
- All project employees and contractors will be instructed to enter and exit the mine site in a courteous manner and without undue traffic noise;

- All access roads will be signposted and speed limited to minimise transport noise;
- Equipment with lower sound power levels will be used in preference to more noisy equipment;
- All equipment used on site will be regularly serviced to ensure the sound power levels remain at or below the levels used in the modelling to assess generated noise levels and compliance with the criteria; and
- The on-site road network will be well maintained to limit body noise from empty trucks travelling on internal roads.

Narrabri Mine also regularly liaises with the majority of surrounding neighbours to seek feedback on the mining activities. It is noted that over the life of the mine to-date, i.e. since March 2008, operational noise has only been raised as an issue of concern by three adjoining landholders.

Schedule 4, Condition 5 of PA 08_0144 MOD 2 requires Narrabri Mine to investigate ways to reduce the noise generated by the mine, including off-site road and rail noise and maximum noise levels which may result in sleep disturbance. The condition also requires Narrabri Mine to report on these investigations and the implementation and effectiveness of these measures in AEMRs/Annual Reviews. Given the measured noise compliance during the reporting period, as detailed in Section 3.10.3, no additional investigations have been conducted.

3.10.3 Operational Noise Monitoring

3.10.3.1 Introduction

The Stage 1 and Stage 2 NMPs detail the requirements for attended and real-time noise monitoring. Attended noise monitoring sites are identified on Figure 2.

The following sub-sections present a summary of the outcomes of each monitoring event conducted by Spectrum Acoustics. During the reporting period the noise monitoring requirements for privately owned residences were increased as required by a variation to Narrabri Mine's EPL.

Copies of all monitoring reports are presented in Appendix 7.

3.10.3.2 Attended Noise Monitoring

June 2012

On the 20th to 23rd June 2012, Spectrum Acoustics conducted attended noise monitoring at the "Bow Hills" (N1), "Naroo" (N3), "Greylands" (N4), "Oakleigh" (N5), "Newhaven"[1] (N6), and "Belah Park"[2] (N7) properties as required by the Stage 2 PA 08_0144 MOD 2, the approved Stage 2 Noise Management Plan and a variation to the sites' EPL. As outlined in the documents mentioned above, monitoring at the "Haylin View" (N8) and "Merrilong" (N9) properties will commence when surface activities approach the eastern end of the southern longwall panels. It should be noted that the real-time noise monitor is located on the "Matilda" property, directly south of the "Haylin View" property. In addition, the monitoring locations "Greylands" (N4) and "Merrilong" (N9) are mine-owned properties.

The results indicated that noise emissions from the site did not exceed the criterion of 35 dB(A),$L_{eq(15min)}$ at any receivers during compliant weather conditions. During the night time measurement circuit the $L_{1(1\ min)}$ noise from mine did not exceed 45 dB(A) at any monitoring location.

July 2012

On the 22nd July 2012, Spectrum Acoustics conducted attended noise monitoring at the "Bow Hills" (N1), "Westhaven" (N2), "Naroo" (N3), "Greylands" (N4) and "Kurrajong" (N5, property boundary) properties. The results indicated that noise emissions from the site did not exceed the criterion of 35 dB(A),$L_{eq(15min)}$ at any receivers.

During the night time measurement circuit the $L_{1(1\ min)}$ noise from mine did not exceed 45 dB(A) at any monitoring location.

August 2012

On the 5th August 2012, Spectrum Acoustics conducted attended noise monitoring at the "Bow Hills" (N1), "Westhaven" (N2), "Naroo" (N3), "Greylands" (N4), "Oakleigh" (N5), "Newhaven" (N6), "Belah Park" (N7) and "Kurrajong" properties. The results indicated that noise emissions from the site did not exceed the criterion of 35 dB(A),$L_{eq(15min)}$ at any receivers under compliant weather conditions.

[1] Access was denied for monitoring at the "Newhaven" residence so the monitoring was undertaken at the southern boundary of the property.

[2] "Belah Park" has no residence located on the property and it currently forms part of "Merriman". As such, the monitoring was undertaken at the "Merriman" residence.

During the night time measurement circuit the $L_{1(1\ min)}$ noise from mine did not exceed 45 dB(A) at any monitoring location.

September 2012

On the 25th to 27th September 2012, Spectrum Acoustics conducted attended noise monitoring at the "Bow Hills" (N1), "Naroo" (N3), "Greylands" (N4), "Oakleigh" (N5), "Newhaven" (N6), and "Belah Park" (N7) properties as required by the Stage 2 PA 08_0144 MOD 2, the approved Stage 2 Noise Management Plan and a variation to the sites' EPL. As outlined in the documents mentioned above, monitoring at the "Haylin View" (N8) and "Merrilong" (N9) properties will commence when surface activities approach the eastern end of the southern longwall panels. It should be noted that the real-time noise monitor is located on the "Matilda" property, directly south of the "Haylin View" property. In addition, the monitoring locations "Greylands" (N4) and "Merrilong" (N9) are mine-owned properties.

The results indicated that noise emissions from the site did not exceed the criterion of 35 dB(A),$L_{eq(15min)}$ at any receivers during compliant weather conditions. During the night time measurement circuit the $L_{1(1\ min)}$ noise from mine did not exceed 45 dB(A) at any monitoring location.

December 2012

On the 18th to 20th September 2012, Spectrum Acoustics conducted attended noise monitoring at the "Bow Hills" (N1), "Naroo" (N3), "Greylands" (N4), "Oakleigh" (N5), "Newhaven" (N6), and "Belah Park" (N7) properties as required by the Stage 2 PA 08_0144 MOD 2, the approved Stage 2 Noise Management Plan and a variation to the sites' EPL. As outlined in the documents mentioned above, monitoring at the "Haylin View" (N8) and "Merrilong" (N9) properties will commence when surface activities approach the eastern end of the southern longwall panels. It should be noted that the real-time noise monitor is located on the "Matilda" property, directly south of the "Haylin View" property. In addition, the monitoring locations "Greylands" (N4) and "Merrilong" (N9) are mine-owned properties.

The results indicated that noise emissions from the site did not exceed the criterion of 35 dB(A),$L_{eq(15min)}$ at any receivers during compliant weather conditions. During the night time measurement circuit the $L_{1(1\ min)}$ noise from mine did not exceed 45 dB(A) at any monitoring location.

March 2012

On the 8th to 10th March 2013, Spectrum Acoustics conducted attended noise monitoring at the "Bow Hills" (N1), "Naroo" (N3), "Greylands" (N4), "Oakleigh" (N5), "Newhaven" (N6), and "Belah Park" (N7) properties as required by the Stage 2 PA

08_0144 MOD 2, the approved Stage 2 Noise Management Plan and a variation to the sites' EPL. As outlined in the documents mentioned above, monitoring at the "Haylin View" (N8) and "Merrilong" (N9) properties will commence when surface activities approach the eastern end of the southern longwall panels. It should be noted that the real-time noise monitor is located on the "Matilda" property, directly south of the "Haylin View" property. In addition, the monitoring locations "Greylands" (N4) and "Merrilong" (N9) are mine-owned properties.

The results indicated that noise emissions from the site did not exceed the criterion of 35 dB(A),$L_{eq(15min)}$ at any receivers. During the night time measurement circuit the $L_{1(1\ min)}$ noise from mine did not exceed 45 dB(A) at any monitoring location.

3.10.3.3 Unattended Noise Monitoring

No unattended noise monitoring was conducted during the reporting period.

3.10.3.4 Real-Time Noise Monitoring

Narrabri Mine was required to submit a revised NMP to the Director-General for approval by the 31st May 2010 as part of a modification to PA 05_0102. The approved Stage 2 NMP, developed in accordance with the Stage 2 PA 08_0144 MOD 2, also includes the requirement for real-time noise monitoring as well as reactive noise control measures to manage noise impacts for sensitive receptors.

Following enquiries from the resident at "Oakleigh" the real-time noise monitor, a mobile unit, was located at "Oakleigh" for a period of three months. Following a noise complaint from the resident at "Matilda", further south of the Narrabri Mine (refer to Section 4.1), the monitor was relocated to this property in September 2011 where it is still in operation. The monitor produces daily reports analysed by Narrabri Mine personnel. The monitor graphs low frequency and total noise, as well as records audio files to indicate if low frequency noise generated by the mine is within the compliance limit of 35 dB(A),$L_{eq(15min)}$.

As the real-time monitoring unit is mobile, the mine has the ability to relocate the monitor to areas where elevated noise levels are expected or where noise related complaints are received. All indications from monitoring with this unit to date confirms compliance with noise criteria.

3.10.4 Comparisons with EA Predictions

The Noise and Vibration Impact Assessment undertaken as part of the Environmental Assessment for the Stage 2 longwall operation (*Environmental Assessment for the Narrabri Coal Mine Stage 2 Longwall Project, Specialist Consultant Studies*

Compendium, Volume 2, Part 6, November 2009) outlines the potential noise and vibration impacts on surrounding landowners. The report also identified four recommendations for operations to assist in reducing noise impacts offsite. These were:

- *No more than two scrapers are to be used during the earthworks stage under temperature inversion conditions* – No scrapers are currently onsite. If scrapers were to be used in the future then this recommendation will be implemented.
- *Use of a bulldozer on the Reject Emplacement Area will be suspended under inversion conditions* – The REA was not utilised during the reporting period but it is expected to commence operations during the next reporting period and when it does then this recommendation will be implemented.
- *Only one truck per 15 minute period will transport reject to the Reject Emplacement Area under inversion conditions* – The REA has not been utilised to date but when it is, which should occur during the next reporting period, then this recommendation will be implemented.
- *Drills operating at the northern ends of LW1 to LW3 or at the southern ends of LW24 to LW26 must have temporary noise screens positioned so as to achieve a sound power level of 109 dB(A) in the direction of the nearest residences, if these drills are to operate under inversion conditions* – The majority of drilling activities in longwall panels 101 to 103 have been completed. Screens comprising hay bales were used when in the northern end of the longwall panels closest to the "Newhaven" property. It should also be noted that geological structures have shortened panels 101 to 103 so works were not undertaken as close to the boundary as outlined in the impact assessment. The requirement to screen longwall panels 24 to 26 will be implemented when drilling occurs in this area.

The Noise and Vibration Impact Assessment also predicted residual criterion exceedances at four residences: "Bow Hills", "Naroo", "Greylands" and "Kurrajong". Both the "Greylands" and "Kurrajong" properties have been purchased since the assessment was undertaken and all monitoring undertaken during the reporting period did not identify any exceedances at the "Bow Hills" or "Naroo" properties, refer to Appendix 7.

3.11 Visual and Lighting

3.11.1 Management

The Narrabri Mine is positioned to the west of the Kamilaroi Highway, upslope of the main road, and is thereby visible to passing motorists and to adjacent property holders to the east. The constructed amenity bund on the southern and western boundary of the site obscures views of the development site from the south and west, whilst vegetation associated with Kurrajong Creek obscures views to the site from the north. Narrabri Mine has undertaken strategic tree planting across the site to further enhance visual screening from adjacent areas.

Lights from the mine site are visible during the night, however, it is not considered a significant detrimental impact given the distance from adjacent non-project related residences and the presence of the amenity bund for the adjacent "Naroo" residence. All lighting is designed to comply with *Australian Standard 4282 – 1997: Control of the Obtrusive Effects of Outdoor Lighting*.

The initial ventilation shaft and associated fans have been constructed in an area already shielded from residences to the south and southeast by topography and existing vegetation. Narrabri Mine has also purchased all of the land in the southern portion of the mining lease except for one property in the south-west. Each additional ventilation shaft will be surrounded by a bund wall, which will be grassed to reduce visual contrast.

Gas drainage drilling activities are temporary in nature, and similar visually to the exploration drilling activities which have been ongoing over the mine site for a number of years. Beyond a distance of a few hundred metres, the activities will be virtually imperceptible with dust suppression activities undertaken to reduce dust generation, likely to be the most noticeable aspect of these operations. Once completed, the gas drainage and drilling sites will be rehabilitated to establish the pre-existing vegetation.

The site is maintained in a clean and tidy condition at all times, with areas of disturbance reshaped and rehabilitated as soon as practicable.

3.11.2 Performance

The now completed surface construction phase of the development was the most visual aspect of the entire development. Given the level of construction activity that has occurred since commencement, the site has responded well to reshaping and revegetation programs which have reduced the overall visual impact of the mine.

With the exception of those areas that require ongoing disturbance (i.e. site roads), the area in and around the surface infrastructure has excellent groundcover. The visual amenity will further improve as tree establishment progresses.

3.11.3 Comparisons with EA Measures

The Environmental Assessment for the Stage 2 longwall operation (*Environmental Assessment for the Narrabri Coal Mine Stage 2 Longwall Project, November 2009*) outlines the potential visual impacts on surrounding landowners. The report identified four recommendations for operations to assist in reducing visual impacts offsite. The recommendations and current performance against these are as follows:

- *The 3m high perimeter amenity bund (see Figure 2.2) provides a barrier for views to the facilities within the Pit Top Area, particularly from Kurrajong Creek Road and the closest residences ("Naroo", "Ardmona" and Bow Hills"). A cover of grass is being established over the bund itself to limit its visual contrast, and it would be planted with a range of trees and shrubs to create a long term screen and fauna movement corridor* – the perimeter amenity bund has been vegetated with grasses and trees have been planted and are established on the majority of the bund.
- *All areas not required for site operations, particularly following site establishment, would be revegetated to ensure the maximum area of grassed paddock is present* – active rehabilitation is undertaken across the site and forms part of drilling operations to have drill sites and access roads rehabbed upon the completion of drilling and logging works.
- *The load-out bin above the rail load-out area and site buildings would be painted in a grey/green hue to limit their overall visibility* – the rail load-out bin, CHPP, rotary breaker enclosure and conveyor covers are all either painted in a green hue or are manufactured from green Colorbond® type sheeting.
- *A high standard of housekeeping would be adopted to maintain a tidy site* – a high standard of housekeeping is required by mine management for both employees and contractors. Designated areas are used for contractors and types of materials across the site.

3.12 Aboriginal Heritage Management

3.12.1 Sites Management and Performance

Two assessments of Aboriginal cultural heritage at the mine site have been undertaken. The first assessment was undertaken in March 2007 for the Stage 1 project and encompassed the Pit Top Area of the mine site. The second assessment was undertaken in November 2009 for the Stage 2 project and consisted of a detailed survey of the surface area associated with Longwall Panels 1 to 7, the Brine Storage Pond Area and the Namoi River Water Pipeline. As part of the Stage 2 work, a reconnaissance survey was also undertaken of Longwall Panels 8 to 26 to substantiate the representativeness of the results of surveys for Longwall Panels 1 to 7, and to provide a larger basis on which to assess the cumulative impacts associated with site salvage.

As required by PA 08_0144 MOD 2 a detailed cultural heritage survey was undertaken for longwall panels 8 to 13 during the reporting period. This survey is required prior to surface disturbance works occurring in this area. The report was pending at the time of preparing this AEMR/Annual Review however the report and any associated revisions to the ACHMP will be forwarded to the relevant Government agencies when available.

In addition to the assessments outlined above, a further two surveys of Longwall Panels 1 to 7 have been undertaken to define the spatial parameters of the sites identified in the November 2009 assessment.

All assessments and surveys were undertaken in consultation with representatives of the local Aboriginal community.

Aboriginal heritage management during the reporting period was based on avoidance. Any planned surface disturbance work has to go through the “Permit to Disturb” process where the Environmental Officer is required to sign off on any disturbance prior to it occurring.

During the reporting period Narrabri Mine organised for Aboriginal site monitors to be present for pre-strip and soil stripping activities occurring across the site in culturally sensitive areas. These monitors are utilised to inform operations of any potential cultural heritage limitations on proposed works.

3.12.2 Consultation

Narrabri Mine maintains contact with the representative Aboriginal groups in order to ensure appropriate engagement with the Aboriginal community prior to surface disturbance activity. This will continue throughout the life of the operation.

The revision to the Aboriginal Cultural Heritage Management Plan, required by PA 08_0144 MOD 2, was approved by the Department of Planning and Infrastructure in December 2011. A Heritage Management Plan was also developed and approved as part of the Extraction Plan for Longwall Panels 101 to 105. Both of these plans were developed in consultation with the local Aboriginal representatives.

Once the report for the survey of longwall panels 8 to 13 is received it will be forwarded to the Aboriginal groups for review. This will also result in a revision to Narrabri Mine's ACHMP, which will also be revised in consultation with the Aboriginal stakeholders.

3.12.3 Comparisons with EA Measures

The Aboriginal Heritage Assessment undertaken as part of the Environmental Assessment for the Stage 2 longwall operation (*Environmental Assessment for the Narrabri Coal Mine Stage 2 Longwall Project, Specialist Consultant Studies Compendium, Volume 2, Part 5, November 2009*) outlines the investigation of the project area and the potential impacts to items and sites of archaeological significance and cultural heritage significance, as provided by the registered stakeholder groups. The report identified five recommendations in relation to cultural heritage management. These are summarised below with the performance against each to date:

- *…it is recommended that NCOPL, subject to the constraints imposed by mine safety considerations, consider relocating surface disturbing activities to avoid the archaeological sites* – during the reporting period all surface disturbance activities were located at least 10 m from fenced cultural heritage areas as identified in PA 08_0144 MOD 2. Any works proposed in proximity to identified cultural heritage sites were relocated to avoid disturbance in these areas.
- *It is further recommended that in the event that they can be avoided, that Sites 10, 19, 38 and 39 should be fenced off with fluorescent para-webbing to protect them from inadvertent or accidental damage from vehicular traffic,*

until such time as the ground surface work to install the goaf drainage boreholes and their access roads has been completed. At that time, the fencing should be removed to allow the cattle to continue to graze the site areas, and thereby provide a measure of weed control and potential grass-fire hazard reduction that would otherwise not occur if the fencing was to remain – sites 10, 19, 38 and 39, as well as all other sites identified in the Pit Top Area and overlying longwall panels 1 to 5 are fenced with a top wire which has orange tags along the length of the wire.

- *The fenced-off areas should be described as 'Environmental Protection Zones' to avoid damage to the sites that might otherwise occur if they were described as Indigenous or Culturally Sensitive Areas* – sites 10, 19, 38 and 39 all have signs attached to the wire identifying them as an "Environmental Protection Zone".
- *With regard to other sites that were recorded but which are not specified above, it is recommended that they should be avoided wherever possible, but where it is not possible, that the archaeological material in the affected sites should be salvaged by the archaeologist assisted by Sites Officers representing Narrabri LALC and Narrabri Gomeroi Traditional Owner Group* – no salvage of identified sites has been required during the reporting period as any potential disturbance is relocated to avoid these areas.
- *The owners, and their employees, earthmoving contractors, subcontractors, machine operators and their representatives, whether working in the survey area or elsewhere, should be instructed that in the event of any bone being unearthed during earthmoving, work should cease immediately in the area of the find* – the induction undertaken by all Narrabri Mine staff and contractors includes information on what to do if cultural heritage sites are identified during works in their respective work areas.

3.13 Natural Heritage

There are no features of Natural Heritage within the mining area and hence, no specific management procedures are required.

3.14 Spontaneous Combustion

3.14.1 Management

Coal at the mine is from the Hoskissons Coal Seam which has been identified as having a high intrinsic spontaneous combustion propensity. As a consequence, a Spontaneous Combustion Major Hazard Management Plan (SCMHMP) and a Stockpile Management Plan have been developed for the site as part of the Narrabri Mine Health and Safety Management System. The SCMHMP and Stockpile Management Plan were developed to give Narrabri Mine a structured system of work to allow the mine to manage and control spontaneous combustion. The plans define how to establish and maintain a safe working environment for mine personnel and the mine itself.

3.14.2 Performance

There was one reported instance of spontaneous combustion (sponcom) on site during the reporting period. Sponcom was observed by a dozer operator on the north-east and north-west side of the ROM stockpile on 6th February 2013. The spots of sponcom were immediately covered with fresh coal and track rolled to starve the area of oxygen in accordance with the Stockpile Management Plan. As a result of the incident a Trigger Action Response Plan (TARP) and a procedure for managing sponcom in surface stockpiles has been developed and implemented onsite.

3.14.3 Comparisons with EA Measures

The Environmental Assessment for the Stage 2 longwall operation (*Environmental Assessment for the Narrabri Coal Mine Stage 2 Longwall Project, November 2009*) outlines the measures to be adopted to minimise the potential for spontaneous combustion. As outlined above, the mine has developed and implemented a SCMHMP to manage spontaneous combustion onsite. The performances against the measures outlined in the EA are as follows:

- *The mine design which employs a low resistance ventilation system achieved through a seven heading mains trunk and two heading gate roads* – the mine plan has seven heading mains and two heading gate roads with the exception of the tailgate of longwall panel 3. Between the install road of longwall panel 2 and the install road of longwall panel 3, a distance of approximately 300 m, only one gate road has been developed.

- *Small diameter ventilation shafts to be installed at the rear of every third gate road panel for ventilation of the gate road in-bye of the active longwall face thus negating the need for a bleed system skirting the perimeter of the goaf* – Small diameter ventilation shafts are being considered at the rear of the gate road panels for ventilation of the gate road inbye of the active longwall face. This system will support the discontinuation of a perimeter roadway that otherwise results in a pressure differential across goaves and therefore reduce potential for spontaneous combustion.
- *Pre- and post- (goaf) gas drainage systems are to be implemented for gas management purposes thereby minimising ventilation pressures that would result if the ventilation system only were used to maintain gas concentration to acceptable levels* – Pre- and Post- gas drainage systems are utilised across the site.
- *Planned installation of high standard ventilation control devices* – mine has installed stoppings, regulators and overcasts through the underground mining area to control ventilation.
- *Installation, operation and maintenance of a dual ventilation monitoring system (telemetric and tube bundle)* – the mine currently has installed both telemetric and tube bundle monitoring systems.
- *On-site gas chromatograph* – gas chromatograph was installed during the reporting period and is currently in use.
- *On-site inertisation capability:*
    - *Pipework and valves fitted to all goaf seals to allow the injection of inert gas* – this has been incorporated into the mine design.
    - *Potential utilisation of in-seam drainage ranges* – can be reticulated through gas plant and back into goaf using the existing boreholes.
    - *Access to Thomlinson Boiler and PSA Nitrogen gas generators, if required* – A 'Floxal' nitrogen generating plant has been secured through Air Liquide. This equipment is located onsite adjacent to the ventilation shaft and reticulated underground via a dedicated pipeline. Access to a Thomlinson Boiler could be arranged if required.
- *Implementation of Ventilation and Monitoring Arrangements and the related spontaneous combustion procedures and action response plans* – Ventilation Arrangements Management Plan, Monitoring Arrangements Management Plan and Spontaneous Combustion Major Hazard Management Plan together

with associated Trigger Action Response Plans (TARPs) have been developed and implemented at the site.

- *Implementation of a Gas Drainage and Outburst Management Plan which would:*
    - *Define acceptable negative pressures at the collars of in-seam boreholes* – Management of negative pressure is achieved through monitoring controls under the Spontaneous Combustion Management Plan.
    - *Establish methods of intersecting and management of in-seam boreholes* – methods for intersecting and management of in-seam boreholes is managed through the borehole intersection procedure and the Borehole Intersection Notices (BIN) developed for each in-seam borehole to be intersected.

3.15 Bushfire Management

3.15.1 Management

Narrabri Mine is equipped to attend to emergency fire situations with appropriate machinery and personnel. Any involvement in such situations would be at the discretion of the local Rural Fire Service (Baan Baa). A fire break was installed around the northern section of longwall panels during the reporting period. This fire break will assist emergency vehicles requiring access to the western portion of the mining lease.

3.15.2 Performance

There were no bushfire incidents on or adjacent to the mine site during the reporting period.

3.15.3 Comparisons with EA Measures

The Project Approval (PA) 08_0144 MOD 2 requires the development of a Rehabilitation Management Plan, see Schedule 5, Condition 4(e), that includes the measures that will be used onsite to manage bushfires. Narrabri Mine has permanent fire fighting hydrants located around the Pit Top Area and mobile fire fighting equipment for use where required. Existing tracks on the western portion of

the site are maintained as required. As mentioned above, a fire break has also been installed around the perimeter of the mine to the west. Tenants on mine-owned land are required to manage their respective parcels of land, which includes measures to manage bushfire potential, as most are currently operating farms.

3.16 Mine Subsidence

Under Stage 1 operations it was predicted that mine subsidence would not exceed 20 mm. The Stage 2 subsidence assessment for longwall operations undertaken by Ditton Geotechnical Services Pty Ltd (DGS) in 2009 (provided as Part 1 of *Specialist Consultant Studies Compendium* for the Stage 2 EA) predicted a maximum subsidence level of 2.44 m.

The ground surface will tend to subside more towards the centre of the longwall panel (i.e. away from the chain pillars between the longwall panels). As a consequence of this differential subsidence, DGS (2009) has predicted the following possible impacts:

- Surface cracking of between 20 mm (in the west) and 190 mm (in the east);
- Altered surface gradients of up to 6 % (3°) along creeks;
- Potential ponding depths of 0.5 m to 1.5 m within the watercourses in the flatter areas of the site;
- Possible interaction between discontinuous sub-surface fracturing and surface cracks (where cover depths are <215 m) leading to possible flow re-routing; and
- Possible impacts on subsurface aquifers within 110 m to 180 m above the proposed panels as a result of direct hydraulic connections to the workings.

Based on the above summary of potential subsidence, the impacts are likely to be largely limited to the mining area, the majority of which is owned by Narrabri Mine. The potential impacts include:

- Impacts on groundwater;
- Surface cracking;
- Drainage line ponding;
- Erosion and slope stability;
- Impacts on Aboriginal sites/artefacts; and
- Impacts on local residences.

Management measures for subsidence related impacts are described in the approved Extraction Plan.

3.16.1 Longwall Mining during the Reporting Period

The longwall unit commenced mining during June 2012 in longwall panel 1. The target mining height is 4.0-4.2m and focuses on the bottom section of the Hoskissons Coal seam. The overburden thickness above longwall panel 1 is 160-180 m. The final extraction void is 305 m which includes the gate roads. Chain pillar dimensions are a minimum of 30 m rib-to-rib at a maximum of 100 m cut-through centres. The longwall unit had retreated 1,416 m along longwall panel 1 during the reporting period which has a total length of 1,785 m. The longwall unit move to panel 2 will occur early in the next reporting period.

3.16.2 Performance

3.16.2.1 Monitoring

Narrabri Mine has monitored the subsidence movement across the surface of longwall panel 1 in accordance with the approved Extraction Plan. The subsidence monitoring survey lines are illustrated on Figure 5. Table 9 outlines the maximum subsidence parameters recorded as part of the subsidence monitoring program and a comparison with the maximum predicted subsidence parameters as outlined in the Extraction Plan.

Baseline monitoring has been undertaken on the 11kv powerline that traverses the southern end of longwall panel 1 but no monitoring of the powerline occurred during the reporting period as the monitoring intervals outlined in the Extraction Plan were not triggered.

Table 9 – Subsidence Parameters

Longwall Panel 1		
	Maximum Predicted Extraction Plan	**Maximum Measured**
Line A – Cross panel survey line		
Subsidence (m)	2.44	2.449
Tilt (mm/m)	47	53.8
Tensile Strain (mm/m)	11	17.1
Compressive Strain (mm/m)	14	14.0
Line B – Pine Creek Tributary 1		
Subsidence (m)	2.44	2.380
Tilt (mm/m)	47	54.4
Tensile Strain (mm/m)	11	11.9
Compressive Strain (mm/m)	14	9.2
Gradient Change (%)	Up to 6	5.45
Line E – Pine Creek Tributary 1 Crossline 1		
Subsidence (m)	2.44	0.052
Tilt (mm/m)	47	0.9
Tensile Strain (mm/m)	11	2.0
Compressive Strain (mm/m)	14	2.9
Line F – Pine Creek Tributary 1 Crossline 2*		
Subsidence (m)	2.44	0.034
Tilt (mm/m)	47	0.6
Tensile Strain (mm/m)	11	1.2
Compressive Strain (mm/m)	14	1.4
Line 101 – Centre of longwall panel 1		
Subsidence (m)	2.44	2.606
Tilt (mm/m)	47	46.2
Tensile Strain (mm/m)	11	20.7
Compressive Strain (mm/m)	14	26.6

* - Line F in longwall panel 2.

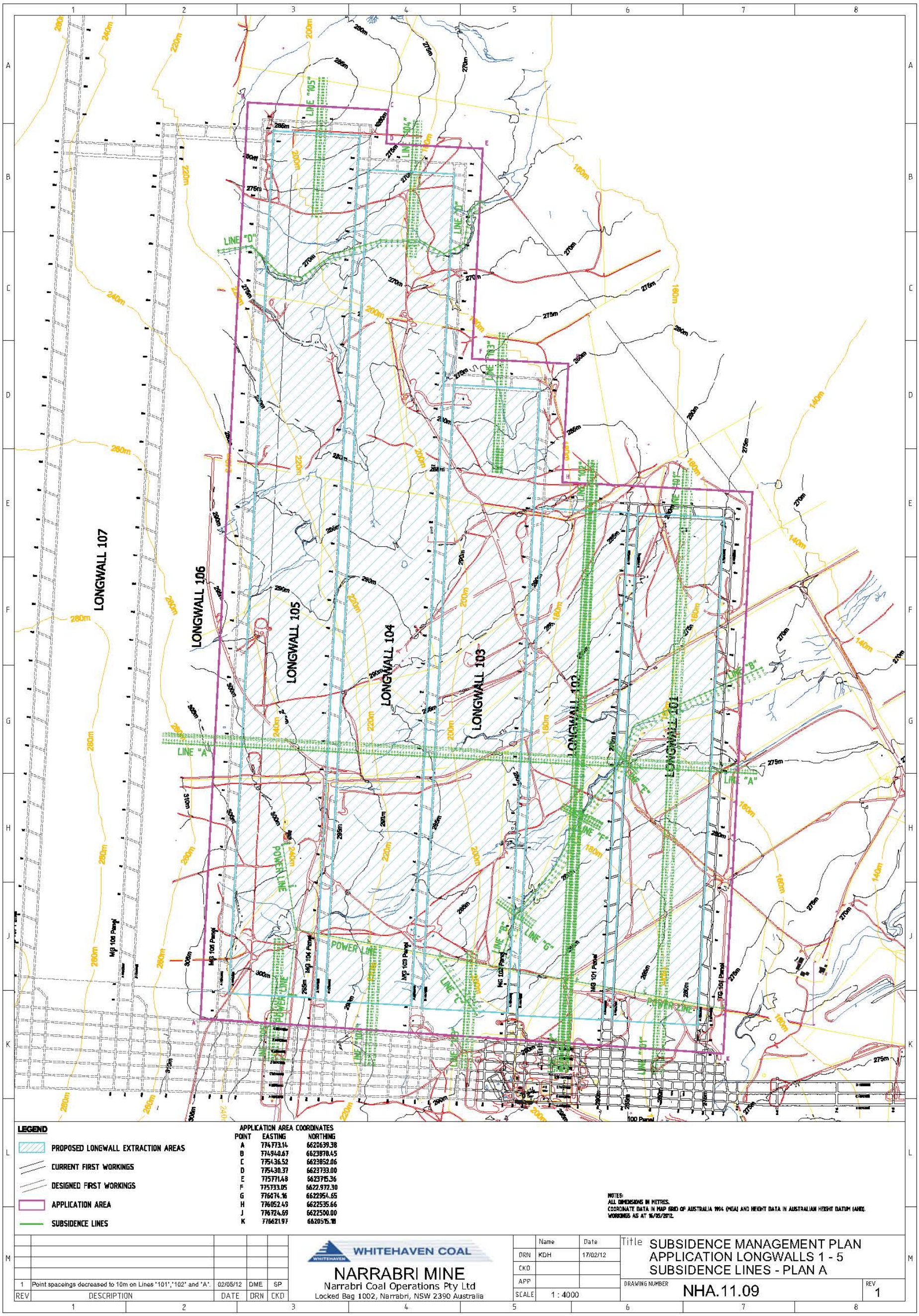

Figure 5 – Subsidence Monitoring Plan

3.16.2.2 Impacts

Surface cracks generally developed along goaf edges and in the panel itself. Where required, areas have been ploughed to fill cracks. Cracks are still evident in the panel where it was affected by ponding and when this area can be safely accessed it will be remediated.

Greylands Road was closed during active subsidence and the subsequent remediation works involved building the road up with gravel and installing a culvert as water was ponding close to the road. This road has since been re-opened in consultation with Narrabri Shire Council.

Ponding was observed in longwall panel 1 in the tributary of Pine Creek and spreading out over the adjacent paddock. The ponding has been pumped down and an investigation into mitigation options is being progressed and will be finalised in the next reporting period.

No fences were damaged as a result of subsidence and no farm dams were undermined during the reporting period.

Large trees along Greylands Road and in the tributary of Pine Creek have been adversely impacted by subsidence and further monitoring will be undertaken during the 2013 Spring ecological survey of the Extraction Plan area.

3.16.3 Comparisons with EA Predictions

The Mine Subsidence Predictions and Impact Assessment undertaken as part of the Environmental Assessment for the Stage 2 longwall operation (*Environmental Assessment for the Narrabri Coal Mine Stage 2 Longwall Project, Specialist Consultant Studies Compendium, Volume 1, Part 1, November 2009*) outlines the range of subsidence predicted to occur as a result of longwall mining operations as well as potential impacts and the recommended monitoring program.

As can be seen from Table 9 above, the levels of measured subsidence are greater than those predicted in the subsidence assessment undertaken for the site. The areas of greatest subsidence generally correspond with existing access tracks on the surface. The average subsidence for the centre line of panel 1 in the actively subsided and stabilised area is 2.400 m. During the Spring 2013 ecological survey any impacts that may be attributable to the increased subsidence will be investigated and any associated remedial measures will be implemented.

All subsidence monitoring results are forwarded to the relevant Government agencies.

3.17 Hydrocarbon Contamination

3.17.1 Management

It is Narrabri Mine's objective that:

- All bulk hydrocarbons, i.e. fuel, oils, grease etc (both new and waste) retained at the Narrabri Mine be contained within bunded areas within the contained water management system as described in Section 2.8.2;
- All fixed or portable equipment incorporate self-contained bunding;
- Hydrocarbon contaminated materials be disposed of appropriately; and
- Minor spillages, if occurring, are cleaned up and the contaminated soil either bio-remediated or transferred offsite to an appropriately licensed waste disposal area.

Major spillages, if occurring, would be treated in accordance with a three-phase system of containment, collection and remediation.

3.17.2 Performance

Narrabri Mine's procedures for hydrocarbon management have been effective throughout the reporting period with:

- No surface or groundwater contamination evident or reported by landowners; and
- No requirement for off-site disposal of contaminated materials.

In addition, a bio-remediation area has been established onsite for minor spills to treat impacted soil. A Hydrocarbon Management Plan is also being developed which will be implemented during the next reporting period and will be used to supplement the existing Whitehaven Group's procedure for 'Chemical and Hydrocarbon Spill Response'.

3.17.3 Comparisons with EA Measures

The Environmental Assessment for the Stage 2 longwall operation (*Environmental Assessment for the Narrabri Coal Mine Stage 2 Longwall Project, Section 4B.3.4.2.5 – Contaminated Water Management, November 2009*) outlines the range of management measures to be implemented at the site to manage hydrocarbons

spills, identified as a potential main source of water contamination. These measures include:

These areas would be managed as follows:

- *Runoff would be drained to a triple interceptor (or similar) to reduce hydrocarbon concentration to acceptable levels before draining to SB1. The oily fraction would enter a containment system for removal as necessary* – Two oil-water separators are located at the wash down/refuelling bay and the workshop which are inspected monthly. The treated outflow is directed to SB1 via open drains
- *All oil, grease, fuel and hydrocarbon products would be securely stored on an impermeable surface within a bund capable of containing 110% of the largest tank's capacity* – oils are stored in a bunded container onsite. Waste oil is stored in self bunded tanks or in Intermediate Bulk Containers (IBCs) on bunded pallets. All fuel tanks are self-bunded trans-tanks or similar.
- *Refuelling, oiling and greasing would be restricted to designated areas, away from drainage and where spill kits are readily available* – Refuelling in the field is undertaken by a trained and competent person with a fully operational service truck, which has a spill kit available. Spill kits are also available at the fuel farm, waste oil area, workshop and other areas as required.

In the event of a major hydrocarbon spill, the following actions would be undertaken:

- *The contaminated soil at the site of the spill would be collected and transported to an approved waste depot or remediated safely on the Mine Site* – Narrabri Mine has established a plastic lined cell to house hydrocarbon contaminated soil for bio-remediation. The soil will be tested and treated to an acceptable level before being transported to a licenced facility or used onsite pending the results of the analysis. No contamination requiring bio-remediation occurred during the reporting period.
- *Pits would be constructed around the spill with sufficient hydraulic gradient to capture seepage water and contaminated material, enabling the pits to be pumped out* – no hydrocarbon contamination events occurred during the reporting period.
- *The local groundwater would be monitored for signs of further contamination* – Narrabri Mine has implemented a comprehensive groundwater monitoring network around the site, refer to Section 3.4.

In addition to the actions outlined above the Narrabri Mine has developed and implemented a Pollution Incident Response Management Plan (PIRMP) as required

for holders of an EPL by Part 5.7A of *Protection of the Environment Operations Act 1997* and Part 3A of the *Protection of the Environment Operations (General) Regulation 2009*. The PIRMP has been developed and implemented to manage pollution events at the Narrabri Mine.

3.18 Greenhouse Gas Emissions

Narrabri Mine remains committed to minimising greenhouse gas emission levels as much as possible throughout the life of the development. During the reporting period greenhouse gas emissions have been predominantly associated with ventilation of the mine, gas drainage and electricity use onsite. Due to the ramp in production following the commencement of longwall mining the electricity supply has increased during the reporting period and is expected to increase again during the next reporting period as the mine reaches planned production levels.

Ventilation air was monitored during the reporting period with approximately 9,209 Mm^3 of air vented from the mine with an average composition of 0.02 % methane (CH_4) and 0.19 % CO_2.

During the reporting period, a total of 2,791,521 litres of diesel was used at the site by both Narrabri Mine and associated contractors. Assuming an energy content for Automotive Diesel Oil of 38.6 GJ/kL and using Table 3 of the *National Greenhouse Accounts (NGA) Factors – July 2011*, the estimated direct – Scope 1 Greenhouse Gas emissions including all CO_2 and non CO_2 gasses are shown in Table 10.

Electricity consumption totalled approximately 42,569,292 kWh, which is an approximate 210% increase from the previous year. This is a direct result of the increase in production, completion of construction activities, and longwall and CHPP commissioning and ramp up. Table 10 shows the estimated CO_2-e emissions which are based on the NGERS NSW and ACT emission factor for consumption of electricity purchased from a grid.

Table 10 - Greenhouse Gas Emissions

	Usage	Emission Factor	CO_2 Equivalent Tonnes
Diesel (kL)	2,791,521	69.2 t CO_2 –e/GJ	7,489
Electricity (kWh)	42,569,292	0.89 kg CO_2-e/kWh	37,887

Diesel consumption has increased slightly when compared to the previous reporting period due to the increased numbers of underground equipment and gas-drainage and associated works occurring at the surface. Diesel generators are also installed at the gas-drainage wells over longwall panels one to five, where required. The volume

of diesel used during the reporting period is considered indicative of the long-term annual usage that could be expected at the Narrabri Mine.

The Narrabri operation forms part of the wider Whitehaven group which has reported for the last three years via the National Greenhouse and Energy Reporting Scheme (NGERS). The 2009/2010 NGERS report for the company triggered reporting requirements under the Commonwealth Government's Energy Efficiency Opportunities Program. The first assessment cycle includes Whitehaven's Tarrawonga, Rocglen and Werris Creek operations. It is expected that Narrabri Mine will be included in the second assessment cycle in 2014.

In the meantime, the site continues to operate with an Energy Savings Action Plan (ESAP), with the initial plan required by PA 05_0102 MOD 1 and a revised version for the Stage 2 longwall operation, as required by PA 08_0144 MOD 2. The *Guidelines for Energy Savings Action Plans (DEUS, 2005)* require an Annual Progress Report of Outcomes to be submitted following implementation of an ESAP. After experiencing difficulty interpreting how the progress report should be completed, Narrabri Mine contacted an ESAP representative at the Office of Environment and Heritage (OEH) who advised that ESAP reporting has progressed substantially since the initial *Guidelines* were developed and reporting is now completed via an online system of which Narrabri Mine cannot access because it is only available to those companies that OEH require to report. As Narrabri Mine did not trigger OEH's requirements the company was not permitted access to the online reporting system and OEH advised that they did not wish to receive annual progress reports from Whitehaven sites. When asked how to complete the original progress report in the 2005 *Guidelines*, OEH were unable to provide sufficient information to allow for a meaningful progress report to be completed. OEH also advised that the ESAP process was not designed for new sites, thereby further complicating the reporting process.

On this basis, Narrabri Mine requested consideration from DP&I to exclude the requirement of the Guidelines to complete annual progress reports. DP&I subsequently advised that they did not expect the company to provide annual progress reports to OEH, however they expect greenhouse gas monitoring and management measures to be reported in AEMRs/Annual Reviews.

PA 08_0144 MOD 2 also requires the mine to submit a Greenhouse Gas Minimisation Plan prior to carrying out longwall operations. The Greenhouse Gas Minimisation Plan was subsequently approved by DP&I on 12 June 2012.

3.18.1 Comparisons with EA Predictions

The Greenhouse Gas Assessment (GHGA) undertaken as part of the Environmental Assessment for the Stage 2 longwall operation (*Environmental Assessment for the Narrabri Coal Mine Stage 2 Longwall Project, Specialist Consultant Studies Compendium, Volume 2, Part 8, November 2009*) outlines the predicted greenhouse gas emissions associated with the longwall operation. Comparisons are made with the Stage 2 assessment as it more closely reflects the operations onsite with the only exceptions being the fully operational longwall unit and CHPP, both of which have undergone commissioning during the reporting period with full operation expected to commence early in the next reporting period. A comparison of predictions in the Stage 2 GHGA and the actual amounts are provided below:

- *Diesel usage was estimated at 2,022 kL/year (years 2-20)* – Narrabri Mine used a total of 2,792 kL during the reporting period;
- *Electricity use during Year 1 in the GHGA is predicted to be 11,429 MWh with a worst case consumption of 49,283 MWh* – Narrabri Mine used 42,569 MWh during the reporting period;
- *Predicted gas-drainage volumes and composition annualised for a 30 year mine life (GHGA, Table 2) were 50.77 Mm^3 of CO_2 (73 % of total gas-drainage composition) and 17.93 Mm^3 of CH_4 (27 % total gas-drainage composition)* – Narrabri Mine has produced 54.6 Mm^3 of CO_2 (67 % of total gas-drainage composition) and 5.8 Mm^3 of CH_4 (8 % of total gas-drainage composition) during the reporting period. The remaining 25 % of ventilation gas is comprised of air;
- *Predicted ventilation gas volumes for longwall panel 1 was 9.8 Mm^3 of CO_2 and 4.6 Mm^3 of CH_4* – Narrabri Mine has produced 17.5 Mm^3 of CO_2 (0.19 % of total ventilation gas composition) and 1.8 Mm^3 of CH_4 (0.02 % of total ventilation gas composition) during the reporting period; and
- *Predicted CO_2-e emissions annualised for a 30 year mine life (GHGA, Table 2) were 0.35 Mt* – Narrabri Mine has calculated the emissions for the reporting period were 0.29 Mt of CO_2-e.

3.19 Gas Drainage / Ventilation

Since February 2012 the main ventilation fans have been ventilating the mine and the temporary fans in the box cut have now been removed providing another ingress/egress point for the mine. The three main fans provide all of the ventilation

for the active areas of the mine with pre-drainage works undertaken 3-4 longwall panels in advance of the workings.

The pre-drainage Surface to Inseam (SIS) works were scaled back during the reporting period with SIS works installed up to longwall panel 5. There are currently 52 active Vertical Production Wells (VPW's) and 17 that have now been decommissioned. The decommissioning process incorporates grouting the holes and rehabilitation of the immediate areas. Gas drainage drilling and construction works included the use of a SIS lateral rig drilling out to 2,000 meters, standard drill rigs for vertical boreholes, and poly welding of pipe for the interconnection of the wells with the gas plant. Rehabilitation of areas disturbed by drilling activities has continued during the period with improved weather conditions allowing these works to be conducted in a more efficient manner.

For comparisons between predicted gas make at the mine and actual gas make refer to Section 3.18.1.

3.20 Public Safety

3.20.1 Management

The Narrabri Mine Pit Top Area and drilling operations are all located wholly on mine owned land and is appropriately signed allowing authorised access only. The site is visible from the Kamilaroi Highway and accessible via an access road from the Highway across the main northern railway line. Narrabri Mine has applied to close Greylands road, the only other access road in the northern portion of the site. Once the mine takes possession of this road, anticipated during the next reporting period, the road will be closed and all access will be directed through the Pit Top Area. Visitors to the mine are required to report to the mine office and unauthorised personnel are not permitted to move around the mine area unaccompanied.

As required by the Extraction Plan (PA 08_0144 MOD 2, 3(4)) for second workings (i.e. longwall mining), Narrabri Mine has developed a Public Safety Management Plan that outlines the management of subsidence on public infrastructure overlying longwall panels 1 to 5. As required by this plan and the Subsidence Management Plan approval received from DRE, Narrabri Mine developed and implemented two management plans.

One plan outlined the management measures that would be undertaken to reduce the risk to public safety in relation to Greylands road. This plan was developed in consultation with the Narrabri Shire Council and allowed Narrabri Mine to close the road during periods of active subsidence and while remediation activities were

undertaken. This road was reopened during the reporting period but will be impacted once longwall mining has progressed in longwall panel 2.

The other plan was developed in consultation with Essential Energy and outlined the management measures to be implemented for the 11kV powerline that traverses longwall panels 1 to 5. The powerline was de-energised at the end of the reporting period pending subsidence impacts expected to occur during the next reporting period.

No other public infrastructure exists within longwall panels 1 to 5, i.e. the approved Extraction Plan area.

3.20.2 Performance

The control measures outlined in the Public Safety Management Plan and what has been undertaken onsite are outlined below for Greylands Road and the 11kV powerline:

Greylands Road

- *Erection of warning signage and communication with leaseholders, owners, staff and contractors*: Signs are erected on Greylands road at the mining area boundary. Lease holders were notified either by letter or by phone and safety briefs were issued for the staff and contractors.
- *Traffic control, and consider closing road to general traffic*: Road closure implemented in consultation with Narrabri Shire Council.
- *Inspection and survey monitoring of roads*: Daily inspections undertaken during periods of active subsidence.
- *Twice-daily inspection and implement repairs in response to observed impacts*: Daily inspections undertaken during periods of active subsidence.

Powerline

- *Pre and post mining survey of asset condition / line clearances and remediation if required*: Baseline survey undertaken however subsidence impacts not yet impacting the line, this will be reported during the next reporting period.
- *De-energise affected transmission line for period of undermining until inspection and repairs are completed to Essential Energy's satisfaction*: Powerline is currently de-energised and will remain de-energised until any remediation works are undertaken, if required, and Essential Energy are

satisfied as required by the management plan developed and implemented for the powerline.

- *Provided alternative power supply to dwellings as required*: Diesel generators are currently located at the "Westhaven" and "Barton Hedge" properties as an alternative power supply.

3.21 Feral Animal Control

Feral animals are not a significant land management issue at the Narrabri Mine and are generally limited to isolated occurrences of foxes, hares, rabbits and pigs. In view of the low frequency of occurrence, and in the absence of an extensive programme by all surrounding landowners, no broad scale feral animal control programme was considered warranted during this reporting period. It should be noted however that pig trapping has been occurring on mine-owned land as well as on neighbouring properties and feral dog baiting has been undertaken by surrounding land owners during the reporting period.

Narrabri Mine will continue to monitor feral animal occurrences and implement necessary control programmes if and when necessary, as outlined in the Landscape Management Plan and in consultation with the local branch of the Livestock Health and Pest Authority (LHPA) and surrounding land owners

3.22 Land Capability

3.22.1 Management

The majority of land currently disturbed by mining activities, including drilling operations and subsidence, is classified as Land Capability Class III. On completion of all mining activities, the successful rehabilitation of areas of disturbance and the relinquishment of the mining leases, the land affected by mining within the project area will, in the main, be returned to a classification similar to that prior to mining. As a consequence, the area disturbed for mining operations will be returned to a Class III land capability. Rehabilitation works such as reshaping and seeding of previously disturbed areas has been undertaken ensuring the visual impact of the development was kept to a minimum and that the soil resources of the area is appropriately managed for future land use requirements.

3.22.2 Performance

The Land Management Plan prepared for the Extraction Plan outlined the performance measures and criteria for impacts associated with longwall mining. A Spring Monitoring Survey report is yet to be finalised however the measures and Spring 2012 assessment results are included below:

- *Surface Cracking – Permanent cracks (which do not self-close within one month of longwall face passing) are remediated as soon as practicably possible (and safe to do so). Surface cracking is remediated to prevent erosion and slope instability issues within 6 months of each longwall pass*: Surface cracks are ploughed when required.
- *Topographic form (LiDAR):*
    - *Landscape morphology – Subsidence across landscape does not exceed subsidence predictions for LW 101-105*: Not assessed during the reporting period (required every 3 years in accordance with Land Management Plan). While LiDAR data was not recorded the measured subsidence onsite is slightly greater than predicted but no significant impacts as a result of the increased subsidence have been observed.
    - *Creek lines – No identifiable change to overall drainage pattern*: Not assessed during the reporting period (required every 3 years in accordance with Land Management Plan).
- *Soil moisture and nutrient distribution (EM mapping) – Identified areas of EM mapping change (greater than 1 standard deviation from the mean change) investigated in the field to determine the source of the change. Site specific management report prepared and recommendations implemented where necessary:* Not assessed during the reporting period (required every 3 years in accordance with Land Management Plan).
- *Groundcover (multi-spectral images – erosion and pasture cover) - Identified areas of NDVI change (greater than 1 standard deviation from the mean change) investigated in the field to determine the source of the change. Site specific management report prepared and recommendations implemented where necessary*: Areas of change have been identified but in relation to surface infrastructure activities.
- *Pasture:*

- *Pasture biomass - Less than 20% reduction in pasture biomass in impact zones in comparison to control zones*: No significant difference was determined between any zones during the reporting period.
- *Weed species Weed species identified and managed according to the weed management measures provided in the Rehabilitation MP*: No noxious weeds recorded.
- *Weed cover Less than 10% increase in weed cover in impact zones in comparison to the control zone*: No statistical difference calculated for weed cover onsite.

- *Soil nutrient status:*
  - *pH - pH remains within +/- 0.5 pH unit of baseline pH. If soil amelioration is undertaken, pH is to remain within recommended pH range for pasture (5.2-8.0)*: Not assessed during the reporting period (required every 3 years in accordance with Land Management Plan).
  - *EC - Less than 20% increase in EC in comparison to baseline values:* Not assessed during the reporting period (required every 3 years in accordance with Land Management Plan).
  - *Organic matter - Less than 20% reduction in organic matter in comparison to baseline values:* Not assessed during the reporting period (required every 3 years in accordance with Land Management Plan).
  - *Nitrogen - Less than 20% reduction in total nitrogen in comparison to baseline values:* Not assessed during the reporting period (required every 3 years in accordance with Land Management Plan).
  - *Phosphorus - Less than 20% reduction in phosphorus in comparison to baseline values:* Not assessed during the reporting period (required every 3 years in accordance with Land Management Plan).
- *Field survey of creek stability and condition - Less than 20% increase in creek erosion (bank and bed) in comparison to control Less than 20% increase in cross sectional area in comparison to control cross sectional area (unless stabilisation works have been undertaken)*: No new areas of creek erosion detected during the survey.

3.23 Meteorological Monitoring

3.23.1 Introduction

In June 2006, a meteorological station was commissioned on the "Claremont" property. The station has been operating since that time recording 15 minute wind speed, wind direction, temperatures, humidity and rainfall. Due to technical difficulties with the meteorological station and due to the requirement to also monitor solar radiation in the mine's EPL, Narrabri Mine purchased and installed a new meteorological station, in the same location, on 31 January 2012. Daily meteorological data for the reporting period is presented in Appendix 8.

3.23.2 Rainfall

Rainfall data for the reporting period is presented in Table 11.

Table 11 - Rainfall Data

Month	Monthly Rainfall (mm)	Cumulative Rainfall (mm)	Long Term Average* (mm)	Number of Rain Days**	Long Term Average Rain Days
Apr 2012	22.4	22.4	39.1	4	2.3
May 2012	65.4	87.8	48.0	4	2.6
Jun 2012	41.2	129.0	48.1	4	3.3
Jul 2012	77.0	206.0	46.8	8	3.2
Aug 2012	8.2	214.2	40.7	2	3.0
Sep 2012	26.8	241.0	42.1	2	3.0
Oct 2012	5.2	246.2	52.5	3	3.5
Nov 2012	15.4	261.6	61.2	3	3.9
Dec 2012	38.2	299.8	77.8	8	4.1
Jan 2013	125.2	425.0	84.2	7	3.7
Feb 2013	102.2	527.2	63.6	6	3.1
Mar 2013	120.8	648.0	56.2	4	2.8
Total	648.0	648.0	660.3	55	38.5
* – Narrabri West Post Office averages from 1891-2013. ** – >1mm.					

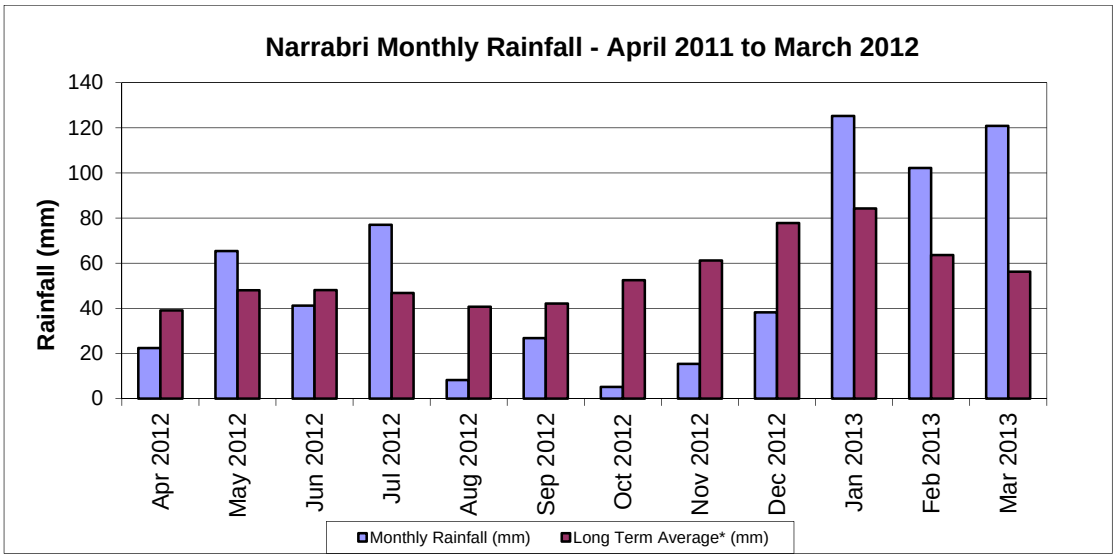

Figure 6 - Monthly Rainfall Data

A review of Table 11 and Figure 6 shows that the total rainfall at the mine site during the reporting period was 648 mm, which is 12.3 mm below the long term average for Narrabri West Post Office and 284 mm less than the site total during the previous reporting period.

Below average rainfall was experienced for 7 of the 12 months during the reporting period. The weather patterns did generally reflect the long-term rainfall trends with drier Autumn/Winter periods followed by wetter Spring/Summer periods.

Total rain days during the reporting period was more than the long term average but less than that recorded during the previous reporting period. A number of significant rainfall events occurred during the reporting period (e.g. 29/01/2013 – 100.4 mm, 2/02/2013 – 53 mm and 2/03/2013 – 93.6 mm).

3.23.3 Temperature

Average maximum and minimum temperatures for the reporting period are presented in Table 12 together with long-term monthly averages for Narrabri West Post Office (Bureau of Meteorology Station 053030).

Table 12 – Average Maximum and Minimum Temperatures

Month	Average Daily Temperature			
	Reporting Period (°C)		Station 053030 (°C)	
	Min	Max	Min	Max
Apr 2012	12.4	25.7	11.9	27.3
May 2012	5.7	21.4	8.3	22.5
Jun 2012	5.6	17.0	5.2	18.7
Jul 2012	5.0	16.7	3.7	18.0
Aug 2012	3.2	18.9	4.6	19.8
Sep 2012	6.5	23.8	7.6	23.4
Oct 2012	10.2	27.1	11.7	27.1
Nov 2012	16.0	32.1	14.8	30.1
Dec 2012	19.2	33.4	17.7	33.0
Jan 2013	21.5	36.1	19.3	33.8
Feb 2013	17.3	30.2	19.1	33.2
Mar 2013	16.5	28.8	16.4	31.2

Table 12 shows that average minimum temperatures at the mine site were similar to the long term average minimum temperatures from the Narrabri West Post Office Station. The average maximum temperatures at the mine site were generally lower than, or similar to, the long term averages. January 2013 was 2.3 degrees above the long term average indicating a hotter than usual month.

3.23.4 Wind Speed and Direction

Fifteen minute average wind speed and direction data is collected from the Narrabri Mine meteorological station as it, together with operational records and environmental monitoring results, can be used to assess the environmental effects or consequences of specific activities undertaken at the mine or in surrounding areas.

Monthly wind roses are included in Appendix 8. The wind roses show that the predominant wind directions during the reporting period were from the south-east and north-west. Recorded wind speeds were often over 5m/sec, particularly during winter, early spring.

3.23.5 Inversions

The Noise Management Plan (NMP) provides details more specific to inversion monitoring requirements. During the winter months of 2012 temperature inversion conditions were monitored during the monthly noise monitoring undertaken as outlined in the NMP developed in accordance with PA 05_0102 MOD 1 and PA

08_0144 MOD 2. Inversion monitoring conducted during the noise monitoring program did not identify any significant impact on noise propagation although inversions were present. The association between inversions and noise impacts will also be assessed through the use of the real-time noise monitor, as discussed in Section 3.10.3.4.

Current inversion monitoring is undertaken by placing temperature sensors on the "Kurrajong" and "Turabaa" properties to allow for the minimum 50 m separation required to determine inversion strength (refer to Appendix 7). Narrabri Mine is investigating options to establish permanent inversion monitoring equipment and reporting at the site as required by the NMP.

4 COMMUNITY RELATIONS

4.1 Complaints

Narrabri Mine maintains a designated complaints line, with messages checked on a daily basis by site personnel. In the event of a complaint, details pertaining to the complainant, complaint and action taken are recorded on a "Complaints Form".

During the reporting period, ten complaints were made to the mine. Two complaints were received via the designated complaints line. The nature of the complaint, details and response are presented in Table 13.

Table 13 - Complaints Summary 2012/2013 Reporting Period

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken / Follow-up
Phone call to EO	22/05/2012 9:25am	Complaint relating to noise from the site. Noise sources include: hammering, reverse alarms, vehicular/machinery horns, general noise from CHPP and product tripper. Complainant also noted that it was a very still and cool morning.	Continuous miner located on the surface as it is being off-hired and cleaned. A generator is used to run the miner and it was emitting noise during the morning period. The miner is on tracks and not 'dragged' along the surface. Banging noise sources possibly from maintenance workshop onsite.	EO downloaded noise files from the noise monitor located at complainants' residence. Complainant noted noise from approx. 8am onwards. EO listened to noise files for the 8:15-8:30 and 9:15-9:30 periods. Some banging noticeable around 9:16am that may be attributable to site but faint and not likely to be exceeding noise limits. The significant noise sources are either birds or train movements, both not attributable to site operations. EO returned call at approx. 2pm to discuss as noises not easily identifiable from site. Complainant said he could definitely hear 'loud' noises from site. EO to closely monitor levels reported through the portable noise monitor over the next week.
Phone call to site, returned by TSM	6/09/2012 12:51pm	Complaint relating to visible dust being carried by high winds from product stockpile. Dust was not travelling towards complainant's property however concerns were raised about the visible dust plume.	Dust was generated both at discharge of stacker as coal falls to stockpile and by the movement of dozers pushing coal into reclaim valves to load a train. The complainant noted the difficulty in managing dust from stockpiles in windy conditions but thought that operations should have ceased given the wind speed.	It was noted that sprays were active from the gantry of the conveyor but were ineffective in the wind conditions. EO to review wind speed data from weather station. CHPP superintendent notified and advised that a wind speed sensor trips the belt when wind velocity reaches 40km/hr. GM and EM were spoken to with regard to establishing an agreed standard for stopping CHPP if required when weather conditions exceeded an agreed operating envelope. EO to review options for setting a TARP for weather conditions.

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken / Follow-up
				Further investigations indicated gusts on the day exceeded 40km/hr but only for short periods of time. A review of dust control measures by an air quality expert has been undertaken and the results of this review are currently being considered.
Phone call to site, returned by EO	16/11/2012 3:20pm	Complaint relating to visible dust being carried by high winds from product tripper. Dust was not travelling towards complainant's property however concerns were raised about the visible dust plume.	Dust was generated at discharge of stacker as coal falls to stockpile. The complainant thought that operations should have ceased given the wind speed.	CRO and EO spoke to complainant. Water suppression was activated on tripper gantry and was running on conveyor transfer points. EO spoke with Engineering Manager and a meeting was planned to talk through options. EO rang complainant to inform him that options for dust management from the tripper will be discussed early next week. Meeting discussed concentrating coal stream by adding PCI coal to thermal stream. Suppressants will also be trialled soon. EO to review options for setting a TARP for weather conditions.
Phone call to site, talked with TSM	28/12/2012 1:00pm	Complaint relating to visible dust being carried by high winds from product tripper. A steady NW wind was carrying a plume of dust away from the discharge of the conveyor and it was visible to the complainant when returning home from Narrabri. The complainants property was not directly impacted by the dust, but it was claimed that dust was observed leaving site. The complainant subsequently informed the mine on Monday 31 December that coal dust was settling at his property.	Gantry sprays not activated to suppress dust.	TSM contacted CHPP control room and advised them of complaint. CHPP superintendent was also notified. The sprays on the gantry were activated adjacent to the discharge point. EO to review options for setting a TARP for weather conditions.
Phone call to site, talked with CRO	1/01/2013 2:10pm	Complaint relating to visible dust being generated from the product stockpile. Dozer was working on stockpile and the main source of the dust.	Dozer was working on product stockpile following train load out. Dust being generated from dozer movements on the coal stockpile. Gantry sprays not activated.	CRO advised TSM of complaint. Gantry sprays were activated following complaint. EO to review options for setting a TARP for weather conditions. Complainant came to site and talked with EO/TSM on Wednesday 2 January. Complainant advised that coal dust is settling on his property. First flush system to be installed on rainwater tanks.
Phone call to	6/01/2013	Complaint relating to visible dust being	Dozer was working on product	Complainant was put in contact with

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken / Follow-up
CRO, also attended site	~11:00am	generated from the coal stockpiles. Dozer was working on stockpile and the main source of the dust. Complainant requested that dozer operations cease and that the sprays be activated on the gantry. The CRO informed complainant that he cannot comply as it is outside of his area of control.	stockpile during train load out. Dust being generated from dozer movements on the coal stockpile. Gantry sprays not activated.	CHPP CRO and CHPP Supervisor. Sprays on the gantry were then activated. CHPP Supervisor assured complainant that we were attempting to do all we could under the circumstances. EO contacted complainant on Monday 7th January to inform complainant that a meeting is planned early this week to discuss dust issues.
Phone call to CRO	13/01/2013 11:58am	Complaint relating to visible dust being generated from the coal stockpiles. Complainant also noted noise from the mine wakes him up.	CRO noted that sprays were on and that the company is addressing the issue. No specific date/time for noisy activities given.	Complainant rang EO on Tuesday 15th January to follow up and highlight current dust generation. EO explained that the issue is being addressed but no timeline for implementation as assessing options.
Phone call to CRO	23/01/2013 6:50pm	Complaint relating to visible dust being generated from the product tripper during a gusty weather change.	CRO informed complainant that the CHPP control room was already in the process of shutting the plant down due to the strong winds.	EO rang complainant on Thursday 24th January to follow up and ensure complainant was happy with the response received.
Phone call to site	20/02/2013 10:20am	Complaint related to rubbish accumulating adjacent to the main access road to the site in an area that mine personnel utilise for smoking as the mine site is a non-smoking site.	Phone call transferred to EO. Mine personnel utilise this area and the issue has been raised in the past.	EO organised for area to be tidied planned for the 21st February. TBT to be issued to remind personnel to keep areas tidy and to clean up after themselves.
EPA emailed EM on behalf of anonymous complainant	26/02/2013 2:45pm	General complaint in relation to noise and dust from site. EPA also reviewed complaints register and queried dust TARP development, real-time noise unit and noise monitoring locations.	No specific date/times for general complaint but real-time noise data reviewed daily.	Response provided to the EPA advising of current dust management measures and noise monitoring undertaken at the site including locations. Dust TARP has now been implemented.

EO – Environmental Officer, TSM – Technical Services Manager, GM – General Manager, EM – Environmental Manager, CHPP – Coal Handling and Preparation Plant, CRO – Control Room Operator, TBT – Tool Box Talk

The number of complaints during the reporting period more than doubled when compared to the previous reporting period when four complaints were received. It should be noted that eight of the complaints were made by the same complainant.

Any complaints that are made are reported to the Community Consultative Committee and documented in this AEMR/Annual Review.

4.2 Employment Status, Demography and Socio-Economic Contributions

4.2.1 Employment Status and Demography

At the end of the reporting period, the mine had approximately 190 employees and approximately 108 long term contractors (not all onsite at the one time). Of the mine employees, 74% reside in the local area.

Narrabri Mine has a preference for sourcing personnel from the local area however certain activities requiring specialist knowledge and experience had to be sourced from other locations.

4.2.2 Social and Economic Contributions

In addition to the community funding required by PA 08_0144, direct and indirect employment, and the purchase of goods and services from local suppliers, during the reporting period Narrabri Mine also contributed over $34,000 to the local community, including a donation of more than $12,000 to the Narrabri Public School. The Narrabri Mine is also a proud supporter of the 2012 Narrabri BEST Business Awards; the Australian Museum's Science Unleashed regional program —'Science in the Bush'; and the Narrabri Show Society.

As members of the Gunnedah/Narrabri area community, mine-related employees also contribute socially and economically through their involvement in community sporting, educational and social organisations and expenditure of a component of their disposable income.

4.3 Community Liaison

In accordance with Condition 9 of Schedule 4 of PA 05_0102 MOD 1 and Condition 9 of Schedule 6 of PA 08_0144 MOD 2 a Community Consultative Committee (CCC) was formed within 3 months of the Project Approval. The committee comprises representatives of Narrabri Shire Council, Narrabri Mine and the community. The CCC is chaired by an Independent Chairperson, Mr Terry Miller.

Since its inception, the CCC has met on a regular basis, meeting 4 times per year in accordance with the condition of consent. During the reporting period meetings were held on 14 June 2012, 1 August 2012, 1 November 2012 and 30 January 2013.

The State member for Barwon attended the meeting on 1 August 2012 at the request of members of the CCC.

Narrabri Mine representatives continue to maintain contact with neighbours in the vicinity of the mine site. These contacts not only provide a means of information dissemination, but also enable Narrabri Mine to ascertain and address any potential issues which may arise from time to time.

4.3.1 Narrabri Mine Community Newsletter

During February and March 2013 a Community Newsletter was published by the mine as an update on the project. The newsletter was posted to local residents and made available in the local bakery, the Narrabri West Post Office, Narrabri Shire Council's administration building, the Boggabri Post Office and the Narrabri Shire Visitors Information Centre. The newsletter is also available at the mine site as well as being published on the Whitehaven Coal website.

The newsletter included a general overview of operations and production information, an update on the 'Cleanskin' Programme, the Biodiversity Offset Strategy and information relating to environmental incidents that occurred on the mine site and reported in the previous AEMR/Annual Review. Narrabri Mine aims to distribute a newsletter every 6 months to ensure the local area is up to date with the operation.

5 REHABILITATION

5.1 Buildings

No buildings have been removed during the reporting period.

5.2 Rehabilitation of Disturbed Land

5.2.1 Objectives

Narrabri Mine's rehabilitation / land use objectives for the Project Area (i.e. the area within the boundary of ML 1609) are as follows:

Areas affected by mining – short term

- To minimise clearing / vegetation disturbance consistent with operational requirements;
- To rehabilitate areas of disturbance no longer required for mining related operations in accordance with the approved Rehabilitation Management Plan;
- To apply soil (top soil / sub-soil) to the final landform based on material availability and post-mining land use;
- To stabilise all earthworks, drainage lines and disturbed areas required for mine-related activities to minimise erosion and sedimentation;
- To control vermin, feral animals and noxious weeds; and
- Reduce the visibility of the activities from adjacent properties and the local road network.

Areas affected by mining – long term

- To control vermin, feral animals and noxious weeds. Continuation and/or restoration of biodiversity and ecological integrity of areas affected by mining or agriculture within the mining lease;
- To establish a low maintenance, geotechnically stable, safe and vegetated landform which blends in with the surrounding natural landscape;
- To backfill the box cut and blend the final landform with the surrounding topography such that the visual impact of the post-mining landform is minimised;

- To provide habitat for fauna and corridors for fauna movement within the final landform;
- To monitor rehabilitation success in terms of physical and biological parameters;
- To decommission and remove all project-related infrastructure not required for the future use of the site;
- To remediate any land contaminated by accumulated salts or hydrocarbon spills/leaks; and
- The re-establishment of agricultural land of comparable land capability to that of the pre-disturbance environment (ie. Class III).

5.2.2 Achievements during the Reporting Period

Table 14 presents a Rehabilitation Summary while Table 15 presents a listing of maintenance activities undertaken during the reporting period. As the majority of cover crop establishment occurred during the previous reporting period, rehabilitation during this reporting period was limited to minor cover crop maintenance (Plate 10).

Approximately 2,050 tubestock have been planted since the commencement of construction with an estimated success rate of approximately 90% (Plate 10). Tubestock species planted around the site include Kurrajong, River Bottlebush, White Box, Hop Bush, Grey Box and Poplar Box. No tubestock was planted during the reporting period as the majority of the area disturbed was in previously cultivated/cleared paddocks.

For comparisons between disturbance described in the Stage 2 EA and actual disturbance refer to Section 3.6.1.

Plate 10 – Rehabilitated Drill Site

Plate 11 - Tubestock Plantings Around Box Cut

Table 14 - Rehabilitation Summary

	Area Affected (hectares)			
	This Report Period (as of 31.03.13)	**Last Report Period (up to 31.03.12)**	**Next Report Period (estimated)**	
A: MINE LEASE AREA				
A1 Mine Lease(s) Area	5298ha (454.2ha surface area)			
B: DISTURBED AREAS				
B1 Infrastructure area (other disturbed areas to be rehabilitated at closure including facilities, roads)	38	0	5	
B2: Active Mining Area (excluding items B3 - B5 below)	18	29	26	
B3 Waste emplacements, (active/unshaped/in or out-of-pit)	0.5	0	2	
B4 Tailings emplacements, (active/unshaped/uncapped)	N/A	N/A	N/A	
B5 Shaped waste emplacement (awaits final vegetation)	0	0	0	
ALL DISTURBED AREAS	56.5	29	33	F1
C REHABILITATION PROGRESS*				
C1 Total Rehabilitated area (except for maintenance)	6	26	12	F2
D: REHABILITATION ON SLOPES				
D1 10 to 18 degrees	0	0	0	
D2 Greater than 18 degrees	0	0	0	
D3 Less than 10 degrees	6	26	12	
E: SURFACE OF REHABILITATED LAND				
E1 Pasture and grasses	6	26	12	
E2 Native forest/ecosystems	0	0	0	
E3 Plantations and crops	0	0	0	
E4 Other (include non vegetative outcomes)				

* Note – rehabilitation estimates are based on the current acceptable level of rehabilitation for an operating mine (i.e. cover crop establishment on amenity bund). Final rehabilitation (i.e. infill of box cut, removal of amenity bund etc) will be calculated closer to mine closure.

Table 15 - Maintenance Activities on Rehabilitated Land

NATURE OF TREATMENT	Area Treated (ha)		
	Report period	Next period	Comment/control strategies/ treatment detail
Additional erosion control works (drains re-contouring, rock protection)	Nil	Nil	
Re-covering (detail - further topsoil, subsoil sealing etc)	Nil	Nil	
Soil treatment (detail - fertilizer, lime, gypsum etc)	Nil	Nil	
Treatment/Management (detail - grazing, cropping, slashing etc)	Nil	Nil	
Re-seeding/Replanting (detail - species density, season etc)	Nil	Nil	Retreatment of areas that may be required based on seasonal conditions.
Adversely Affected by Weeds (detail - type and treatment)	1	1	Ongoing control of Mother of Millions along Kurrajong Creek and its tributaries plus spot spraying of other weeds. See Section 3.8.
Feral animal control (detail - additional fencing, trapping, baiting etc)	Nil*	Nil*	* See Section 3.21

5.3 Rehabilitation Monitoring and Performance

Internal rehabilitation / revegetation monitoring undertaken to date has primarily been limited to inspections of roads/creeks impacted by subsidence, water management structures, soil stockpiles and seeded areas for evidence of instability / erosion or poor germination. This process will continue over the life of the mine, with the extent and nature of activities undertaken being consistent with the relevant MOP, Extraction Plan, Landscape Management Plan and other relevant management plans prepared in satisfaction of Narrabri Mine's Project Approval.

Rehabilitation resulting from the impacts of subsidence has been restricted to ploughing affected areas on the surface. Creek diversions and the large trees that have been impacted by subsidence will be addressed during the next reporting period.

6 CONTINUOUS IMPROVEMENT AND TARGET INITIATIVES

6.1 Objectives

Narrabri Mine has an ongoing commitment to environmental management and aims to minimise any adverse impacts on the physical, biological, cultural and socio-economic environment in the immediate and surrounding areas.

Activities at site to date have been on the basis of minimising the extent of disturbance to the minimum extent possible, and rehabilitating those areas as soon as practicable.

6.2 Achievements to Date

Achievements at the mine in its fifth year have included:

- The continued implementation of a working environmental management program and the establishment of culture of environmental awareness / responsibility within all levels of the workforce;
- Routine implementation of all relevant aspects of the approved management plans;
- The ongoing establishment and maintenance of an open and honest relationship with the neighbours, community in general, regulatory authorities, Local Government and other groups such as the local Aboriginal community. Narrabri Mine recognises that it is part of the community and that its activities have the potential to create benefits which extend beyond the life of the mine. The isolated nature of complaints received to date is indicative of the success of this approach;
- Establishment of a Biodiversity Offset Strategy with implementation to commence in the following reporting period;
- Ongoing real-time monitoring in areas with the potential of increased impact. One neighbouring property monitored during the reporting period; and
- Effective rehabilitation of areas of disturbance.

6.3 Targets and Goals

Targets and goals for the 2013/2014 reporting period include:

- Maintenance of established groundcover across areas of disturbance on the pit top area and additional tubestock planting to further enhance visual amenity;
- Continued improvement in noise management and amenity, including active implementation of inversion monitoring and real time noise assessment;
- Continued community liaison, support and involvement / education in the mine's activities;
- Compliance with all relevant conditions of all leases, licences and consents;
- Assess and review the effectiveness of the Extraction Plan following the completion of the first longwall panel, including the subsidence monitoring programme; and
- Implementation of the Biodiversity Offset Strategy and Management Plan that meets the requirements of DP&I, OEH and DSEWPaC.

N6625000
N6624000
N6623000
N6622000
N6621000
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E772000
E773000
E774000
E775000
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E780000
N

NARRABRI MINE

WHITEHAVEN COAL

LEGEND

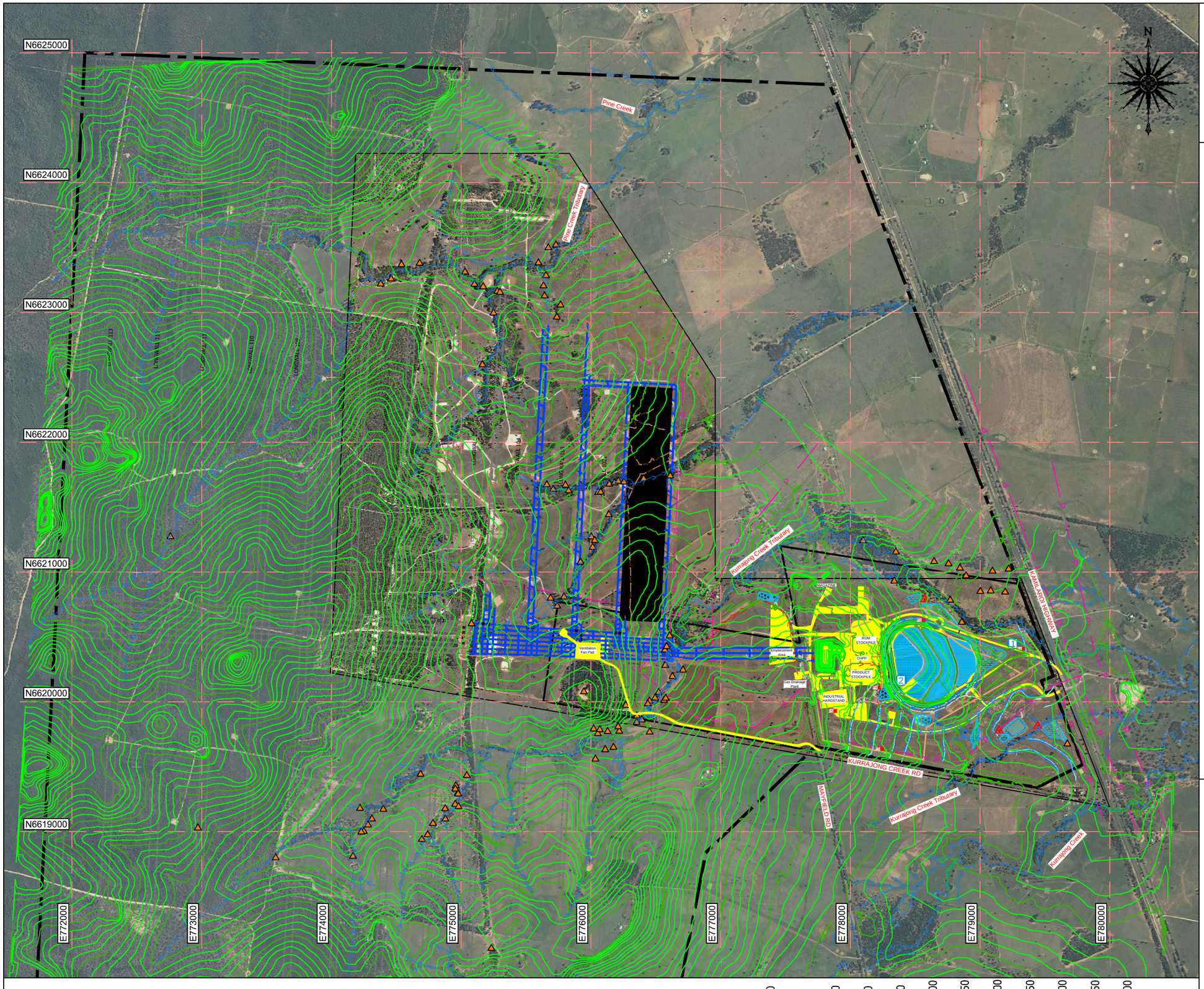
- Soil Stripping Area Prior to this AEMR
- Soil Stripping Area (2012/2013 AEMR)
- Proposed Soil Stripping Area (2013/2014 AEMR)
- Proposed Soil Stripping Area Requiring MOP Amendment
- Rehab Area Prior to this AEMR. Less then 10 deg slope
- Rehab Area Prior to this AEMR. 10 to 18 deg slope
- Rehab Area Prior to this AEMR. Greater then18 deg slope
- Rehab Area (2012/2013 AEMR) Less the 10 deg slope
- Rehab Area (2012/2013 AEMR) 10 to 18 deg slope
- Subsoil Stockpile
- Subsoil Stockpile
- 15cm Topsoil Stripping Depth
- 25cm Subsoil Stripping Depth
- Mining Lease Boundary & Colliery Holding Boundary
- Mining Surface Lease
- P2 Soil Test Pit Site
- (2) Soil Mappng Unit
- Soil Mapping Unit Boundary

250 00 250 500 750 1000 1250 1500 1750 2000 2250 2500

Scale Bar metres

AEMR PLAN 3
LAND PREPARATION
NARRABRI MINE

File Ref:	NC_AEMR(2012-13)
Surveyor:	David Ellwood
Date:	15/05/2013



NARRABRI COAL OPERATIONS PTY LTD

WHITEHAVEN COAL

LEGEND

- Infrastructure Areas
- Sediment Basin (Dirty)
- Evaporation/Storage Pond
- Storage Dam (Clean)
- Flow (Dirty)
- Flow (Clean)
- Mining Lease Boundary & Colliery Holding Boundary
- Mining Surface Lease
- Contour banks
- Aboriginal Site
- Discharge Monitoring Point
- GAS — Gas Drainage Infrastructure
- P — Power Lines

AEMR PLAN 4
MINING & REHABILITATION
NARRABRI MINE

File Ref:	NC_AEMR(2012-13)
Surveyor:	David Ellwood
Date:	17/05/2013

NARRABRI MINE

WHITEHAVEN COAL

LEGEND

- Area to be Rehabed Next AEMR Period
- Infrastructure Areas
- Mining Lease Boundary & Colliery Holding Boundary
- Mining Surface Lease

N6625000
N6624000
N6623000
N6622000
N6621000
N6620000
N6619000

E772000 E773000 E774000 E775000 E776000 E777000 E778000 E779000 E780000

MAGAZINE
ROM STOCKPILE
CHPP
PRODUCT STOCKPILE
INDUSTRIAL HARDSTAND
Emplacement Area
Ventilation Fan Pad
Gas Drainage Plant

250 00 250 500 750 1000 1250 1500 1750 2000 2250 2500

Scale Bar metres

AEMR PLAN 5
PROPOSED REHABILITATION
NARRABRI MINE

File Ref:	NC_AEMR(2012-13)
Surveyor:	David Ellwood
Date:	15/05/2013

Appendix 1

PA 05_0102 MOD 1 &

PA 08_0144 MOD 2

Project Approval

Section 75J of the *Environmental Planning and Assessment Act 1979*

I approve the project referred to in schedule 1, subject to the conditions in schedules 2 to 4.

These conditions are required to:
- prevent and/or minimise adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

Frank Sartor MP
Minister for Planning

Sydney 13th Nov, 2007

SCHEDULE 1

Application No:	05_0102
Proponent:	Narrabri Coal Pty Limited
Approval Authority:	Minister for Planning
Land:	See Appendix 1
Project:	Narrabri Coal Project

TABLE OF CONTENTS

DEFINITIONS

AEMR	Annual Environmental Management Report
BCA	Building Code of Australia
CCC	Community Consultative Committee
Day	The period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays
DECC	Department of Environment and Climate Change
Department	Department of Planning
Director-General	Director-General of Department of Planning, or delegate
DPI	Department of Primary Industries
DWE	Department of Water and Energy
EA	Environmental Assessment prepared for Narrabri Coal Pty Limited entitled *Narrabri Coal Project Environmental Assessment* and *Specialist Consultant Studies Compendium,* Volumes 1&2 (April 2007), including the *Response to Public and Government Agency Submissions* (June 2007) and *Preferred Project Report* (June 2007)
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPL	Environment Protection Licence issued under the *Protection of the Environment Operations Act 1997*
Evening	The period from 6pm to 10pm
GSC	Gunnedah Shire Council
Kamilaroi Highway Intersection	The intersection of the Kamilaroi Highway and the mine access road and "Bow Hills" quarry access road (see Figure 4 of Appendix 2)
km	Kilometre
Land	The whole of a lot, or contiguous lots owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this approval
Material harm to the environment	Material harm to the environment as defined in *Protection of the Environment Operations Act 1997*
Mining operations	The extraction, processing and transportation of coal on the site, including the formation of mine access drifts
Minister	Minister for Planning, or delegate
NSC	Narrabri Shire Council
Night	The period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and Public Holidays
Privately-owned land	Land that is not owned by a public agency, or a mining company (or its subsidiary)
Proponent	Narrabri Coal Pty Limited or any other person or persons who rely on this approval to carry out the project that is subject to this approval
Project	The Narrabri Coal Project described in the EA
RTA	Roads and Traffic Authority
ROM	Run-of-mine
Site	Land to which the project application applies (see Appendix 2)
Statement of Commitments	The Proponent's commitments in Appendix 4
Subsidence	Subsidence of the land surface caused by underground coal mining

SCHEDULE 2
ADMINISTRATIVE CONDITIONS

Obligation to Minimise Harm to the Environment

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

Terms of Approval

2. The Proponent shall carry out the project generally in accordance with the:
   (a) EA;
   (b) statement of commitments (see Appendix 3); and
   (c) conditions of this approval.

   Note: The general layout of the project is shown in Figure 1 of Appendix 2.

3. If there is any inconsistency between the above documents, the later document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.

4. The Proponent shall comply with any reasonable and feasible requirements of the Director-General arising from the Department's assessment of:
   (a) any reports, plans, programs, strategies or correspondence that are submitted in accordance with the conditions of this approval; and
   (b) the implementation of any actions or measures contained in these reports, plans, programs, strategies or correspondence.

Limits on Approval

5. Mining operations may take place on the site for 21 years from the grant of the mining lease for the project.

   Note: Under this Approval, the Proponent is required to rehabilitate the site to the satisfaction of the Director-General and DPI. Consequently this approval will continue to apply in all other respects other than the right to conduct mining operations until the site has been rehabilitated to a satisfactory standard.

6. The Proponent shall not extract more than 2.5 million tonnes of ROM coal a year from the site.

7. The Proponent shall transport all coal from the site by rail.

Management Plans / Monitoring Programs

8. With the approval of the Director-General, the Proponent may submit any management plan or monitoring program required by this approval on a progressive basis.

Structural Adequacy

9. The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.

   Notes:
   - *Under Part 4A of the EP&A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works.*
   - *Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.*

Demolition

10. The Proponent shall ensure that all demolition work is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures*, or its latest version.

Operation of Plant and Equipment

11. The Proponent shall ensure that all plant and equipment used on site is:
    (a) maintained in a proper and efficient condition; and
    (b) operated in a proper and efficient manner.

Planning Agreements

12. Within 12 months of this approval, the Proponent shall enter into a planning agreements with Narrabri Shire Council (NSC), Gunnedah Shire Council (GSC) and the Minister in accordance with:
    (a) Division 6 of Part 4 of the EP&A Act; and
    (b) the terms of the Proponent's offer to the Minister on 7 September 2007, which includes the matters set out in Appendix 4.

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

WATER MANAGEMENT

Note: These conditions should be read in conjunction with sections 6, 7, 8 and 11 of the Statement of Commitments.

Great Artesian Basin

1. Within 5 years of the date of this approval, the Proponent shall ensure that any loss of water flow into the Great Artesian Basin aquifers (equal to the maximum predicted impact, or the measured impact of the project, whichever is the greater), is managed, licensed or offset to the satisfaction of DWE.

   Note: The EA predicts a maximum impact of 100 megalitres a year for Great Artesian Basin aquifers in year 50 of the project.

Groundwater Model

2. Within 12 months of the commencement of mining operations, the Proponent shall undertake a transient calibration of the groundwater model presented in the EA, in consultation with DWE and DECC, and to the satisfaction of the Director-General.

3. Following the completion of the transient calibration of the groundwater model and the first annual review of the water balance, the Proponent shall prepare a Dewatering Contingency Plan. This plan must:
   (a) be prepared in consultation with DWE and DECC and to the satisfaction of the Director-General;
   (b) identify the freeboard required to prevent the evaporation/storage ponds from discharge of water under weather conditions of a 1 in 100 year 72 hour storm event for the site;
   (c) contain measures to ensure minewater is not pumped to the evaporation/storage ponds once this freeboard level is reached;
   (d) identify lead times required for the construction of a water conditioning plant to ensure the capacity of the site's evaporation /storage ponds is not exceeded (see below);
   (e) refine its estimates of quantities of salts that would be accumulated within the evaporation/storage ponds over the life of the project;
   (f) identify how it would manage and/or dispose of these accumulated salts, in consultation with DWE and DECC, and to the satisfaction of the Director-General.

4. The Proponent must commence construction of the water conditioning plant identified in condition 10(d) when daily mine dewatering volumes exceed 0.88 megalitres, or an alternative trigger point based on a review of the water balance and model and established in consultation with DWE and DECC, and approved by the Director-General.

Discharge

5. Except as may be expressly provided for by an EPL, the Proponent shall not discharge any surface waters from the site. However, product water from the water conditioning plant may be transferred to water users in accordance with an approved Water Management Plan (see below).

Evaporation/Storage Ponds

6. The Proponent shall:
   (a) construct evaporation/storage ponds incorporating the use of low permeability layers to manage minewater generated by the project;
   (b) prior to commencement of construction, submit pond designs and a construction QA/QC program to DECC; and
   (c) prior to commissioning the ponds, summit an "as constructed" report, produced by an experienced and qualified engineer, to DECC;
   to the satisfaction of the Director-General.

Water Management Plan

7. The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Director-General. This plan must be submitted to the Director-General for approval prior to the commencement of construction activities (not including the construction of the Kamilaroi Highway

intersection) in consultation with DECC and DWE by suitably qualified expert/s whose appointment/s have been approved by the Director-General and include a:

(a) Site Water Balance;
(b) Erosion and Sediment Control Plan;
(c) Surface Water Monitoring Plan;
(d) Groundwater Monitoring Program; and
(e) Surface and Groundwater Response Plan, setting out the procedures for:
    - investigating, and if necessary mitigating, any exceedances of the surface or groundwater assessment criteria (see below); and
    - responding to any unforeseen impacts of the project.

Site Water Balance

8. The Site Water Balance must:
    (a) include details of:
        - sources and security of water supply;
        - water use on site;
        - water management on site;
        - off-site water transfers;
        - reporting procedures;
    (b) describe measures to minimise water use by the project; and
    (c) be reviewed and recalculated each year in the light of the most recent water monitoring data.

Erosion and Sediment Control

9. The Erosion and Sediment Control Plan must:
    (a) be consistent with the requirements of *Managing Urban Stormwater: Soils and Construction* manual (Landcom, 2004), or its latest version;
    (b) identify activities that could cause soil erosion and generate sediment;
    (c) describe measures to minimise soil erosion and the potential for transport of sediment to downstream waters;
    (d) describe the location, function, and capacity of erosion and sediment control structures; and
    (e) describe what measures would be implemented to monitor and maintain the structures over time.

Surface Water Monitoring Program

10. The Surface Water Monitoring Plan must include:
    (a) detailed baseline data on surface water flows and quality in creeks and other waterbodies that could be affected by the project;
    (b) surface water impact assessment criteria;
    (c) a program to monitor the impact of the project on surface water flows and quality;
    (d) procedures for reporting the results of this monitoring.

Groundwater Monitoring Program

11. The Groundwater Monitoring Program must include:
    (a) further development of the regional and local groundwater model;
    (b) detailed baseline data to benchmark the natural variation in groundwater levels, yield and quality (including at any privately owned bores in the vicinity of the site);
    (c) groundwater impact assessment criteria;
    (d) a program to monitor the impact of the project on groundwater levels, yield and quality;
    (e) a program to monitor, (by the use of shallow piezometers/lysimeters), detect, and quantify any leakage from the site's evaporation/storage ponds; and
    (f) procedures for reporting the results of this monitoring.

NOISE

Note: These conditions should be read in conjunction with section 15 of the Statement of Commitments.

Impact Assessment Criteria

12. The Proponent shall ensure that the noise generated by the project does not exceed the levels set out in Table 1 at any privately-owned residence.

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All privately owned residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

- *To determine compliance with the $L_{Aeq(15\ minute)}$ limit, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Noise Policy.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*

Continuous Improvement

13. The Proponent shall:
    (a) implement all reasonable and feasible best practice noise mitigation measures;
    (b) investigate ways to reduce the noise generated by the project, including off-site road and rail noise and maximum noise levels which may result in sleep disturbance; and
    (c) report on these investigations and the implementation and effectiveness of these measures in the AEMR,

    to the satisfaction of the Director-General.

Monitoring

14. The Proponent shall prepare and implement a Noise Monitoring Program for the project to the satisfaction of the Director-General. This program must:
    (a) be submitted to the Director-General for approval prior to the commencement of construction activities;
    (b) be prepared in consultation with the DECC;
    (a) use attended noise monitoring measures to monitor the performance of the project
    (c) include a protocol to establish whether the project is complying with the noise impact assessment criteria in Table 1.

BLASTING AND VIBRATION

Note: These conditions should be read in conjunction with section 2 of the Statement of Commitments.

Airblast Overpressure Limits

15. The Proponent shall ensure that the airblast overpressure level from blasting at the project does not exceed the criteria in Table 2 at any residence on privately-owned land.

Airblast overpressure level (dB(Lin Peak))	Allowable exceedance
115	5% of the total number of blasts in a 12 month period
120	0%

Table 2: Airblast overpressure impact assessment criteria

Note: The overpressure values in Table 2 apply when the measurements are performed with equipment having a lower cut-off frequency of 2 Hz or less. If the instrumentation has a higher cut-off frequency a correction of 5 dB should be added to the measured value. Equipment with a lower cut-off frequency exceeding 10 Hz should not be used.

Ground Vibration Impact Assessment Criteria

16. The Proponent shall ensure that the ground vibration level from blasting, or any other activity at the project does not exceed the criteria in Table 3 at any residence on privately-owned land.

Peak particle velocity (mm/s)	Allowable exceedance
5	5% of the total number of blasts in a 12 month period
10	0%

Table 3: Ground vibration impact assessment criteria

Blasting Hours

17. The Proponent shall only carry out blasting associated with construction activities on site between 10 am and 4pm Monday to Friday.

Blasting Frequency

18. The Proponent may carry out:
    (a) a maximum of 2 blasts a day associated with construction activities; and
    (b) 5 blasts a week associated with construction activities, averaged over a 12 month period;
    on site without the written approval of the Director-General.

Property Inspections

19. Before carrying out any blasting, the Proponent shall advise all landowners within 2 km of proposed blasting activities, and any other landowner nominated by the Director-General, that they are entitled to a property inspection.

20. If the Proponent receives a written request for a property inspection from any landowner within 2 km of proposed blasting activities, or any other landowner nominated by the Director-General, the Proponent shall within 3 months of receiving this request:
    (a) commission a suitably qualified person, whose appointment has been approved by the Director-General, to inspect the condition of any building or structure on the land, and recommend measures to mitigate any potential blasting impacts; and
    (b) give the landowner a copy of this property inspection report.

Property Investigations

21. If any landowner within a 2 km of proposed blasting activities, or any other landowner nominated by the Director-General, claims that his/her property, including vibration-sensitive infrastructure such as water supply or underground irrigation mains, has been damaged as a result of blasting at the project, the Proponent shall within 3 months of receiving this request:
    (a) commission a suitably qualified person whose appointment has been approved by the Director-General to investigate the claim; and

(b) give the landowner a copy of the property investigation report.

If this independent investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damages to the satisfaction of the Director-General.

If the Proponent or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Director-General for resolution.

Monitoring

22. Prior to the commencement of blasting, the Proponent shall prepare and implement a detailed Blasting Monitoring Program for the project to the satisfaction of the Director-General.

AIR QUALITY

Note: These conditions should be read in conjunction with section 13 of the Statement of Commitments.

Impact Assessment Criteria

23. The Proponent shall ensure that dust emissions generated by the project does not cause additional exceedances of the criteria listed in Tables 4 to 6 at any residence on privately owned land, or on more than 25 percent of any privately-owned land.

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

Table 4: Long term impact assessment criteria for particulate matter

Pollutant	Averaging period	Criterion
Particulate matter < 10 µm (PM_{10})	24 hour	50 µg/m^3

Table 5: Short term impact assessment criteria for particulate matter

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m^2/month	4 g/m^2/month

Table 6: Long term impact assessment criteria for deposited dust

Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 1991, AS/NZS 3580.10.1-2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.

Monitoring

24. The Proponent shall prepare and implement an Air Quality Monitoring Program for the project to the satisfaction of the Director-General. This program must:
    (a) be submitted to the Director-General prior to the commencement of construction activities (not including the construction of the Kamilaroi Highway intersection);
    (b) be prepared in consultation with the DECC; and
    (c) use a combination of high volume samplers and dust deposition gauges to monitor the performance of the project.

METEOROLOGICAL MONITORING

25. During the project, the Proponent shall ensure there is a suitable meteorological station on site that complies with the requirements in *Approved Methods for Sampling of Air Pollutants in New South Wales* (DECC, 2007), or its latest version.

SUBSIDENCE

Subsidence Impact Limits

26. The Proponent shall ensure that the project does not result in subsidence impacts of greater than 20 mm vertical subsidence on any land.

Notification of Landowners

27. Six months prior to mining occurring under each privately owned property, the Proponent shall notify the relevant landowner/s of the extent of planned mining operations under their property.

LANDSCAPE MANAGEMENT

Note: These conditions should be read in conjunction with sections 5, 9 and 11 of the Statement of Commitments.

Rehabilitation

28. The Proponent shall rehabilitate the site to the satisfaction of the Director-General and DPI.

Landscape Management Plan

29. The Proponent shall prepare and implement a detailed Landscape Management Plan for the site to the satisfaction of the Director-General and DPI. This plan must:
    (a) be submitted to the Director-General for approval within 12 months of this approval;
    (b) be prepared by suitably qualified expert/s whose appointment/s have been endorsed by the Director-General;
    (c) be prepared in consultation with DWE, DECC and NSC; and
    (d) include a:
        - Rehabilitation Management Plan; and
        - Mine Closure Plan.

Rehabilitation Management Plan

30. The Rehabilitation Management Plan must include:
    (a) the rehabilitation objectives for the site;
    (b) a strategic description of how the rehabilitation of the site would be integrated with surrounding land use;
    (c) a general description of the short and long term measures that would be implemented to rehabilitate the site;
    (d) a detailed description of the measures that would be implemented to rehabilitate the site, including the measures to be implemented for:
        - managing the remnant vegetation and habitat on site;
        - minimising impacts on fauna;
        - minimising visual impacts;
        - conserving and reusing topsoil;
        - controlling weeds, feral pests, and access;
        - managing bushfires; and
        - managing any potential conflicts between the rehabilitation works and Aboriginal cultural heritage.
    (e) detailed performance and completion criteria for the rehabilitation of the site;
    (f) a detailed description of how the performance of the rehabilitation works would be monitored over time to achieve the stated objectives and against the relevant performance and completion criteria; and
    (g) details of who is responsible for monitoring, reviewing and implementing the plan.

Mine Closure Plan

31. The Mine Closure Plan must:
    (a) define the objectives and criteria for mine closure;
    (b) investigate options for the future use of the site;
    (c) provide a detailed methodology for decommissioning the site's evaporation/storage ponds and the treatment of any accumulated salt within or around those ponds;
    (d) investigate ways to minimise the adverse socio-economic effects associated with mine closure, including reduction in local and regional employment levels;
    (e) describe the measures that would be implemented to minimise or manage the on-going environmental effects of the project; and
    (f) describe how the performance of these measures would be monitored over time.

HERITAGE

Note: These conditions should be read in conjunction with section 10 of the Statement of Commitments.

Aboriginal Cultural Heritage Management Plan

32. The Proponent shall not destroy any known Aboriginal objects (as defined in the *National Parks and Wildlife Act 1974*) without the written approval of the Director-General.

33. The Proponent shall prepare and implement an Aboriginal Cultural Heritage Management Plan for the project to the satisfaction of the Director-General. This plan must:
    (a) be submitted the Director-General prior to the commencement of construction activities (not including the construction of the Kamilaroi Highway intersection);
    (b) be prepared in consultation with the DECC and the Narrabri Local Aboriginal Land Council;
    (c) include a protocol for the ongoing consultation and involvement of Aboriginal communities in the conservation and management of Aboriginal heritage on site;
    (d) describe the measures that would be implemented to protect Aboriginal sites on site, or if any new Aboriginal objects or skeletal remains are discovered during the project.

TRANSPORT

Note: These conditions should be read in conjunction with section 14 of the Statement of Commitments.

Kamilaroi Highway Intersection

34. The Proponent shall construct the Kamilaroi Highway intersection in consultation with NSC and to the satisfaction of RTA. This intersection must:
    (a) be completed, other than for items listed in (c) below, prior to the commencement of construction activities on site (with the exception of construction of the Access Road);
    (b) be constructed in accordance with a Traffic Management Plan approved by NSC and RTA;
    (c) include boom gates, flashing lights and warning bells for the Kurrajong Creek Road level crossing, to the satisfaction of ARTC and NSC;
    (d) include illumination of the Kurrajong Creek Road level crossing during construction of the intersection;
    (e) provide a information sign on Kurrajong Creek Road to inform road users of likely delays due to train traffic; and
    (f) maintain permanent access for the "Bow Hills" quarry.

Kurrajong Creek Road

35. Within 12 months of commencement of mining operations, the Proponent shall bitumen seal Kurrajong Creek Road (Shire Road 188) for a distance of 7 km south of the Kamilaroi Highway intersection (see Figure 2 of Appendix 2), to the satisfaction of NSC.

VISUAL IMPACT

Note: These conditions should be read in conjunction with section 12 of the Statement of Commitments.

Visual Amenity

36. The Proponent shall minimise the visual impacts of the project to the satisfaction of the Director-General.

Lighting Emissions

37. The Proponent shall ensure that:
    (a) no outdoor lights shine above the horizontal; and
    (b) all external lighting associated with the project complies with *Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting*.

GREENHOUSE GAS

Note: These conditions should be read in conjunction with section 13 of the Statement of Commitments.

Energy Savings Action Plan

38. The Proponent shall prepare and implement an Energy Savings Action Plan for the project to the satisfaction of the Director-General. This plan must:
    (a) be prepared in consultation with DECC;
    (b) be prepared in accordance with the *Guidelines for Energy Savings Action Plans* (DEUS, 2005), or its latest version;
    (c) be submitted to the Director-General for approval within 3 months of this approval; and
    (d) include a program to monitor the effectiveness of measures to reduce energy use on site.

Gas Drainage

39. The Proponent shall implement all reasonable and feasible measures to minimise the greenhouse gas emissions from the underground mining operations to the satisfaction of the Director-General.

40. Prior to carrying out underground coal mining operations, the Proponent shall submit a Greenhouse Gas Minimisation Plan to the Director-General. This plan must:
    (a) identify options for minimising greenhouse gas emissions from underground mining operations, with a particular focus on capturing and/or using these emissions;
    (b) investigate the feasibility of implementing each option;
    (c) propose the measures that would be implemented in the short to medium term on site; and
    (d) include a research program to inform the continuous improvement of the greenhouse gas minimisation measures on site.

WASTE

Note: These conditions should be read in conjunction with section 9 of the Statement of Commitments.

Waste Minimisation

41. The Proponent shall prepare and implement a Waste Management Plan for the project to the satisfaction of the Director-General. This plan must:
    (a) be submitted to the Director-General for approval prior to commencing of construction;
    (b) identify the various waste streams of the project;
    (c) describe what measures would be implemented to reuse, recycle, or minimise the waste generated by the project;
    (d) ensure irrigation of treated wastewater is undertaken in accordance with *Environmental Guidelines: Use of Effluent by Irrigation* (DEC, 2004), or its latest version; and
    (e) include a program to monitor the effectiveness of these measures.

SCHEDULE 4

ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING AND REPORTING

Note: This schedule should be read in conjunction with sections 18 and 19 of the Statement of Commitments.

ENVIRONMENTAL MANAGEMENT STRATEGY

1. The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Director-General. This strategy must be submitted to the Director-General prior to the commencement of construction activities, and:
   (a) provide the strategic context for environmental management of the project;
   (b) identify the statutory requirements that apply to the project;
   (c) describe in general how the environmental performance of the project would be monitored and managed;
   (d) describe the procedures that would be implemented to:
      - keep the local community and relevant agencies informed about the operation and environmental performance of the project;
      - receive, handle, respond to, and record complaints;
      - resolve any disputes that may arise during the course of the project;
      - respond to any non-compliance;
      - manage cumulative impacts; and
      - respond to emergencies; and
   (e) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project.

ENVIRONMENTAL MONITORING PROGRAM

2. The Proponent shall prepare and implement an Environmental Monitoring Program for the project to the satisfaction of the Director-General. This program must be submitted to the Director-General within 6 months of this approval and consolidate the various monitoring requirements in schedule 3 of this approval into a single document.

REPORTING

Incident Reporting

3. As soon as practicable, and in any event within 24 hours of detecting an exceedance of the limits/performance criteria in this approval or the occurrence of an incident that causes (or may cause) material harm to the environment, the Proponent shall notify the Department and other relevant agencies of the exceedance/incident.

4. Within 6 days of notifying the Department and other relevant agencies of an exceedance/incident, the Proponent shall provide the Department and these agencies with a written report that:
   (a) describes the date, time, and nature of the exceedance/incident;
   (b) identifies the cause (or likely cause) of the exceedance/incident;
   (c) describes what action has been taken to date; and
   (d) describes the proposed measures to address the exceedance/incident.

Annual Reporting

5. Within 12 months of this approval, and annually thereafter, the Proponent shall submit an AEMR to the Director-General and to all 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 would 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 EA;

(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.

INDEPENDENT ENVIRONMENTAL AUDIT

6. Within 2 years of this approval, and every 3 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:
   (a) be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General;
   (b) include consultation with the relevant agencies
   (c) assess the environmental performance of the project and assess whether it is complying with the relevant requirements of this approval and any relevant mining lease or EPL (including any strategy, plan or program required under these approvals);
   (d) review the adequacy of strategies, plans or programs required under these approvals; and, if appropriate,
   (e) recommend measures or actions to improve the environmental performance of the project, and/or any strategy, plan or program required under these approvals.

   Note: This audit team must be led by a suitably qualified auditor and include experts in the fields of water and noise management.

7. Within 6 weeks of the completing of this audit, or as otherwise agreed by the Director-General, the Proponent shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.

8. Within 3 months of submitting the audit report to the Director-General, the Proponent shall review, and if necessary revise the strategies/plans/programs required under this approval to the satisfaction of the Director-General.

COMMUNITY CONSULTATIVE COMMITTEE

9. Within 3 months of this approval, the Proponent shall establish a Community Consultative Committee (CCC) for the project to the satisfaction of the Director-General, in general accordance with the *Guideline for Establishing and Operating Community Consultative Committees for Mining Projects (Department of Planning, 2007)*, or its latest version.

ACCESS TO INFORMATION

10. Within 3 months of the approval of any strategy/plan/ program required under this approval (or any subsequent revision of these strategies/plans/ programs), or the completion of the audits or AEMRs required under this approval, the Proponent shall:
    (a) provide a copy of the relevant document/s to the relevant agencies and CCC; and
    (b) put a copy of the relevant document/s on its website.

11. During the project, the Proponent shall:
    (a) make a summary of monitoring results required under this approval publicly available at the mine and on its website; and
    (b) update these results on a regular basis (at least every three months).

APPENDIX 1
SCHEDULE OF PROJECT LAND

Area	***Land Title Reference***
Pit Top Area	*Part Lot 60 DP 757124* *Part Lots 151 & 152 DP 816020.*
Indicative Mining Area	*Part Lots 57, 58, 63 to 65, 81 to 84 & 115 DP 757124* *Lot 61 DP 757124* *Part Lot 1 DP 811171, Lot 2 DP 811171* *Part Lots 3, 8, 25, 67 & 68 DP 757104* *Lot 7 DP 757104* *Part Lot 152 DP 816020* *Lot 1 DP 659899, Part Lot 3 DP 1005608* *Part Pilliga East State Forest* *Various Crown roads.*
Remainder of Project Site	*Lots 381 & 382 DP 1028753* *Part Lot 1 DP 798487* *Part Lots 57, 58, 60, 63 to 65, 81 to 84, 115 DP 757124* *Part Lot 1 DP 811171* *Part Lots 3, 8, 10, 25, 67 & 68 DP 757104* *Part Lot 3 DP 1005608* *Part Lots 151 & 152 DP 816020* *Part Pilliga East State Forest* *Various Crown roads.*

APPENDIX 2
PROJECT MAPS

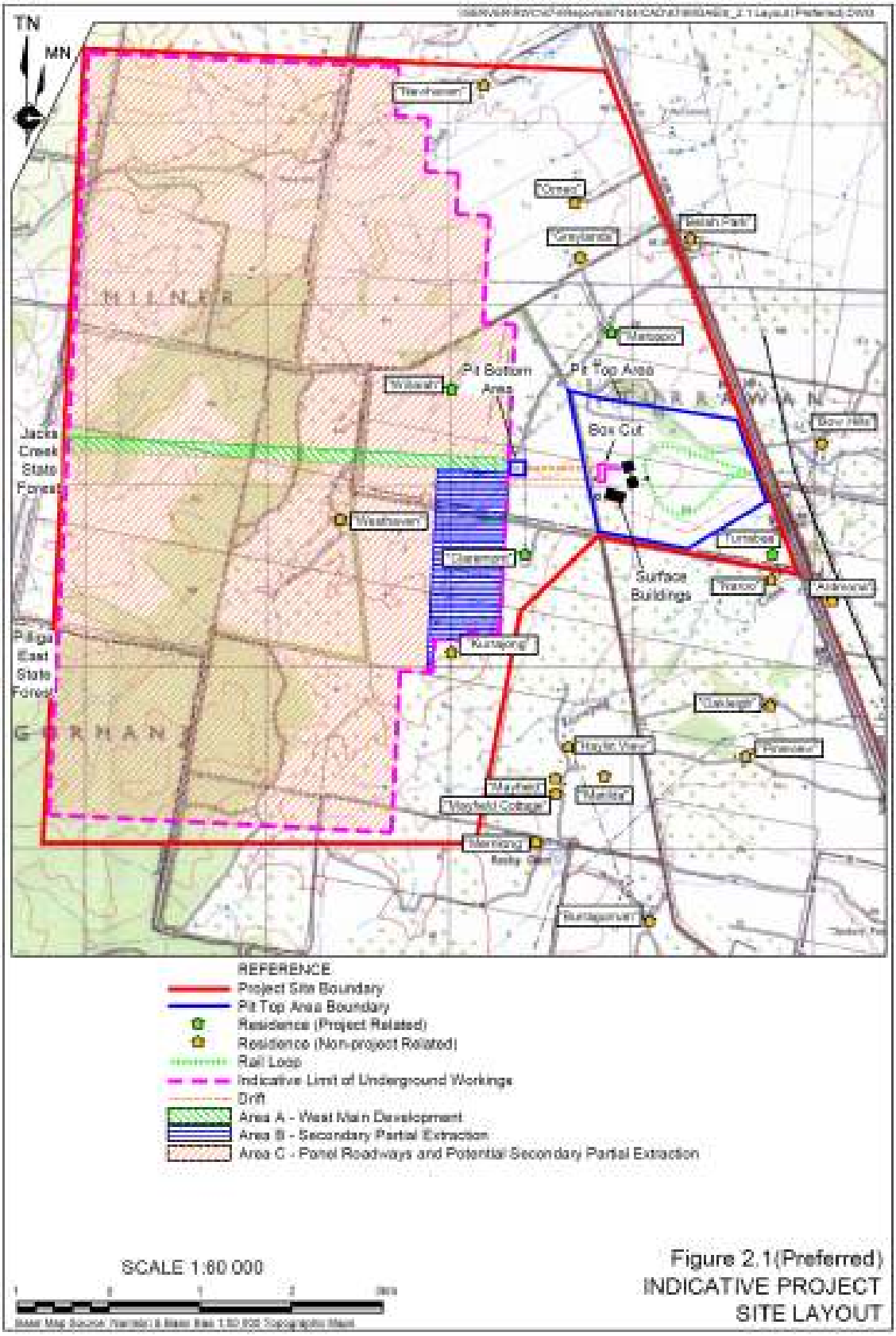


Figure 1: *Project Layout*

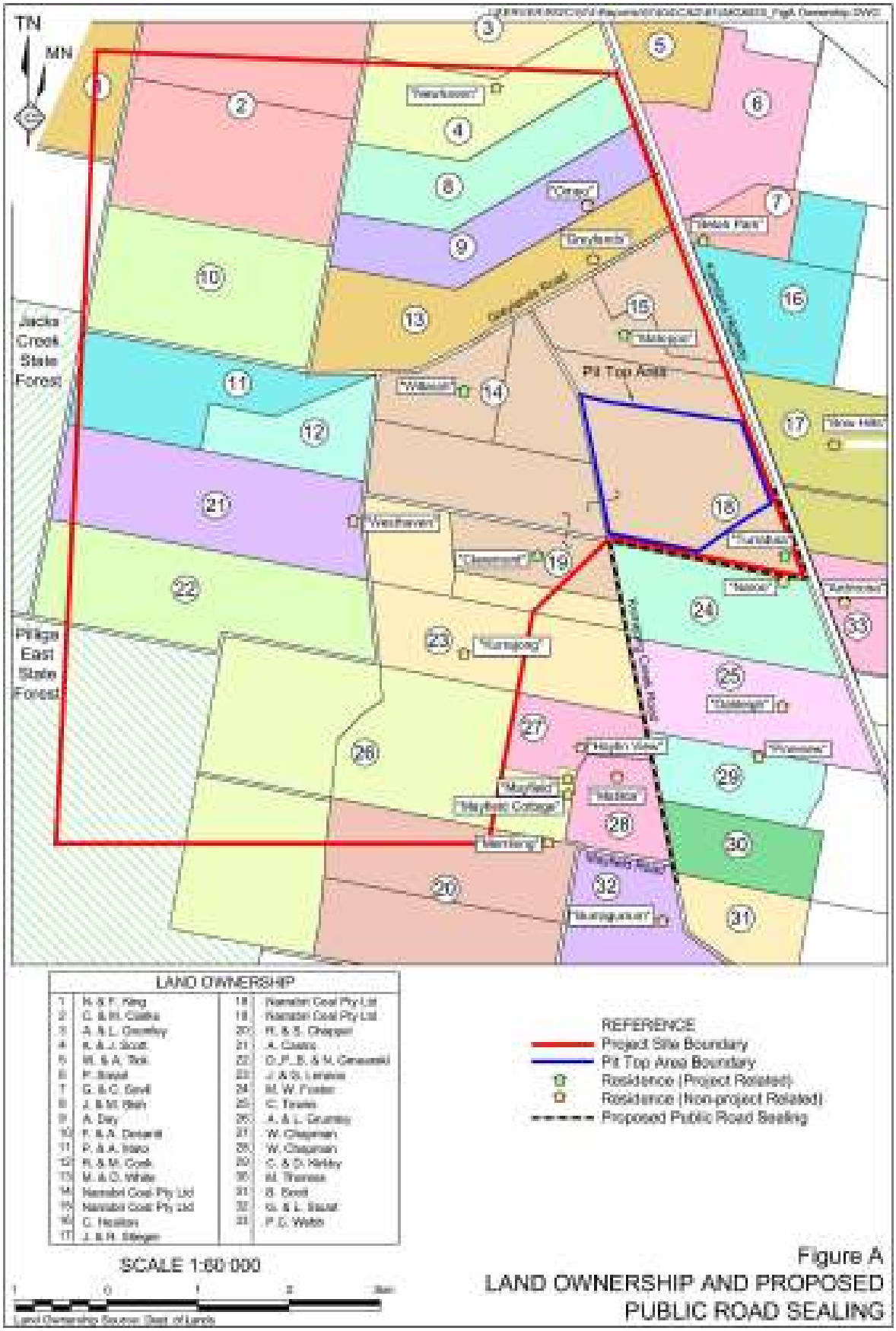


Figure 2: *Section of Kurrajong Creek Road proposed to be sealed*

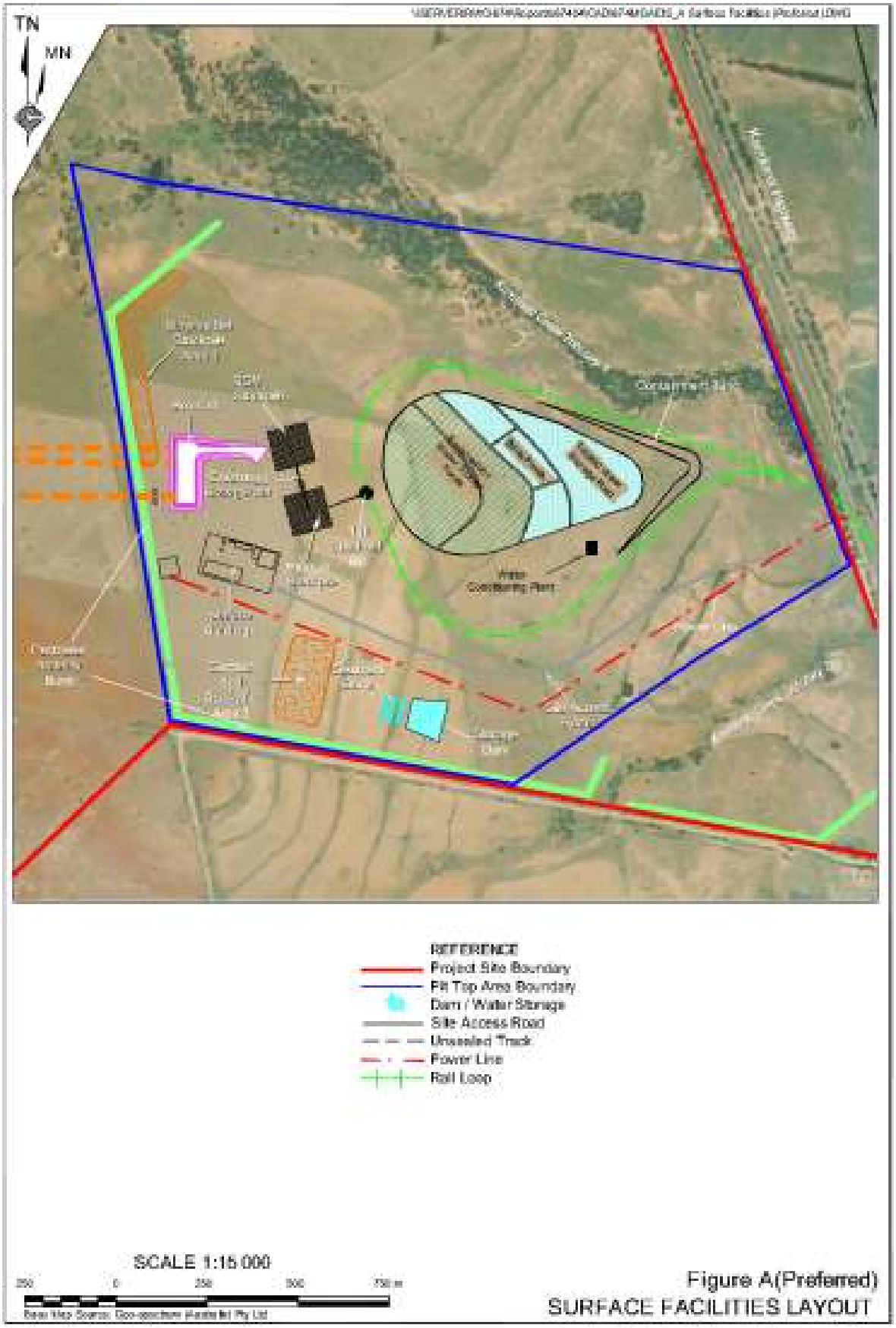


Figure 3: *Surface Facilities Layout*

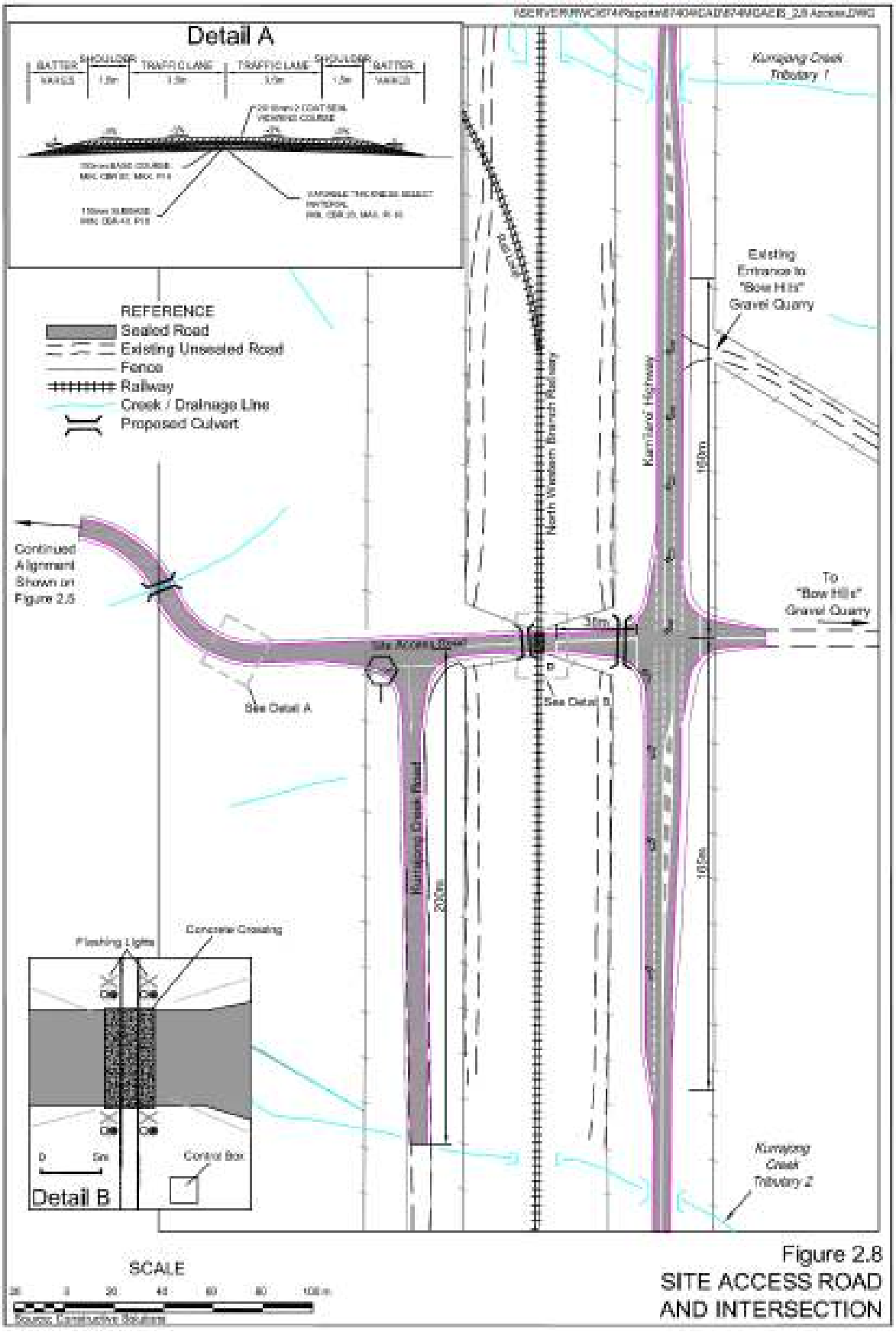


Figure 4: *Proposed Kamilaroi Highway Intersection*

APPENDIX 3
STATEMENT OF COMMITMENTS

APPENDIX 4
GENERAL TERMS OF PLANNING AGREEMENTS

Funding Area	Minimum Proponent Contribution	Funding Time Frame
Narrabri Shire Upgrade and seal Kurrajong Creek Road, adjacent to the Project site	7.0 kilometres length of Kurrajong Creek Road to be upgraded and sealed.	Works to be completed within 12 months of this approval.
Narrabri Shire Monetary Contribution – Provision of bush fire services	$7,000	One instalment to be paid within 12 months of this approval.
Narrabri Shire Community Infrastructure Contribution	$93,000	An initial instalment of $13,000 to be paid within 12 months of this approval with $20,000 to paid for a period of four years on the anniversary of the initial payment.
Gunnedah Shire Monetary Contribution – Gunnedah Urban Riverine Scheme	$100,000	$20,000 each year for a period of 5 years with the first instalment to be paid within 12 months of this approval.

Notes:

- The Gunnedah Urban Riverine Scheme Contributions must be reviewed and adjusted to take into account any increase in the CPI over time, in accordance with the Planning Agreement between the Proponent and Gunnedah Shire Council required under this approval.
- The Community Infrastructure Contribution must be reviewed and adjusted to take into account any increase in the CPI over time, in accordance with the Planning Agreement and Narrabri Shire Council required under this approval.

Notice of Modification

Section 75W of the *Environmental Planning and Assessment Act 1979*

I modify the Project Approval referred to in Schedule 1, subject to the conditions in Schedule 2.

David Kitto
Director
Mining and Industry Projects
(as Delegate for the Minister for Planning)

Sydney 26 MARCH 2010

SCHEDULE 1

The Project Approval (05_0102) for the Narrabri Coal Project, granted by the Minister for Planning on 13 November 2007.

SCHEDULE 2

1. Delete the definitions for "DECC", "DPI", "DWE" and "Land" in "DEFINITIONS" and insert in alphabetical order the following:

DECCW	Department of Environment, Climate Change and Water
Feasible	Feasible relates to engineering considerations and what is practical to build
I&I NSW	Industry and Investment NSW
Land	In general, the definition of land is consistent with the definition in the EP&A Act. However, in relation to the noise and air quality conditions in Schedules 3 and 3A it means the whole of a lot, or contiguous lots owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this approval
NOW	DECCW's NSW Office of Water
Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements

2. Delete all references to "DECC" and replace with "DECCW".

3. Delete all references to "DPI", and replace with "I&I NSW".

4. Delete all references to "DWE" and replace with "NOW".

5. In condition 2 of schedule 2, delete all words after "statement of commitments (see Appendix 3);" and replace with the following:

   (c) modification application 05_0102_MOD 1, supporting Environmental Assessment titled "*Narrabri Coal Mine – Section 75W Modification*", dated October 2009 and Proponent's Response to Submissions dated 10 February 2010; and
   (d) conditions of this approval.

6. Following condition 8 of schedule 2 insert:

   8A. The Proponent shall prepare revisions of any strategies, plans or programs required under this approval if directed to do so by the Director-General. Such revisions shall be prepared to the satisfaction of, and within a timeframe approved by, the Director-General.

7. Delete the text of the second dot point in the "Notes" below Table 1 and replace with:

- *The noise limit applies to applicable receivers under all meteorological conditions except for any one of the following:*
  - *wind speed greater than 3 metres/second at 10 metres above ground level; or*
  - *temperature inversions of 1.5 - 4°C/100 metres and a source-to-receiver wind speed greater than 2 metres/second at 10 metres above ground level; or*
  - *temperature inversions of greater than 4°C/100 metres.*
- *The meteorological data to be used for determining meteorological conditions is the data recorded by the meteorological weather station to be determined in consultation with the DECCW.*

8. Following condition 12 of schedule 3 insert:

Noise Acquisition Criteria

12A. If the noise generated by the project exceeds the criteria in Table 1A at any residence on privately-owned land, or on more than 25% of any privately-owned land, then the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 5-7 of schedule 3A.

Table 1A: Noise acquisition criteria dB(A)

Location	Day	Evening	Night
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$
All privately owned residences	40	40	40

Note: Noise generated by the project is to be measured in accordance with the notes presented below Table 1. For this condition to apply, the exceedances of the criteria must be systemic.

Additional Noise Mitigation Measures

12B. If the noise generated by the project is equal to or exceeds the criteria in Table 1B at any residence on privately-owned land, then the Proponent shall, upon receiving a written request from the landowner, implement reasonable and feasible noise mitigation measures (such as double-glazing, insulation, and/or air conditioning) at the residence in consultation with the landowner. If within 3 months of receiving this request from the landowner, the Proponent and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.

Table 1B: Additional noise mitigation criteria

Location	Day	Evening	Night
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$
All privately owned residences	38	38	38

Note: Noise generated by the project is to be measured in accordance with the notes presented below Table 1. For this condition to apply, the exceedances of the criteria must be systemic.

9. Following condition 13 of schedule 3 insert:

Noise Management

13A. The Proponent shall prepare and implement a Noise Management Plan for the mine's activities to the satisfaction of the Director-General. This Plan shall:

(a) be prepared in consultation with DECCW by a suitably qualified expert whose appointment has been approved by the Director-General;

(b) be submitted to the Director-General for approval by 31 May 2010;

(c) include a Noise Monitoring Program incorporating real-time noise and temperature inversion monitoring; and

(d) include reactive noise control measures to manage noise impacts for sensitive receivers.

10. Following condition 32 of schedule 3 insert:

32A. Prior to the commencement of any surface disturbance activities associated with modification application 05_0102_MOD 1, the Proponent shall protect, whether by fencing or appropriate signage, all known Aboriginal sites within 50 metres of these activities.

11. Following condition 41 of schedule 3 insert a new Schedule 3A, as follows:

SCHEDULE 3A
ADDITIONAL PROCEDURES

NOTIFICATION OF LANDOWNERS

1. If the results of the monitoring required in schedule 3 identify that impacts generated by the project are greater than the relevant impact assessment criteria, except where a negotiated agreement has been entered into in relation to that impact, then the Proponent shall, within 2 weeks of obtaining the monitoring results, notify the Director-General, the affected landowners and tenants (including tenants of mine-owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the project is complying with the criteria in schedule 3.

2. If the results of monitoring required in schedule 3 identify that impacts generated by the project are greater than the relevant air quality impact assessment criteria in schedule 3, then the Proponent shall send the relevant landowners and tenants (including tenants of mine-owned properties) a copy of the NSW Health fact sheet entitled "Mine Dust and You" (and associated updates) in conjunction with the notification required in condition 1.

INDEPENDENT REVIEW

3. If a landowner considers the project to be exceeding the impact assessment criteria in schedule 3, then he/she may ask the Director-General in writing for an independent review of the impacts of the project on his/her land.

If the Director-General is satisfied that an independent review is warranted, the Proponent shall within 2 months of the Director-General's decision:

(a) consult with the landowner to determine his/her concerns;

(b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to conduct monitoring on the land, to:

- determine whether the project is complying with the relevant impact assessment criteria in schedule 3; and
- identify the source(s) and scale of any impact on the land, and the project's contribution to this impact; and

(c) give the Director-General and landowner a copy of the independent review.

4. If the independent review determines that the project is complying with the relevant impact assessment criteria in schedule 3, then the Proponent may discontinue the independent review with the approval of the Director-General.

If the independent review determines that the project is not complying with the relevant impact assessment criteria in schedule 3, and that the project is primarily responsible for this non-compliance, then the Proponent shall:

(a) take all reasonable and feasible measures, in consultation with the landowner, to ensure that the project complies with the relevant criteria and conduct further monitoring to determine whether these measures ensure compliance; or

(b) secure a written agreement with the landowner to allow exceedances of the relevant criteria,

to the satisfaction of the Director-General.

If further monitoring under paragraph (a) determines that the project is complying with the relevant criteria, then the Proponent may discontinue the independent review with the approval of the Director-General.

If the independent review determines that the project is not complying with the relevant land acquisition criteria in schedule 3, then the Proponent shall offer to acquire all or part of the landowner's land in accordance with the procedures in conditions 5-7 below, to the satisfaction of the Director-General.

LAND ACQUISITION

5. Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent shall make a binding written offer to the landowner based on:
   (a) the current market value of the landowner's interest in the property at the date of this written request, as if the property was unaffected by the project the subject of the project application, having regard to the:
      - existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and
      - presence of improvements on the property and/or any approved building or structure which has been physically commenced at the date of the landowner's written request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of 'reasonable and feasible measures' in condition 12B of schedule 3 or condition 4(a) of this schedule;
   (b) the reasonable costs associated with:
      - relocating within the Narrabri or Gunnedah local government areas, or to any other local government area determined by the Director-General;
      - obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is to be acquired; and
   (c) reasonable compensation for any disturbance caused by the land acquisition process.

   However, if following this period, the Proponent and landowner cannot agree on the acquisition price of the land and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Director-General for resolution.

   Upon receiving such a request, the Director-General shall request the President of the NSW Division of the Australian Property Institute (the API) to appoint a qualified independent valuer to:
   (a) consider submissions from both parties;
   (b) determine a fair and reasonable acquisition price for the land and/or the terms upon which the land is to be acquired, having regard to the matters referred to in paragraphs (a)-(c) above;
   (c) prepare a detailed report setting out the reasons for any determination; and
   (d) provide a copy of the report to both parties and the Director-General.

   Within 14 days of receiving the independent valuer's report, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the independent valuer's determination.

   However, if either party disputes the independent valuer's determination, then within 14 days of receiving the independent valuer's report, they may refer the matter to the Director-General for review. Any request for a review must be accompanied by a detailed report setting out the reasons why the party disputes the independent valuer's determination. Following consultation with the independent valuer and both parties, the Director-General shall determine a fair and reasonable acquisition price for the land, having regard to the matters referred to in paragraphs (a)-(c) above and the independent valuer's report. Within 14 days of this determination, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the Director-General's determination.

   If the landowner refuses to accept the Proponent's binding written offer under this condition within 6 months of the offer being made, then the Proponent's obligations to acquire the land shall cease, unless the Director-General determines otherwise.

6. The Proponent shall pay all reasonable costs associated with the land acquisition process described in condition 5 above.

7. If the Proponent and landowner agree that only part of the land shall be acquired, then the Proponent shall also pay all reasonable costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of the plan at the Office of the Registrar-General.

Project Approval

Section 75J of the *Environmental Planning and Assessment Act 1979*

I approve the project referred to in schedule 1, subject to the conditions in schedules 2 to 7.

These conditions are required to:
- prevent, minimise and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

Richard Pearson
Deputy Director-General, DASP
as delegate for the Minister for Planning

Sydney 2010

SCHEDULE 1

Application No:	08_0144
Proponent:	Narrabri Coal Operations Pty Limited
Approval Authority:	Minister for Planning
Land:	See Appendix 1
Project:	Narrabri Coal Project – Stage 2

March 2011 modification in blue text
December 2011 modification in red text

TABLE OF CONTENTS

DEFINITIONS

Annual Review	The review required by Condition 6 of Schedule 6
Approved mine plan	The mine plan depicted in Figures 1 and 3 of Appendix 2
BCA	Building Code of Australia
Brine	Very salty water
Built features	Includes any building or work erected or constructed on land, and includes dwellings and infrastructure such as any formed road, any pipeline, water sewer, telephone, gas or other service main and communication towers
CCC	Community Consultative Committee
CMA	Catchment Management Authority
Conditions of this approval	Conditions contained in schedules 2 to 7 inclusive
Construction	The demolition of buildings or works, carrying out of works and erection of buildings covered by this approval
CPI	Consumer Price Index, as published by the Australian Bureau of Statistics
Day	The period from 7 am to 6 pm on Monday to Saturday, and 8 am to 6 pm on Sundays and Public Holidays
DECCW	Department of Environment, Climate Change and Water
Department	Department of Planning
Director-General	Director-General of the Department, or delegate
Dispute resolution process	The independent dispute resolution process as described in Appendix 5
EA	Environmental Assessment prepared for Narrabri Coal Pty Limited entitled *Stage 2 Narrabri Coal Project Environmental Assessment* and *Specialist Consultant Studies Compendium,* Volumes 1&2 (October 2009), including the *Response to Public and Government Agency Submissions* (May 2010)
Environmental consequences	The environmental consequences of subsidence impacts, including: damage to built features; loss of surface flows to the subsurface; loss of standing pools; adverse water quality impacts; development of iron bacterial mats; cliff falls; rock falls; damage to Aboriginal heritage sites; impacts to aquatic ecology; ponding
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPL	Environment Protection Licence issued under the POEO Act
Evening	The period from 6 pm to 10 pm
Feasible	Feasible relates to engineering considerations and what is practical to build
First workings	Development of the main headings and gate roads to establish access to the coal in the mining area
GSC	Gunnedah Shire Council
I&I NSW	Industry and Investment NSW
Incident	A set of circumstances that causes or threatens to cause material harm to the environment, and/or breaches or exceeds the limits of performance measures/criteria in this approval
km	Kilometre
Land	In general, the definition of land is consistent with the definition in the EP&A Act. However, in relation to the noise and air quality conditions in Schedule 4 it means the whole of a lot, or contiguous lots owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this approval
Material harm to the environment	Harm to the environment is material if it involves actual or potential harm to the health or safety of human beings or ecosystems that is not trivial
MSB	Mine Subsidence Board
Mining area	The area outlined by a dashed purple line on the figures in Appendix 2
Mining operations	The extraction, processing and transportation of coal on the site, including the formation of mine access drifts and associated surface infrastructure such as gas and water drainage facilities
Minister	Minister for Planning, or delegate
Mitigation	Activities associated with reducing the impacts of the project
Mtpa	Million tonnes per annum
Negligible	Small and unimportant, such as not worth considering
Night	The period from 10 pm to 7 am on Monday to Saturday, and 10 pm to 8 am on Sundays and Public Holidays
NOW	DECCW's NSW Office of Water

NSC	Narrabri Shire Council
POEO Act	*Protection of the Environment Operations Act 1997*
Privately-owned land	Land that is not owned by a public agency, or a mining company (or its subsidiary)
Project	The Stage 2 Narrabri Coal Project described in the EA
Proponent	Narrabri Coal Operations Pty Limited or any other person or persons who rely on this approval to carry out the project that is subject to this approval
Raffinate	Good quality water produced by a water conditioning plant, lower in salinity than the water fed to the plant. The "waste" produced by the plant is brine.
Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Reasonable costs	The costs agreed between the Department and the Proponent for obtaining independent experts to review the adequacy of any aspects of the extraction plan, or where such costs cannot be agreed, the costs determined by the Dispute Resolution Process
Rehabilitation	The treatment or management of land disturbed by the project for the purpose of establishing a safe, stable and non-polluting environment including the remediation of impacts
Remediation	Activities associated with partially or fully repairing or rehabilitating the impacts of the project or controlling the environmental consequences of this impact
ROM	Run-of-mine
RTA	Roads and Traffic Authority
Second workings	Extraction of coal from longwall panels, mini-wall panels or pillar extraction
Site	All the land to which the project application applies, comprising the mining area and surface facilities area, as listed in Appendix 1 and shown in Appendix 2
Safe, serviceable & repairable	Safe means no danger to users who are present, serviceable means available for its intended use, and repairable means damaged components can be repaired economically
Stage 1 Approval	The project approval granted by the Minister Planning for the Narrabri Coal Project, dated 14 November 2007
Stage 2 Approval	This project approval, for Stage 2 of the Narrabri Coal Project which includes the introduction of longwall mining operations and increasing ROM coal production to 8.0 Mtpa
Statement of Commitments	The Proponent's revised commitments in Appendix 3, dated May 2010
Steep slopes	An area of land having a natural gradient of between 33° and 66°
Subsidence	The totality of subsidence effects, subsidence impacts and environmental consequences of subsidence impacts
Subsidence effects	Deformation of the ground mass due to mining, including all mining-induced ground movements, such as vertical and horizontal displacement, tilt, strain and curvature
Subsidence impacts	Physical changes to the ground and its surface caused by subsidence effects, including tensile and shear cracking of the rock mass, localised buckling of strata caused by valley closure and upsidence and surface depressions or troughs

SCHEDULE 2
ADMINISTRATIVE CONDITIONS

OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT

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

TERMS OF APPROVAL

2. The Proponent shall carry out the project generally in accordance with the:
   (a) EA;
   (b) statement of commitments (see Appendix 3);
   (c) the modification application 08_0144 MOD 1 and accompanying letter prepared by Narrabri Coal Operations Pty Limited;
   (d) the modification application 08_0144 MOD 2 and accompanying letter prepared by Narrabri Coal Operations Pty Limited; and
   (e) conditions of this approval.

   Note: The general layout of the project is shown in Figures 1 to 3 of Appendix 2.

3. If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.

4. The Proponent shall comply with any reasonable and feasible requirements of the Director-General arising from the Department's assessment of:
   (a) any reports, plans, programs, strategies or correspondence that are submitted in accordance with the conditions of this approval; and
   (b) the implementation of any actions or measures contained in these reports, plans, programs, strategies or correspondence.

LIMITS ON APPROVAL

5. The Proponent may undertake mining operations on the site for 21 years from the date of this approval.

   Note: Under this Approval, the Proponent is required to rehabilitate the site and to perform additional undertakings to the satisfaction of the Director-General. Consequently, this approval will continue to apply in all other respects other than the right to conduct mining operations until the site has been rehabilitated to a satisfactory standard.

6. The Proponent shall not extract more than 8.0 million tonnes of ROM coal from the site per calendar year.

7. The Proponent shall transport all coal from the site by rail.

7A The Proponent may undertake a one off transport of coal by road of an approximate 600 tonne bulk sample of coal in accordance with the procedures, vehicle traffic route and transport operating hours as specified in the modification application 08_0144 MOD 2 and accompanying letter dated 12 December 2011 from Whitehaven Coal Mining Limited.

8. The Proponent shall not transport any coal reject from the site.

PLANNING AGREEMENTS

9. Within 6 months of this approval, the Proponent shall enter into planning agreements with Narrabri Shire Council (NSC), Gunnedah Shire Council (GSC) and the Minister in accordance with:
   (a) Division 6 of Part 4 of the EP&A Act; and
   (b) the terms of the Proponent's offers accepted at NSC's meeting of 16 February 2010, and GSC's meeting of 16 February 2010, which includes the matters set out in Appendix 4.

   If there is any dispute between the Proponent and either NSC or GSC during the formal drafting of the planning agreements, then any of the parties involved may refer the matter to the Director-General for resolution.

SURRENDER OF STAGE 1 APPROVAL

10. Within 12 months of the date of this approval, the Proponent shall surrender its previous project approval for the Narrabri Coal Mine to the satisfaction of the Director-General, in accordance with section 75YA of the EP&A Act. Prior to the surrender of the Stage 1 approval, if there is any inconsistency between the Stage 1 and Stage 2 approvals, the conditions of the Stage 2 approval shall prevail to the extent of any inconsistency.

MANAGEMENT PLANS / MONITORING PROGRAMS

11. With the approval of the Director-General, the Proponent may submit any management plan or monitoring program required by this approval on a progressive basis.

Note: The conditions of this approval require certain strategies, plans, and programs to be prepared for the project. They also require these documents to be reviewed and audited on a regular basis to ensure they remain effective. However, in some instances, it will not be necessary or practicable to prepare these documents for the whole project at any one time, particularly as these documents are intended to be dynamic and improved over time. Consequently, the documents may be prepared and implemented on a progressive basis, subject to the conditions of this approval. In doing this however, the Proponent will need to demonstrate that it has suitable documents in place to manage the existing operations of the project.

12. Stage 1 strategies, plans or programs continue to have effect until replaced by an equivalent approved strategy, plan or program prepared and approved under this approval.

STRUCTURAL ADEQUACY

13. The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.

Notes:
- *Under Part 4A of the EP&A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works.*
- *Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.*

DEMOLITION

14. The Proponent shall ensure that all demolition work is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures*, or its latest version.

OPERATION OF PLANT AND EQUIPMENT

15. The Proponent shall ensure that all plant and equipment used on site is:
    (a) maintained in a proper and efficient condition; and
    (b) operated in a proper and efficient manner.

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS – MINING AREA

Note: These conditions should be read in conjunction with section 5 of the revised Statement of Commitments.

SUBSIDENCE IMPACT PERFORMANCE MEASURES

1. The Proponent shall ensure that mine subsidence does not cause any exceedances of the performance measures in Table 1.

Table 1: Subsidence Impact Performance Measures

Water Resources	
Great Artesian Basin	The Proponent shall ensure that, within 5 years of the date of this approval, any loss of water flow into the Great Artesian Basin aquifers (equal to the maximum predicted impact, or the measured impact of the project, whichever is the greater), is managed, licensed or offset (including the possibility of injection of raffinate) to the satisfaction of NOW.
Biodiversity	
Flora and Fauna	The Proponent shall ensure that clearing and disturbance of vegetation above the mining area is minimised, to the satisfaction of the Director-General.

Note: The Proponent may be required to define other performance measures and performance indicators in management plans required under this approval (see eg condition 3 below).

Performance Measures – Built Features

2. The Proponent shall ensure that the project does not cause any exceedances of the performance measures in Table 2, to the satisfaction of the Director-General of I&I NSW.

Table 2: Subsidence Impact Performance Measures

Built Features	
All built features	Always safe. Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated.
Public Safety	
Public Safety	No additional risk

Notes:

1) The Proponent will be required to define more detailed performance indicators for each of these performance measures in Built Features Management Plans or Public Safety Management Plan (see condition 4 below).

2) Requirements regarding safety or serviceability do not prevent preventative or mitigatory actions being taken prior to or during mining in order to achieve or maintain these outcomes.

3) Compensation required under this condition includes any compensation payable under the Mine Subsidence Compensation Act 1961 and/or the Mining Act 1992.

3. Any dispute between the Proponent and the owner of any built feature over the interpretation, application or implementation of the performance measures in Table 2 is to be settled by the Director-General of I&I NSW. The Director-General of I&I NSW may seek the advice of the MSB on the matter. Any decision by the Director-General of I&I NSW shall be final and not subject to further dispute resolution under this approval.

Extraction Plan

4. The Proponent shall prepare and implement Extraction Plans for any second workings to be mined to the satisfaction of the Director-General. Each Extraction Plan must:
   (a) be prepared by a team of suitably qualified and experienced persons whose appointment has been endorsed by the Director-General;

(b) be approved by the Director-General before the Proponent carries out any of the second workings covered by the plan;
(c) include detailed plans of the proposed first and second workings and any associated surface development;
(d) include detailed performance indicators for each of the performance measures in Tables 1 and 2;
(e) provide revised predictions of the potential subsidence effects, subsidence impacts and environmental consequences of the proposed second workings, incorporating any relevant information obtained since this approval;
(f) describe the measures that would be implemented to ensure compliance with the performance measures in Tables 1 and 2, and manage or remediate any impacts and/or environmental consequences;
(g) include the following to the satisfaction of I&I NSW:
- a Coal Resource Recovery Plan that demonstrates effective recovery of the available resource;
- a Subsidence Monitoring Program to:
  - provide data to assist with the management of the risks associated with subsidence;
  - validate the subsidence predictions; and
  - analyse the relationship between the subsidence effects and impacts under the plan and any ensuing environmental consequences;
- a Built Features Management Plan to manage the potential subsidence impacts and/or environmental consequences of the proposed second workings, and which:
  - addresses in appropriate detail all items of public infrastructure and all classes of other built features; and
  - has been prepared following appropriate consultation with the owner/s of potentially affected feature/s;
- a Public Safety Management Plan to ensure public safety in the mining area; and
- appropriate revisions to the Landscape Management Plan required under condition 3 of Schedule 5; and

(h) include a:
- Water Management Plan, which has been prepared in consultation with DECCW and NOW, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on surface water resources, groundwater resources and flooding, and which includes:
  – surface and groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse impacts on water resources or water quality;
  – a program to monitor and report groundwater inflows to underground workings; and
  – a program to manage and monitor impacts on groundwater bores on privately-owned land;
- Biodiversity Management Plan, which has been prepared in consultation with DECCW and I&I NSW, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on flora and fauna;
- Land Management Plan, which has been prepared in consultation with any affected public authorities, to manage the potential impacts and/or environmental consequences of the proposed second workings on land in general;
- Heritage Management Plan, which has been prepared in consultation with DECCW and relevant stakeholders for Aboriginal heritage, to manage the potential environmental consequences of the proposed second workings on heritage sites or values; and

(i) include a program to collect sufficient baseline data for future Extraction Plans.

Notes:

Management plans prepared under condition 4(h) should address all potential impacts of proposed underground coal extraction on the relevant features. Other similar management plans required under this approval (eg under conditions 13 and 23 of schedule 4 or condition 3 of schedule 5) are not required to duplicate these plans or to otherwise address the impacts associated with underground coal extraction.

5. The Proponent shall ensure that the management plans required under condition 4(h) above include:
(a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this approval;
(b) a detailed description of the measures that would be implemented to remediate predicted impacts; and
(c) a contingency plan that expressly provides for adaptive management.

First Workings

6. The Proponent may carry out first workings within the underground mining area, other than in accordance with an approved extraction plan, provided that I&I NSW is satisfied that the first workings are designed to remain stable and non-subsiding in the long-term, except insofar as they may be impacted by approved second workings.

   Note: The intent of this condition is not to require an additional approval for first workings, but to ensure that first workings are built to geotechnical and engineering standards sufficient to ensure long- term stability, with negligible resulting direct subsidence impacts.

Payment of Reasonable Costs

7. The Proponent shall pay all reasonable costs incurred by the Department to engage independent experts to review the adequacy of any aspect of an Extraction Plan.

SCHEDULE 4
SPECIFIC ENVIRONMENTAL CONDITIONS – SURFACE FACILITIES AREA AND GENERAL

NOISE

Note: These conditions should be read in conjunction with section 10 of the revised Statement of Commitments.

Impact Assessment Criteria

1. The Proponent shall ensure that the noise generated by the project does not exceed the levels set out in Table 1 at any privately-owned residence.

Table 1: Impact assessment criteria dB(A)

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All privately-owned residences	35	35	35	45

Notes:

- *To determine compliance with the $L_{Aeq(15\ minute)}$ limit, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECCW may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *These noise limits apply to applicable receivers under all meteorological conditions except for any one of the following:*
  - *wind speeds greater than 3 metres/second at 10 metres above ground level; or*
  - *temperature inversions of 1.5 - 4^{o}C/100 metres and a source-to-receiver wind speed greater than 2 metres/second at 10 metres above ground level; or*
  - *temperature inversions of greater than 4^{o}C/100 metres.*
- *The meteorological data to be used for determining meteorological conditions are the data recorded by the meteorological weather station to be determined in consultation with the DECCW.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECCW may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*

Noise Acquisition Criteria

2. If the noise generated by the project exceeds the criteria in Table 2 at any residence on privately-owned land, or on more than 25% of any privately-owned land, then the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 5-7 of schedule 7.

Table 2: Noise acquisition criteria dB(A)

Location	Day	Evening	Night
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$
All privately-owned residences	40	40	40

Note: Noise generated by the project is to be measured in accordance with the notes presented below Table 1. For this condition to apply, the exceedances of the criteria must be systemic.

Additional Noise Mitigation Measures

3. If the noise generated by the project is equal to or exceeds the criteria in Table 3 at any residence on privately-owned land, then the Proponent shall, upon receiving a written request from the landowner, implement reasonable and feasible noise mitigation measures (such as double-glazing, insulation, and/or air conditioning) at the residence in consultation with the landowner. If within 3 months of receiving this request from the landowner, the Proponent and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.

Table 3: Additional noise mitigation criteria

Location	Day $L_{Aeq(15\ minute)}$	Evening $L_{Aeq(15\ minute)}$	Night $L_{Aeq(15\ minute)}$
All privately-owned residences	38	38	38

Note: Noise generated by the project is to be measured in accordance with the notes presented below Table 1. For this condition to apply, the exceedances of the criteria must be systemic.

Noise Management Plan

4. The Proponent shall revise the Noise Management Plan for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with noise management (Stages 1 and 2) and subsequently implement this revised version of the Noise Management Plan to the satisfaction of the Director-General. This Plan shall:
   (a) be prepared in consultation with DECCW by a suitably qualified expert whose appointment has been approved by the Director-General;
   (b) be submitted to the Director-General for approval by 30 June 2011;
   (c) include a Noise Monitoring Program incorporating:
   - real-time noise and temperature inversion monitoring; and
   - attended noise monitoring

   to monitor the performance of the project;
   (d) include reactive noise control measures to manage noise impacts for sensitive receivers; and
   (e) include a protocol to establish whether the project is complying with the noise impact assessment criteria in Table 1.

Continuous Improvement

5. The Proponent shall:
   (a) implement all reasonable and feasible best practice noise mitigation measures;
   (b) investigate ways to reduce the noise generated by the project, including off-site road and rail noise and maximum noise levels which may result in sleep disturbance; and
   (c) report on these investigations and the implementation and effectiveness of these measures in the Annual Review,

   to the satisfaction of the Director-General.

AIR QUALITY

Note: These conditions should be read in conjunction with section 11 of the revised Statement of Commitments.

Impact Assessment Criteria

6. The Proponent shall ensure that dust emissions generated by the project do not cause additional exceedances of the criteria listed in Tables 4 to 6 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.

Table 4: Long term impact assessment criteria for particulate matter

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

Table 5: Short term impact assessment criteria for particulate matter

Pollutant	Averaging period	Criterion
Particulate matter < 10 µm (PM_{10})	24 hour	50 µg/m^3

Table 6: Long term impact assessment criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m^2/month	4 g/m^2/month

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

Air Quality Monitoring

7. The Proponent shall revise the Air Quality Monitoring Program for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with air quality (Stages 1 and 2) and subsequently implement this revised version of the Air Quality Monitoring Program to the satisfaction of the Director-General. This program must:
   (a) be submitted to the Director-General for approval prior to 30 June 2011;
   (b) be prepared in consultation with DECCW; and
   (c) use a combination of high volume samplers and dust deposition gauges to monitor the performance of the project.

METEOROLOGICAL MONITORING

8. During the project, the Proponent shall ensure there is a suitable meteorological station on site that complies with the requirements in *Approved Methods for Sampling of Air Pollutants in New South Wales* (DECC, 2007), or its latest version.

WATER MANAGEMENT

Note: These conditions should be read in conjunction with sections 6 and 7 of the revised Statement of Commitments.

Groundwater Model

9. Within 2 years of the commencement of longwall coal extraction, and every 5 years thereafter, the Proponent shall undertake a transient calibration of the groundwater model presented in the EA, in consultation with NOW, and to the satisfaction of the Director-General. This re-calibration of the groundwater model must include forward impact predictions of brine re-injection to the mine's goaf at the conclusion of mining operations.

Discharges

10. Except as may be expressly provided for by an EPL, the Proponent shall not discharge any waters from the disturbed areas of the site. However, raffinate from the water conditioning plant may be transferred to water users in accordance with an approved Water Management Plan (see below).

11. Any raffinate from the water conditioning plant discharged to the Namoi River must be discharged in accordance with the conditions of an EPL and meet the following criteria:
    (a) 50 percentile of all samples (volume based) are below 250 mg/l of Total Dissolved Solids;
    (b) 100 percentile of all samples (volume based) are below 350 mg/l of Total Dissolved Solids; and
    (c) pH values of all sampled water to be between 6.5 and 8.5.

12. Within 3 years of the date of this approval, or otherwise agreed by the Director-General, the Proponent must commission the water conditioning plant identified in the EA, to the satisfaction of the Director-General.

Water Management Plan

13. Prior to 30 June 2011, the Proponent shall revise the Water Management Plan for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with water management (Stages 1 and 2) and subsequently implement this revised version of the Water Management Plan to the satisfaction of the Director-General. This revised plan must be produced in consultation with DECCW and NOW by suitably qualified expert/s whose appointment/s have been approved by the Director-General and include a:
    (a) Site Water Balance;
    (b) Erosion and Sediment Control Plan;
    (c) Surface Water Monitoring Plan;
    (d) Raffinate Discharge and Transfer Control and Monitoring Plan;
    (e) Groundwater Monitoring Program; and
    (f) Surface and Groundwater Response Plan, setting out the procedures for:
        - investigating, and if necessary mitigating, any exceedances of the surface or groundwater assessment criteria (see conditions 16(b) and 18(c)); and
        - responding to any unforeseen impacts of the project.

    Note: The Raffinate Discharge and Transfer Control and Monitoring Plan does not need to be produced and approved until 3 months prior to the planned discharge or transfer of raffinate from the site.

Site Water Balance

14. The Site Water Balance must:
    (a) include details of:
        - sources and security of water supply;
        - underground water make;
        - water use on site;
        - water management on site;
        - off-site water transfers;
        - reporting procedures;
    (b) describe measures to minimise water use by the project; and
    (c) be reviewed and recalculated each year in the light of the most recent water monitoring data.

Erosion and Sediment Control

15. The Erosion and Sediment Control Plan must:
    (a) be consistent with the requirements of *Managing Urban Stormwater: Soils and Construction* manual (Landcom, 2004), or its latest version;
    (b) identify activities that could cause soil erosion and generate sediment;
    (c) describe measures to minimise soil erosion and the potential for transport of sediment to downstream waters;
    (d) describe the location, function, and capacity of erosion and sediment control structures; and
    (e) describe what measures would be implemented to monitor and maintain the structures over time.

Surface Water Monitoring Program

16. The Surface Water Monitoring Plan must include:
    (a) detailed baseline data on surface water flows and quality in creeks and other water bodies that could be affected by the project;
    (b) surface water impact assessment criteria;
    (c) a program to monitor the impact of the project on surface water flows and quality;
    (d) procedures for reporting the results of this monitoring.

Raffinate Discharge and Transfer Control and Monitoring Plan

17. The Raffinate Discharge Control and Monitoring Plan must:
    (a) be approved by the Director-General prior to any raffinate discharge to the Namoi River;
    (b) include measures for the continuous monitoring and recording of volumes of water discharged to the Namoi River;
    (c) contain an ambient water quality monitoring program upstream and downstream of the discharge point; and
    (d) contain a water quality monitoring program for discharged waters.

Groundwater Monitoring Program

18. The Groundwater Monitoring Program must include:
    (a) further development of the regional and local groundwater model;
    (b) detailed baseline data to benchmark the natural variation in groundwater levels, yield and quality (including at any privately owned bores in the vicinity of the site);
    (c) groundwater impact assessment criteria;
    (d) a program to monitor the impact of the project on groundwater levels, yield and quality;
    (e) a program to monitor any impacts of the project on the Namoi River Alluvium;
    (f) a program to monitor (by the use of shallow piezometers/lysimeters), detect, and quantify any leakage/leachate from the site's evaporation/storage ponds, brine storage area or coal reject emplacement area; and
    (g) procedures for reporting the results of this monitoring.

Evaporation/Storage Ponds

19. The Proponent shall ensure that the integrity of the low permeability layers lining the evaporation/storage ponds is maintained and achieves a permeability of less than $1x10^{-14}$ m/s whenever these ponds are in use for the storage of saline waters and less than $1x10^{-9}$ m/s when being used to store raffinate or captured surface waters.

Brine Storage Ponds

20. The Proponent shall ensure that the integrity of the low permeability layers lining the brine storage ponds is maintained and achieves a permeability of less than $1x10^{-14}$ m/s whenever these storage ponds are in use.

Review of Brine Management and Beneficial Use of Water and Brine

21. Within 2 years of commissioning the water conditioning plant, and every 5 years thereafter, unless otherwise directed by the Director-General, the Proponent shall engage suitably qualified experts approved by the Director-General to review brine management and beneficial use options for raffinate, brine and minewater produced by the project. The Proponent shall implement all reasonable and feasible recommendations of these reviews, to the satisfaction of the Director-General.

HERITAGE

Note: These conditions should be read in conjunction with section 9 of the revised Statement of Commitments.

Aboriginal Cultural Heritage Management Plan

22. The Proponent shall not destroy damage or deface any known Aboriginal objects (as defined in the *National Parks and Wildlife Act 1974*) without the written approval of the Director-General.

23. The Proponent shall revise the Aboriginal Cultural Heritage Management Plan for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with Aboriginal cultural heritage management for the site (Stages 1 and 2) and subsequently implement this revised version of the Aboriginal Cultural Heritage Management Plan to the satisfaction of the Director-General. This plan must:
    (a) be submitted the Director-General by 30 June 2011;
    (b) be prepared in consultation with the DECCW, the Narrabri Local Aboriginal Land Council and the Narrabri Goomeroi Aboriginal Corporation;
    (c) include a protocol for the ongoing consultation and involvement of Aboriginal communities in the conservation and management of Aboriginal heritage on site; and

(d) describe the measures that would be implemented to protect Aboriginal sites on the mine site, (in particular all known Aboriginal sites on lands overlying Longwalls 1-3 and sites 10b, 38, 39 and 106-112), or any new Aboriginal objects or skeletal remains that are identified during the project.

24. Prior to undertaking any activities involving surface disturbance or vegetation removal for the lands overlying Longwalls 8-26, the Proponent shall undertake a detailed Aboriginal cultural heritage survey in consultation with the local Aboriginal community and DECCW, and to the satisfaction of the Director-General. The Director-General may approve this survey being undertaken in several stages, as mining progresses.

TRANSPORT

Note: These conditions should be read in conjunction with section 13 of the revised Statement of Commitments.

Mine Access Road Intersection

25. The Proponent shall maintain the Mine Access Road Intersection with Kurrajong Creek Road and the Kamilaroi Highway in consultation with NSC and to the satisfaction of RTA.

Greylands and Scratch Roads

26. Prior to using Greylands and Scratch Roads to construct mine-related infrastructure, the Proponent shall enter into an agreement with NSC to:
    (a) construct watercourse crossings (either culverts or concrete causeways) on those sections of these roads that it uses in a manner that does not restrict fish passage, in consultation with I&I NSW (Fisheries) and to the satisfaction of NSC; and
    (b) fund the maintenance of those sections of these roads that it uses to an all-weather unsealed road standard.

Gunnedah Traffic Management Study

27. The Proponent shall contribute, on an equitable basis with other coal project rail users, to the costs of an independent Traffic Management Study analysing the impacts of increased rail traffic on road safety and congestion due to increased closure of rail level crossings within Gunnedah, prepared to the satisfaction of GSC.

    Note: This study should examine funding mechanisms to implement any recommendations to improve road safety and reduce traffic congestion associated with rail level crossings and be completed by 30 June 2011.

VISUAL

Note: These conditions should be read in conjunction with section 14 of the Statement of Commitments.

Visual Amenity

28. The Proponent shall minimise the visual impacts of the project to the satisfaction of the Director-General.

Lighting Emissions

29. The Proponent shall ensure that:
    (a) no outdoor lights shine above the horizontal; and
    (b) all external lighting associated with the project complies with *Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting*.

ENERGY EFFICIENCY AND GREENHOUSE GAS

Note: These conditions should be read in conjunction with section 11 of the revised Statement of Commitments.

Energy Savings Action Plan

30. The Proponent shall revise the Energy Savings Action Plan for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with energy management for the site (Stages 1

and 2) and subsequently implement this revised version of the Energy Savings Action Plan to the satisfaction of the Director-General. This plan must:

(a) be prepared in consultation with DECCW;
(b) be prepared in accordance with the *Guidelines for Energy Savings Action Plans* (DEUS, 2005), or its latest version;
(c) be submitted to the Director-General for approval prior to 30 June 2011; and
(d) include a program to monitor the effectiveness of measures to reduce energy use on site.

Gas Drainage

31. The Proponent shall implement all reasonable and feasible measures to minimise the greenhouse gas emissions from the underground mining operations to the satisfaction of the Director-General.

32. Prior to carrying out longwall coal mining operations, the Proponent shall submit a Greenhouse Gas Minimisation Plan for the approval of the Director-General. This plan must:

(a) be prepared in consultation with DECCW;
(b) identify options for minimising greenhouse gas emissions from underground mining operations, with a particular focus on capturing and/or using these emissions;
(c) investigate the feasibility of implementing each option;
(d) propose the measures that would be implemented in the short to medium term on site; and
(e) include a research program to inform the continuous improvement of the greenhouse gas minimisation measures on site.

WASTE

Note: These conditions should be read in conjunction with section 3 of the revised Statement of Commitments.

Waste Minimisation

33. The Proponent shall revise the Waste Management Plan for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with waste management for the site (Stages 1 and 2) and subsequently implement this revised version of the Waste Management Plan to the satisfaction of the Director-General. This plan must:

(a) be submitted to the Director-General for approval prior to 30June 2011;
(b) identify the various waste streams of the project;
(c) describe what measures would be implemented to reuse, recycle, or minimise the waste generated by the project;
(d) ensure irrigation of treated wastewater is undertaken in accordance with *Environmental Guidelines: Use of Effluent by Irrigation* (DEC, 2004), or its latest version; and
(e) include a program to monitor the effectiveness of these measures.

SCHEDULE 5
REHABILITATION AND OFFSETS

REHABILITATION

Note: These conditions should be read in conjunction with sections 4, 8 and 12 of the revised Statement of Commitments and condition 3(c) of schedule 3.

Rehabilitation Objectives

1. The Proponent shall rehabilitate the site to the satisfaction of the Director-General and I&I NSW in accordance with the rehabilitation objectives in Table 1.

Table 1: Rehabilitation Objectives

Domain	***Rehabilitation objective***
Surface Facilities Area	Set through condition 4 below
Other land affected by the project	Restore ecosystem function, including maintaining or establishing self-sustaining native ecosystems: • comprised of local native plant species; with • a landform consistent with the surrounding environment
Built features	Repair/restore to pre-mining condition or equivalent
Community	Minimise the adverse socio-economic effects associated with mine closure including the reduction in local and regional employment Ensure public safety

Note: The Proponent may be required to define other rehabilitation objectives in management plans or strategy required under this schedule.

Progressive Rehabilitation

2. To the extent that mining operations permit, the Proponent shall carry out rehabilitation progressively, that is, as soon as reasonably practicable following the disturbance.

Landscape Management Plan

3. The Proponent shall revise the Landscape Management Plan for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with landscape management for the site (Stages 1 and 2) and subsequently implement this revised version of the Landscape Management Plan to the satisfaction of the Director-General and I&I NSW. This plan must:
   (a) be submitted to the Director-General for approval by 30 June 2011;
   (b) be prepared by suitably qualified expert/s whose appointment/s have been endorsed by the Director-General;
   (c) be prepared in consultation with NOW, DECCW and NSC; and
   (d) include a:
      - Rehabilitation Management Plan; and
      - Mine Closure Plan.

Rehabilitation Management Plan

4. The Rehabilitation Management Plan must include:
   (a) the rehabilitation objectives for the site;
   (b) a strategic description of how the rehabilitation of the site would be integrated with surrounding land use;
   (c) a general description of the short and long term measures that would be implemented to rehabilitate the site;
   (d) a detailed description of the measures that would be implemented to remediate predicted subsidence impacts under individual Extraction Plans;
   (e) a detailed description of the measures that would be implemented to minimise environmental impacts of mining operations and to rehabilitate the site, including measures to be implemented for:
      - managing remnant vegetation and habitat on site;
      - minimising impacts on fauna;
      - minimising visual impacts;
      - conserving and reusing topsoil;

- controlling weeds, feral pests, and access;
- managing bushfires; and
- managing any potential conflicts between rehabilitation works and Aboriginal cultural heritage.

(f) detailed performance and completion criteria for the rehabilitation of the site;

(g) a detailed description of how the performance of the rehabilitation works would be monitored over time to achieve the stated objectives and against the relevant performance and completion criteria; and

(h) details of who is responsible for monitoring, reviewing and implementing the plan.

Note: In accordance with condition 11 of schedule 2, the preparation and implementation of Rehabilitation Management Plans is likely to be staged, with each plan covering a defined area (or domain) for rehabilitation. In addition, while mining operations are being carried out, some of the proposed remediation or rehabilitation measures may be included in the detailed management plans that form part of the Extraction Plan. If this is the case, however, then the Proponent will be required to ensure that there is good cross-referencing between the various management plans.

Mine Closure Plan

5. The Mine Closure Plan must:
   (a) define the objectives and criteria for mine closure;
   (b) investigate options for the future use of the site;
   (c) provide a detailed methodology for decommissioning the site's evaporation/storage ponds and the treatment of any accumulated salt within or around those ponds;
   (d) investigate ways to minimise the adverse socio-economic effects associated with mine closure, including reduction in local and regional employment levels;
   (e) describe the measures that would be implemented to minimise or manage the on-going environmental effects of the project; and
   (f) describe how the performance of these measures would be monitored over time.

OFFSETS

Biodiversity Offset Strategy

6. The Proponent shall provide a suitable biodiversity offset strategy to compensate for the impacts of Stages 1 and 2 of the project. This offset strategy must:
   (a) be prepared in consultation with DECCW;
   (b) be submitted to the Director-General for approval by 31 December 2010, or as otherwise agreed by the Director-General;
   (c) provide a detailed assessment of offset proposal/s involving the property/ies (agreed to by DECCW) adjoining Mt Kaputar National Park to confirm the ability of either of these property/ies to meet "like for like or better" and "maintain or improve" conservation outcomes;
   (d) include and assess proposals to offset impacts to the Inland Grey Box EEC, *Bertya opponens,* and foraging habitat for the Superb Parrot;
   (e) include proposals on offsetting both direct and indirect impacts (ie edge effects) of the project; and
   (f) determine the best overall combination of lands to provide a suitable offset.

7. The Proponent shall make suitable arrangements to provide appropriate long-term security for the offset areas by 31 December 2011, or other date agreed by the Director-General, to the satisfaction of the Director-General.

SCHEDULE 6
ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING AND REPORTING

Note: This schedule should be read in conjunction with sections 15, 16 and 17 of the revised Statement of Commitments.

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Proponent shall revise the Environmental Management Strategy for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with environmental management for the site (Stages 1 and 2) and subsequently implement this revised version of the Environmental Management Strategy to the satisfaction of the Director-General. This strategy must:
   (a) be submitted to the Director-General for approval prior to 30 June 2011;
   (b) provide the strategic context for environmental management of the project;
   (c) identify the statutory requirements that apply to the project;
   (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project
   (e) describe the procedures that would be implemented to:
      - keep the local community and relevant agencies informed about the operation and environmental performance of the project;
      - receive, handle, respond to, and record complaints;
      - resolve any disputes that may arise during the course of the project;
      - respond to any non-compliance; and
      - respond to emergencies; and
   (f) include a clear plan depicting all the monitoring currently being carried out in the project area.

Management Plan Requirements

2. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:
   (a) detailed baseline data;
   (b) a description of:
      - the relevant statutory requirements (including any relevant approval, licence or lease conditions);
      - any relevant limits or performance measures/criteria;
      - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;
   (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
   (d) a program to monitor and report on the:
      - impacts and environmental performance of the project;
      - effectiveness of any management measures (see (c) above);
   (e) a contingency plan to manage any unpredicted impacts and their consequences;
   (f) a program to investigate and implement ways to improve the environmental performance of the project over time;
   (g) a protocol for managing and reporting any:
      - incidents;
      - complaints;
      - non-compliances with statutory requirements; and
      - exceedances of the impact assessment criteria and/or performance criteria; and
   (h) a protocol for periodic review of the plan.

Revision of Strategies, Plans and Programs

3. Within 3 months of the submission of an:
   (a) audit under condition 7 of schedule 6;
   (b) incident report under condition 4 of schedule 6; and
   (c) annual review under condition 5 of schedule 6; and
   (d) any modification to the conditions of this approval (unless the conditions require otherwise),

   the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Director-General.

Note: This is to ensure that the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project

REPORTING

Incident

4. The Proponent shall notify the Director-General and any other relevant agencies of any incident associated with the project as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Director-General and any relevant agencies with a detailed report on the incident.

Regular

5. The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval, and to the satisfaction of the Director-General.

Annual Review

6. Within 12 months of this approval, and annually thereafter, the Proponent shall review the environmental performance of the project to the satisfaction of the Director-General. This review must:
   (a) describe the works that were carried out in the past year, and the works that are proposed to be carried out over the next year;
   (b) include a comprehensive review of the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against the
      - the relevant statutory requirements, limits or performance measures/criteria;
      - the monitoring results of previous years; and
      - the relevant predictions in the EA and Extraction Plan;
   (c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;
   (d) identify any trends in the monitoring data over the life of the project;
   (e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and
   (f) describe what measure will be implemented over the next year to improve the environmental performance of the project.

INDEPENDENT ENVIRONMENTAL AUDIT

7. Prior to 13 September 2010, and every 3 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project (Stages 1 and 2). This audit must:
   (a) be conducted by suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General;
   (b) include consultation with the relevant agencies
   (c) assess the environmental performance of the project and assess whether it is complying with the relevant requirements of this approval and any relevant mining lease or EPL (including any strategy, plan or program required under these approvals);
   (d) review the adequacy of strategies, plans or programs required under these approvals; and, if appropriate,
   (e) recommend measures or actions to improve the environmental performance of the project, and/or any strategy, plan or program required under these approvals.

   Note: This audit team must be led by a suitably qualified auditor and include experts in the fields of subsidence, water and noise management (other than for the 2010 audit which is not required to include a subsidence expert in the audit team).

8. Within 6 weeks of the completing of this audit, or as otherwise agreed by the Director-General, the Proponent shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.

COMMUNITY CONSULTATIVE COMMITTEE

9. The Proponent shall maintain a Community Consultative Committee (CCC) for the project to the satisfaction of the Director-General, in general accordance with the *Guideline for Establishing and Operating Community Consultative Committees for Mining Projects (Department of Planning, 2007)*, or its latest version.

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

ACCESS TO INFORMATION

10. The Proponent shall:
    (a) make copies of the following publicly available on its website:
        - the documents referred to in Condition 2 of Schedule 2;
        - all current statutory approvals for the project;
        - all approved strategies, plans and programs required under the conditions of this approval;
        - a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs;
        - a complaints register, updated on a monthly basis;
        - minutes of CCC meetings;
        - the annual reviews of the project;
        - any independent environmental audit of the project, and the Proponent's response to the recommendations in any audit;
        - any other matter required by the Director-General; and

    (b) keep this information up-to-date,

    to the satisfaction of the Director-General.

SCHEDULE 7
ADDITIONAL PROCEDURES FOR AIR QUALITY AND NOISE MANAGEMENT

NOTIFICATION OF LANDOWNERS

1. If the results of the monitoring required in schedule 4 identify that impacts generated by the project are greater than the relevant impact assessment criteria, except where a negotiated agreement has been entered into in relation to that impact, then the Proponent shall, within 2 weeks of obtaining the monitoring results, notify the Director-General, the affected landowners and tenants (including tenants of mine-owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the project is complying with the criteria in schedule 4.

2. If the results of monitoring required in schedule 4 identify that impacts generated by the project are greater than the relevant air quality impact assessment criteria in schedule 4, then the Proponent shall send the relevant landowners and tenants (including tenants of mine-owned properties) a copy of the NSW Health fact sheet entitled "Mine Dust and You" (and associated updates) in conjunction with the notification required in condition 1.

INDEPENDENT REVIEW

3. If a landowner considers the project to be exceeding the impact assessment criteria in schedule 4, then he/she may ask the Director-General in writing for an independent review of the impacts of the project on his/her land.

   If the Director-General is satisfied that an independent review is warranted, the Proponent shall within 2 months of the Director-General's decision:
   (a) consult with the landowner to determine his/her concerns;
   (b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to conduct monitoring on the land, to:
      - determine whether the project is complying with the relevant impact assessment criteria in schedule 4; and
      - identify the source(s) and scale of any impact on the land, and the project's contribution to this impact; and
   (c) give the Director-General and landowner a copy of the independent review.

4. If the independent review determines that the project is complying with the relevant impact assessment criteria in schedule 4, then the Proponent may discontinue the independent review with the approval of the Director-General.

   If the independent review determines that the project is not complying with the relevant impact assessment criteria in schedule 4, and that the project is primarily responsible for this non-compliance, then the Proponent shall:
   (a) take all reasonable and feasible measures, in consultation with the landowner, to ensure that the project complies with the relevant criteria and conduct further monitoring to determine whether these measures ensure compliance; or
   (b) secure a written agreement with the landowner to allow exceedances of the relevant criteria,

   to the satisfaction of the Director-General.

   If further monitoring under paragraph (a) determines that the project is complying with the relevant criteria, then the Proponent may discontinue the independent review with the approval of the Director-General.

   If the independent review determines that the project is not complying with the relevant land acquisition criteria in schedule 4, then the Proponent shall offer to acquire all or part of the landowner's land in accordance with the procedures in conditions 5-7 below, to the satisfaction of the Director-General.

LAND ACQUISITION

5. Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent shall make a binding written offer to the landowner based on:
   (a) the current market value of the landowner's interest in the property at the date of this written request, as if the property was unaffected by the project the subject of the project application, having regard to the:
      - existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and

- presence of improvements on the property and/or any approved building or structure which has been physically commenced at the date of the landowner's written request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of 'reasonable and feasible measures' under schedule 4 or condition 4(a) of this schedule;

(b) the reasonable costs associated with:
- relocating within the Narrabri or Gunnedah local government areas, or to any other local government area determined by the Director-General;
- obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is to be acquired; and

(c) reasonable compensation for any disturbance caused by the land acquisition process.

However, if following this period, the Proponent and landowner cannot agree on the acquisition price of the land and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Director-General for resolution.

Upon receiving such a request, the Director-General shall request the President of the NSW Division of the Australian Property Institute (the API) to appoint a qualified independent valuer to:

(a) consider submissions from both parties;
(b) determine a fair and reasonable acquisition price for the land and/or the terms upon which the land is to be acquired, having regard to the matters referred to in paragraphs (a)-(c) above;
(c) prepare a detailed report setting out the reasons for any determination; and
(d) provide a copy of the report to both parties and the Director-General.

Within 14 days of receiving the independent valuer's report, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the independent valuer's determination.

However, if either party disputes the independent valuer's determination, then within 14 days of receiving the independent valuer's report, they may refer the matter to the Director-General for review. Any request for a review must be accompanied by a detailed report setting out the reasons why the party disputes the independent valuer's determination. Following consultation with the independent valuer and both parties, the Director-General shall determine a fair and reasonable acquisition price for the land, having regard to the matters referred to in paragraphs (a)-(c) above and the independent valuer's report. Within 14 days of this determination, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the Director-General's determination.

If the landowner refuses to accept the Proponent's binding written offer under this condition within 6 months of the offer being made, then the Proponent's obligations to acquire the land shall cease, unless the Director-General determines otherwise.

6. The Proponent shall pay all reasonable costs associated with the land acquisition process described in condition 5 above.

7. If the Proponent and landowner agree that only part of the land shall be acquired, then the Proponent shall also pay all reasonable costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of the plan at the Office of the Registrar-General.

APPENDIX 1
SCHEDULE OF PROJECT LAND

Area	***Land Title Reference***
Pit Top Area	*Lot 60 DP 757124, Part Lot 115 DP757124* *Lot 152 DP816020, Part Lots 151 & 152 DP816020* *Lots 381 & 382 DP1028753* *Various Crown and Council roads.*
Underground Mining Area	*Lot 7 DP 757104, Part Lots 3, 7, 8, 10, 25, 67 & 68 DP757104* *Part Lots 57, 58, 63 to 65 DP757114* *Lot 61 DP 757124, Part Lots 81 & 83 DP757124* *Lot 2 DP 811171, Part Lot 1 DP811171* *Lot 1 DP254253* *Lot 1 DP659899* *Part Lot 152 DP 816020* *Part Lot 3 DP1005608* *Part Lot 2 DP1124652* *Part Lot 842 DP1134385* *Part Jacks Creek State Forest (Part Lot 58 DP 757114)* *Part Pilliga East State Forest* *Various Crown and Council roads.*
Remainder of Mine Site	*Lot 1 DP1124652, Part Lot 2 DP1124652* *Lot 841 DP1134385, Part Lot 842 DP1134385* *Part Lots 3, 8,10, 25, 67 & 68 DP 757104* *Part Lots 57, 63 to 65 DP 757114* *Part Lots 81 & 83 DP 757124* *Part Lot 1 DP798487* *Part Lot 1 DP811171* *Part Lots 151 & 152 DP816020* *Part Lot 3 DP1005608* *Part Jacks Creek State Forest (Part Lot 58 DP 757114 & Part Lot 60 DP757114)* *Part Pilliga East State Forest (undefined)* *Various Crown and Council roads.*
Water Pipeline Route	*Lots 60 & 89 DP757124* *Lot 151 DP816020* *Lots 381 & 382 DP1028753* *Lot 1 DP1124652* *Various Crown and Council roads.*

APPENDIX 2
PROJECT MAPS

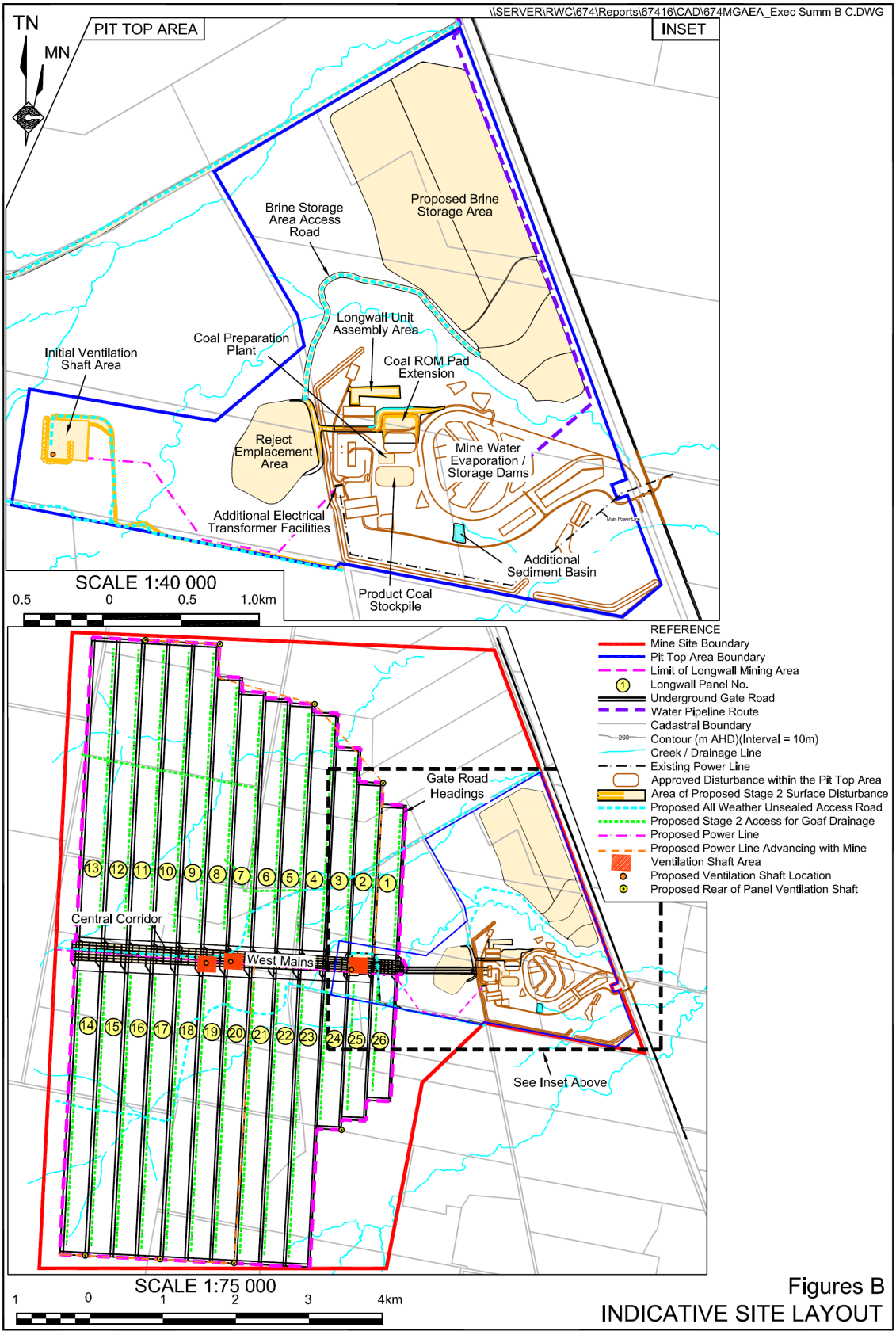


Figure 1: *Project Layout*

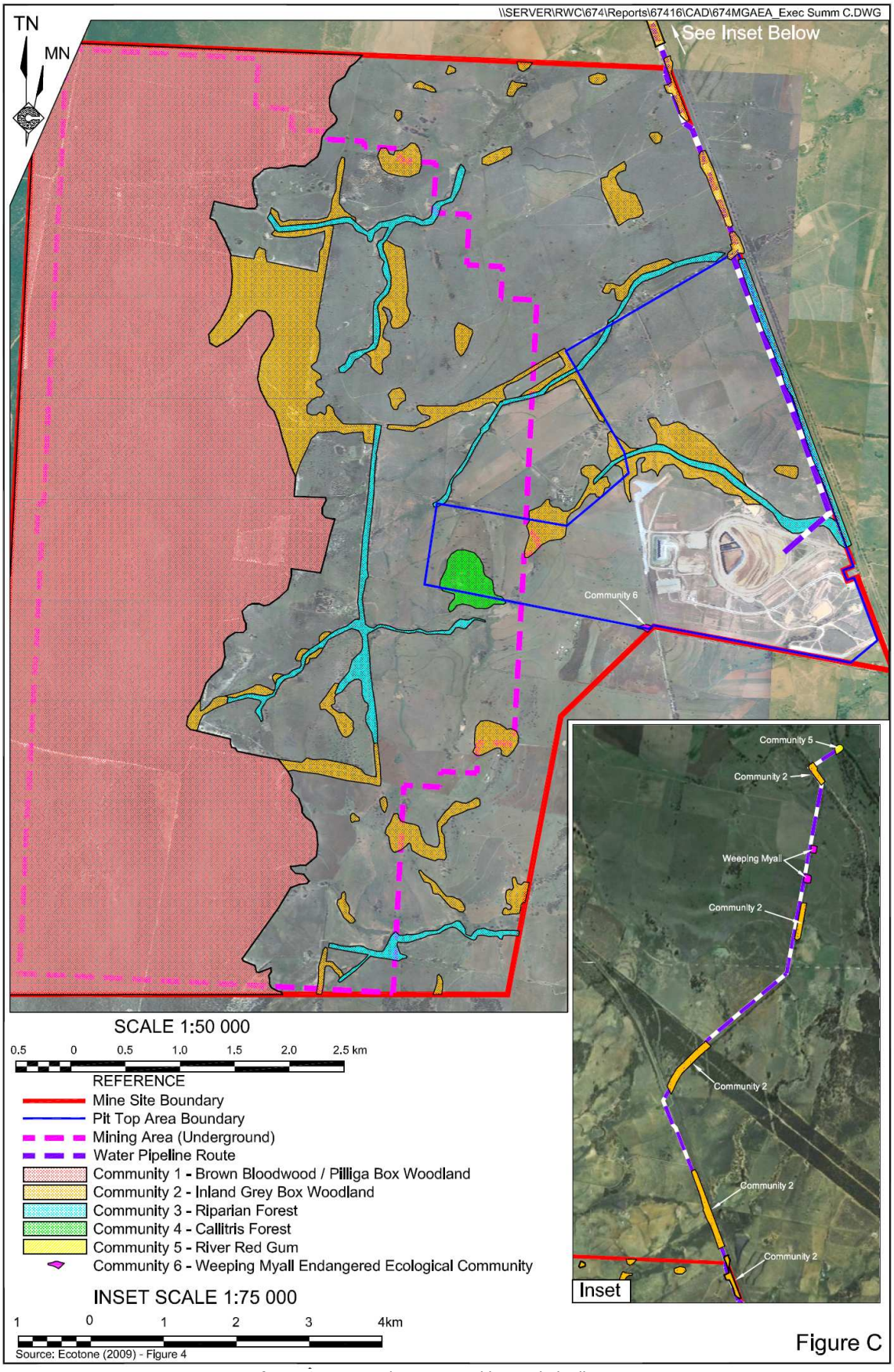


Figure 2: *Vegetation communities and pipeline route*

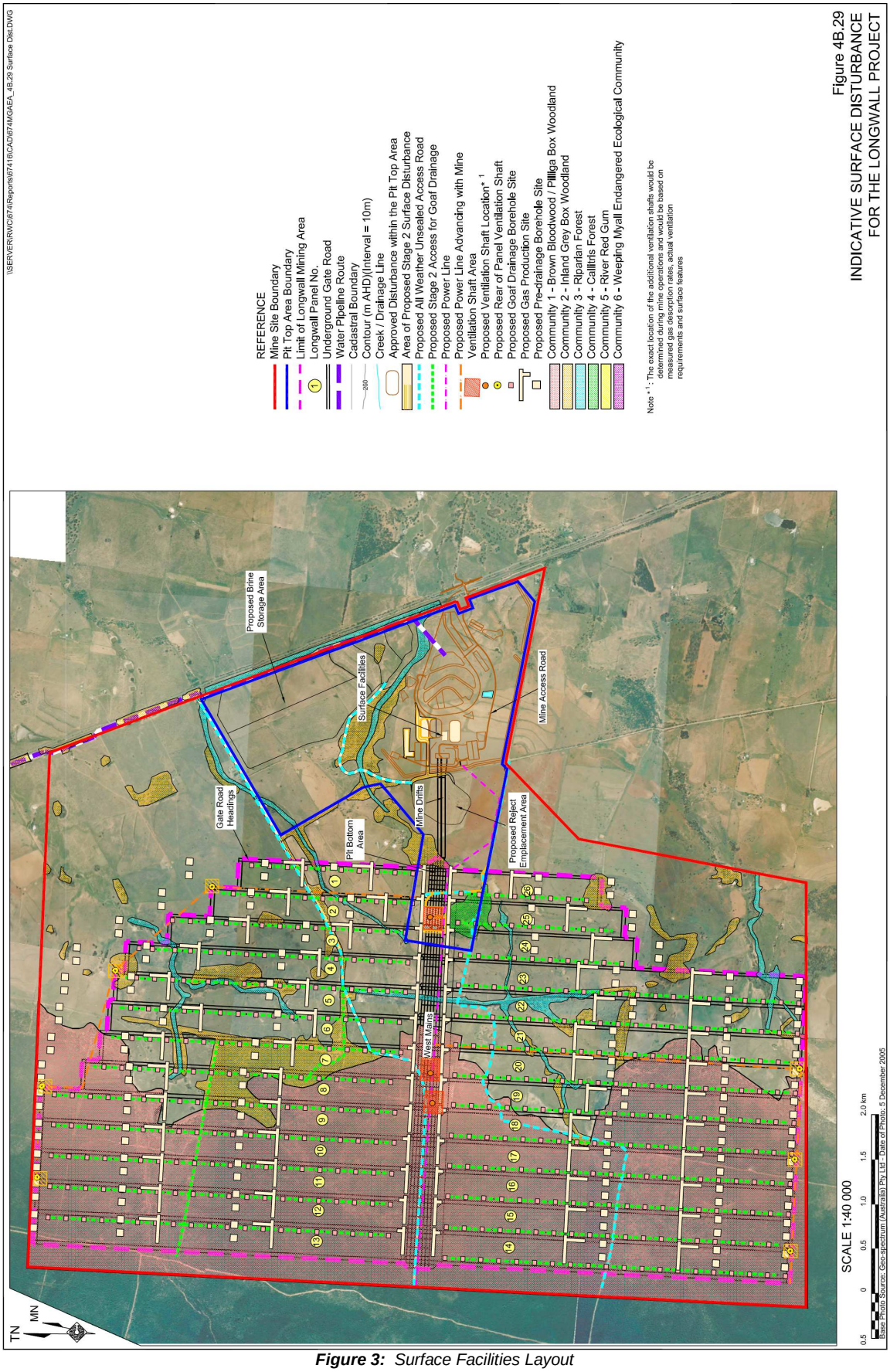


Figure 3: *Surface Facilities Layout*

APPENDIX 3
PROPONENT'S STATEMENT OF COMMITMENTS

APPENDIX 3
STATEMENT OF COMMITMENTS

Desired Outcome	Action		Timing
1. Area of Activities			
All approved activities are undertaken in the area(s) nominated on the approved plans and figures (unless moved slightly to avoid individual trees).	1.1	Survey and mark the boundaries of the areas of disturbance on the ground.	Prior to surface disturbance in nominated areas.
	1.2	(If not already surveyed), commission an ecologist and/or archaeologist (along with representatives of the Aboriginal community) to advise of any constraints posed by threatened flora or fauna, or archaeological sites.	Prior to surface disturbance in nominated areas.
	1.3	Relocate or redesign the area of disturbance (if mine safety is not compromised) to avoid sites of ecological or heritage significance.	Prior to surface disturbance in nominated areas.
	1.4	Align access to sites of surface disturbance following advice from ecologist and/or archaeologist.	Prior to surface disturbance in nominated areas.
	1.5	Advise relevant personnel on restrictions placed on activities by identification of sites of ecological or heritage significance and management requirements.	Prior to surface disturbance in nominated areas.
2. Operating Hours			
Management of site activities in accordance with the approved operating hours.	2.1	Undertake vegetation clearing/soil removal within the hours of: 7:00am to 10:00pm / 7 days.	Continuous, as required.
	2.2	Undertake construction within the Pit Top Area within the hours of: 7:00am to 10:00pm / 7days.	Continuous.
	2.3	Undertake construction of the Reject Emplacement Area and Brine Storage Ponds within the hours of: 7:00am to 10:00pm / 7days.	Continuous
	2.4	Undertake ventilation shaft construction and gas drainage installation within the hours of: 24 hours / 7 days.	As required
	2.5	Undertake ventilation and gas drainage operations within the hours of: 24 hours / 7 days.	Continuous
	2.6	Undertake mining operations within the hours of: 24 hours / 7 days.	Continuous.
	2.7	Undertake coal crushing screening and processing operations within the hours of: 24 hours / 7 days.	Continuous.

Statement of Commitments for Site Operations and Management

Desired Outcome	Action		Timing
2. Operating Hours (Cont'd)			
Management of site activities in accordance with the approved operating hours. (cont'd)	2.8	Undertake CPP reject disposal within the hours of: 7:00am to 10:00pm / 7days. Contingent hours of operation will be 24 hours / 7 days to account for those periods of elevated reject production.	Continuous.
	2.9	Undertake rail loading and transportation within the hours of: 24 hours / 7 days.	Continuous.
	2.10	Undertake raw materials / supply delivery within the hours: 7:00am to 10:00pm / 7 days	Continuous.
3. Waste Management			
Minimisation of the potential risk of environmental impact due to general waste creation, storage and/or disposal.	3.1	Dispose all paper and general waste in suitable waste receptacles.	Ongoing.
	3.2	Collect general waste bins as required to eliminate potential for environmental harm and place contents in large, lidded waste storage receptacles or dumpsters to await removal by licensed contractor.	Ongoing.
	3.3	Collect industrial waste fortnightly, or more frequently if required.	At least fortnightly.
	3.4	Install separate containers for the collection of recyclable items and despatch off site at appropriate intervals.	Ongoing.
	3.5	Employ a licensed waste collection contractor for all general waste / garbage at least on a weekly basis.	Ongoing.
	3.6	Collect waste oils and grease and pump to bulk storage tanks.	As required.
	3.7	Collect all parts/packaging and transfer to the site workshop for disposal or recycling.	As required.
	3.8	Install adequate toilet and ablution facilities within the mine facilities area for the site workforce and visitors.	Initial activities of site establishment phase.
	3.9	Install a self irrigating septic sewage system approved by Narrabri Shire Council.	Initial activities of site establishment phase.
	3.10	Service facilities by a licensed sewage collection / disposal contractor.	As required.
Minimisation of the potential risk of environmental impact due to coal reject storage and/or disposal.	3.11	Characterise coal rejects to establish whether any deleterious products would be produced by leachate during emplacement.	Within initial month of production of CPP reject and annually thereafter, if relevant.
	3.12	Dispose of coal rejects within the nominated Reject Emplacement Area, constructed immediately to the west of the Pit Top Area.	Continuous.

Statement of Commitments for Site Operations and Management

Desired Outcome	Action		Timing
3. Waste Management (Cont'd)			
Minimisation of the potential risk of environmental impact due to coal reject storage and/or disposal. (cont'd)	3.13	Construct the Reject Emplacement Area as a series of 20m wide, elongated (north-south oriented) cells commencing on the eastern side (with a compacted base with a permeability <1 x 10^{-9}m/sec if elevated salinity or other deleterious contaminant is identified as likely to be present within the leachate – see *Commitment 3.11*)	Continuous.
	3.14	Construct drainage features for each cell to divert clean water around and capture and store sediment-laden water generated by run-off from the disturbed areas.	Prior to the commencement of each cell.
	3.15	Strip and store topsoil from each cell for future re-spreading over the final landform or re-spread immediately following stripping.	Prior to the commencement of each cell.
	3.16	Paddock-dump, spread by bulldozer and then compact the coal reject to form typical lifts of about 1.5m thick. The maximum height of the reject emplacement will be restricted to 15m, ie. 10 lifts with final side slopes not exceeding 14°.	Continuous.
	3.17	Install up to four lysimeters on the downslope side of the Reject Emplacement Area. (If saline leachate is generated by CPP reject)	As the structure is constructed, if required
Minimisation of the potential risk of environmental impact due to saline waste creation, storage and/or disposal.	3.18	Line each dam or pond designed to hold either raw groundwater or processed brine with a HDPE liner with a permeability of <1 x 10^{-14}m/sec.	Prior to the commencement of water discharge into pond or dam.
	3.19	Confirm by QA inspection of the liner that the nominated permeability is achieved.	Prior to the commencement of water discharge.
	3.20	Prohibit vehicular access to the walls of the lined dam or pond.	Continuous
	3.21	Remove impermeable liner at completion of mining and dispose of to a facility licenced to accept saline waste.	Following removal of all saline groundwater or brine from the dam/pond.
	3.22	Inspect, sample and analyse ground beneath each dam or pond to confirm no leakage has occurred over the life of the pond.	Prior to final rehabilitation.
	3.23	(should saline contamination be identified), Remove and dispose of saline contaminated material (within the backfilled box cut).	As required and prior to final rehabilitation.

Statement of Commitments for Site Operations and Management

Desired Outcome	Action		Timing
4. Rehabilitation			
Decommission and remove the infrastructure and services no longer required for ongoing activities on the land of the Mine Site.	4.1	Confirm the proposed final land use of the Mine Site lands and identify the infrastructure and services to be retained to support this land use.	As part of the Mine Closure Plan for the mine.
	4.2	Demolish or deconstruct and remove infrastructure and services not required by the confirmed future land use.	Prior to relinquishment of Mining Lease.
The creation of a stable final landform on the Pit Top Area (and surrounding long-term disturbance areas, ie. ventilation shaft areas, Reject Emplacement Area and brine storage ponds), available for the proposed future use(s) of agriculture, and/or nature conservation.	4.3	Stabilise all earthworks, drainage lines and disturbed areas no longer required for mine-related activities in order to minimise erosion and sedimentation, and to reduce the visibility of the activities from adjacent properties and the local road network.	As required.
	4.4	Provide a low maintenance, stable and safe landform that blends with the surrounding topography and which is commensurate with re-established agricultural land uses.	Prior to mine closure.
	4.5	Ensure any areas of disturbance that require profiling meet the requirements of the final landform.	As area becomes available.
	4.6	Replace subsoil and topsoil over areas of disturbance in the same order and approximately same depths as it was removed.	As area becomes available.
	4.7	Ensure the most appropriate crop / pasture species are planted in areas returned for agricultural use.	As areas become available
	4.8	Conduct ongoing rehabilitation monitoring and maintenance throughout and beyond the operation.	Ongoing.
The progressive rehabilitation of disturbance associated with the Mining Area, ie. gas drainage and temporary ventilation activities, to create a stable final landform available for the proposed future use(s) of agriculture, forestry and/or nature conservation.	4.9	Restrict areas of disturbance to the areas identified and marked in accordance with *Commitments 1.1* to *1.5*.	Ongoing.
	4.10	Remove gas drainage equipment and backfill and cap each remaining bore hole in accordance with the former NSW Department of Primary Industries – Mineral Resources EDG01 guideline "*Borehole Sealing Requirements on Land: Coal Exploration*".	At completion of gas drainage activities.
	4.11	Allow water retained within the sump(s) to evaporate, excavate any consolidated drill cuttings and fines, remove the plastic liner and backfill each sump.	At completion of gas drainage activities.
	4.12	Respread previously stripped and stockpiled topsoil and vegetation over the backfilled sumps and other cleared areas.	At completion of gas drainage activities.

Statement of Commitments for Site Operations and Management

Desired Outcome	Action		Timing
4. Rehabilitation (Cont'd)			
The progressive rehabilitation of disturbance associated with the Mining Area, ie. gas drainage and temporary ventilation activities, to create a stable final landform available for the proposed future use(s) of agriculture, forestry and/or nature conservation. (cont'd)	4.13	Complete periodic inspections of the rehabilitated sites to confirm a return to the vegetation of the surrounding landform.	Annually.
	4.14	(Unless required for future access to monitor or manage subsidence related impacts), close, cross-rip and respread previously cleared vegetation over access tracks.	Once no longer required for site inspection purposes.
Cracking or surface deformation is identified promptly and remediated such that general rehabilitation objectives are not compromised.	See *Commitments 5.1* to *5.7*.		
Prevent any noxious weed infestations.	4.15	Obtain certification from plant supplier / contractor that equipment imported to the Mine Site has been cleaned and is free of soil and vegetation.	Prior to movement of equipment from hardstand of the working areas
	4.16	Undertake campaign weed spraying over the Pit Top Area and areas of surface disturbance of the Mining Area in consultation with I&I NSW-Agriculture and/or the local Noxious Weeds Inspector.	Prior to the stripping of topsoil.
5. Subsidence Management			
Identify and remediate surface cracks to minimise impacts on local hydrology, ecology and soils are minimised.	5.1	Inspect the identified 'cracking zones' above each longwall panel to identify occurrence of cracks.	During and for a period of up to 2 years following mining of each longwall panel.
	5.2	Rip the surface over cracks not filled in by natural processes.	Continuous and as required.
	5.3	(For larger cracks for which surface ripping will not completely fill) fill with subsoil material sourced from stockpiles maintained at nearby gas drainage or ventilation sites, or within the footprint of the Reject Emplacement Area.	Continuous and as required.
	5.4	Undertake a detailed condition assessment of the 3rd order waterways within the predicted subsidence zone to enable assessment of changes post mining.	Prior to commencing longwall mining.
Identify and remediate surface cracks to minimise impacts on local hydrology, ecology and soils are minimised.	5.5	Inspect local drainage lines above the active and completed longwall panels. Monitoring should assess any restriction of flows and hence restriction of fish passage to facilitate appropriate restorative measures.	As required.

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Desired Outcome	Action		Timing
5. Subsidence Management (Cont'd)			
Identify and remediate surface cracks to minimise impacts on local hydrology, ecology and soils are minimised. (cont'd)	5.6	Undertake water quality sampling from watercourses within the subsidence impact zone to determine any impacts on sediment loading and other parameters including salt loads.	During creek flow events.
	5.7	Note the effects of any ponding and commission a hydrologist or ecologist to recommend remedial actions should the area of ponding encroach upon sites of conservation or heritage significance.	During and for a period of up to 2 years following mining of each longwall panel.
Identify and minimise the impacts of subsidence-induced erosion on the local environment.	5.8	Inspect areas of the Mine Site susceptible to landslip or accelerated erosion, eg. drainage lines and steeply sloped areas of exposed Purlawaugh Formation derived subsoils.	Quarterly following mining activities which may produce subsidence
	5.9	(In the event of large-scale slope instability), undertake appropriate stabilisation works, eg. installation of deep sub-surface drainage trenches or construction of strategic catch drains along slope crests.	Continuous and as required.
	5.10	(In the event of erosion within Mine Site watercourses), stabilise the damaged or eroded banks (in accordance with an Erosion and Sediment Control Plan for the Longwall Project).	Continuous and as required.
Identify and minimise the impacts of valley closure and uplift ('upsidence') induced erosion on the local environment.	5.11	Establish survey lines along ephemeral drainage gullies and along gully crests and monitor during and after mining of each longwall panel to identify any signs of cracking or 'upsidence'.	Prior to the commencement of mining each longwall panel.
	5.12	Review predictions of 'upsidence' and valley crest movements after each longwall is completed.	Following completion of each longwall.
	5.13	(In the event that 'upsidence' results in surface cracking or erosion), undertake remedial works identified by *Commitments 5.1* to *5.7*.	Continuous and as required.
Identify and minimise the impacts of ponding on the local environment.	5.14	Sample ponded water to determine if there is any increase in salinity.	Quarterly for a period of up to 2 years upon identification of subsidence induced ponding.
	5.15	Inspect the watercourses over the subsidence zone to identify the location and extent of ponding.	Quarterly for a period of up to 2 years following identified subsidence.

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Desired Outcome	Action	Timing
5. Subsidence Management (Cont'd)		
Identify and minimise the impacts of ponding on the local environment. (cont'd)	5.16 For ponding where there is little or no vegetation of conservation significance monitor the location and extent of ponding. (If ponded area continues to increase in area, encroaches on vegetation of conservation significance or there is an increase in water salinity), excavate a channel to reduce the gradient change over the retained chain pillars. The excavation will be undertaken in accordance with an Aboriginal Cultural Heritage Management Plan and vegetation clearing procedures.	Quarterly for a period of up to 2 years following identified subsidence. Continuous and as required.
Identify and minimise the impacts of far field displacements on local infrastructure.	5.17 Monitor surface features (such as culverts) within 800m of the eastern edge and 1.5km of the western edge of the Mining Area. 5.18 (In the event of damage to surface structures such as pipes, culverts, water tanks, dams or other soil or water conservation structures), repair the damaged infrastructure or provide appropriate compensation.	Prior to mining that may result in subsidence at the relevant structure. Continuous and as required.
Identify and manage the impacts of subsidence on local property infrastructure (including residences).	5.19 Commission a dilapidation survey and inspection of all structures on non-project related land within the Mine Site by a qualified building consultant. 5.20 Use the dilapidation survey and subsequent report in an individual property subsidence management plans (IPSMP) (or similar as required under any Extraction Plan requirements) prepared for each non-project related property to be impacted (to provide fair and reasonable outcomes between the affected property owner and the Proponent). 5.21 Each IPSMP will address the following issues. • Timing and scale of predicted impacts. • Monitoring on the affected property during mining. • Timing for any remaining disconnection of services. • Post-mining inspection and reporting.	Prior to mining that may result in subsidence at the relevant structure. Prior to mining that may result in subsidence at the relevant structure. Prior to mining that may result in subsidence at the relevant structure.

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Desired Outcome	Action	Timing
5. Subsidence Management (Cont'd)		
Prepare and implement a Subsidence Monitoring Program	5.22 Prepare a Subsidence Monitoring Program (or similar as required under any Extraction Plan requirements) which includes the following elements. • A transverse subsidence line across the northern and southern panels. The lines will be installed to at least the middle of the next adjacent longwall before undermining occurs. • A longitudinal line extending in-bye and out-bye from the starting and finishing point of each panel, for a minimum distance equal to the cover depth. • A survey line along the riparian management zone of Kurrajong and Pine Creeks and their tributaries over the Mine Site. • A minimum of three monitoring pegs spaced 10m apart in a line or triangle at any feature of interest, eg. dam walls, archaeological sites, to measure subsidence, tilt and strain. • Visual inspections and mapping of damage before, during and after mining.	Prior to the commencement of mining in each longwall panel.
	5.23 Place monitoring survey pegs between 10m and 20m apart with a minimum of two baseline surveys of subsidence and strain completed before mine subsidence effects occur.	Prior to the commencement of mining in each longwall panel.
	5.24 Prepare and implement an Extraction Management Plan to manage subsidence impact(s) to the satisfaction of I&I NSW and DoP	Prior to Longwall mining commencing.
6. Groundwater		
Minimise the volume of mine in-flow to the underground workings.	6.1 Seal the mine drifts and ventilation shaft using in-strata grouting or hydrophobic sealant.	At time of Mine Closure.
Manage mine in-flows to minimise the potential for contamination of surface catchments.	6.2 Divert groundwater accumulating in the underground workings to designated sumps for pumping to surface.	Ongoing.
	6.3 Discharge groundwater pumped from the underground sumps into Dam A1 only.	Ongoing.
Implement a comprehensive and ongoing groundwater monitoring program.	6.4 Record extraction volumes including weekly totals from all pumping bores, and weekly totals from the underground mine and box cut sump.	Weekly.

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Desired Outcome	Action		Timing
6. Groundwater (Cont'd)			
Implement a comprehensive and ongoing groundwater monitoring program. (cont'd)	6.5	Record Volumes of water introduced to the mine for longwall operation and other requirements.	Weekly
	6.6	Record the groundwater quality (EC and pH) discharged from the underground workings and water supply bores.	Monthly.
	6.7	Sample and analyse water from all pumping bores and underground pumping stations.	Monthly.
	6.8	Record (by manual monitoring, or continuous automated monitoring) the standing water levels of piezometers P1 to P27 and WB1 to WB8 (and others as constructed).	Monthly initially and hence quarterly when stable flow established.
	6.9	Monitor the flow rate and water quality of the spring discharge from "Mayfield Spring".	Monthly initially and hence quarterly when stable flow established.
	6.10	Install additional multi-level vibrating wire piezometers over LW1 to LW3 to obtain detailed data as to the impact of mine subsidence on the groundwater of the various strata above the underground workings.	Prior to commencement of longwall mining.
	6.11	Collect data from the vibrating wire piezometers and compare against initial groundwater and subsidence modelling predictions.	Data collected continuously and downloaded and analysed quarterly.
	6.12	Commission an experienced hydrogeologist to collate and review the monitoring data collected annually in order to assess the impacts of the project on the groundwater environment, and to compare any observed impacts with those predicted from groundwater modelling. (see also *Commitment 16.11*)	Annually
	6.13	Develop the groundwater monitoring program in consultation with the Proponent's consultant hydrogeologist, the Department of Environment, Climate Change and Water – Office of Water and those groundwater users potentially affected by the Longwall Project. (see also *Commitment 16.12*)	Prior to commencement of longwall mining.
	6.14	Complete an initial audit of the groundwater model predictions against monitoring data.	6 months after the commencement of longwall mining.

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Desired Outcome	Action		Timing
6. Groundwater (Cont'd)			
Implement a comprehensive and ongoing groundwater monitoring program. (cont'd)	6.15	Recalibrate the groundwater model based on groundwater model audit and generate confirmatory forward impact predictions made. Include in all forward impact predictions the impact of brine re-injection at the conclusion of mine operations and check against initial predictions. (also required for Mine Closure Plan)	6 months after the commencement of longwall mining, every 5 years thereafter, and at least 12 to 18 months prior to cessation of mining.
	6.16	Carry out regular reviews of the groundwater model predictions against monitoring data.	Every 5 years (or more frequently if in-flows deviate significantly from predictions).
	6.17	Should the recalibrated model show groundwater inflows beyond those cases described in the EA, a separate detailed impact assessment will be conducted and mitigating measures determined.	Every 5 years (or more frequently if in-flows deviate significantly from predictions).
Preparation of a contingency plan in the event that the availability or quality of groundwater is reduced for local groundwater users.	6.18	Undertake remedial action if groundwater drawdown attributable to the mine reduces the saturated thickness of any non-project related bore by 15% or more. In the event that an existing water supply is deemed (by the hydrogeologist) to be adversely affected by the Longwall Project, the Proponent will mitigate, or compensate for this impact through the provision of a replacement water supply.	As required.
	6.19	Undertake remedial action if the water quality of the dewatering discharge indicates an inflow salinity of more than 20% above that predicted by Aquaterra (2009)	As required.
	6.20	Ensure all monitoring bores are licenced with the NSW Office of Water. All *Form A's* associated with the bores will be submitted to NOW at the time drilling is undertaken.	At time of Drilling
	6.21	Ensure the project is appropriately licensed for all groundwater make and use in accordance with required licensing arrangements through the NOW.	As required
7. Surface Water			
Minimisation of changes to existing drainage patterns of the Mine Site.	7.1	Retain selected surface water structures such as the farm dams and diversion swales to allow for continued water management across the Pit Top Area.	During construction period.

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Desired Outcome	Action		Timing
7. Surface Water (Cont'd)			
Prevention of discharge of sediment-laden water from the Pit Top Area.	7.2	Direct runoff collected within potentially contaminated catchments of the coal processing area and Reject Emplacement Area to storage basins (SB1, SB2 and SB3).	Ongoing.
	7.3	Dewater storage basins SB1, SB2 and SB3 and discharge the water to Dam A1 (or Dams C or D) to ensure no discharge or overflow.	Ongoing.
	7.4	Design and construct the storage basins to provide the capacity nominated by WRM (2009).	Prior to commencement of longwall mining.
	7.5	Design and construct the sediment dams to provide sufficient water settlement and sediment storage zones to contain the 5 day 90%ile storm event.	Prior to commencement of longwall mining.
	7.6	Dewater sediment dams within 5 days of significant rainfall event.	With 5 days.
	7.7	Direct all water from wash-down areas and workshops to oil/water separators and containment systems. The oily fraction will be placed in a containment system for removal, as necessary.	Ongoing.
	7.8	Ensure all storage tanks are either self-bunded tanks or bunded with an impermeable surface and have a capacity to contain a minimum 110% of the largest storage tank capacity.	Ongoing.
	7.9	Restrict refuelling, oiling and greasing to designated areas, away from drainage and where spill kits are readily available.	Ongoing.
	7.10	Discharge all groundwater into Dam A1, and either use without processing in selected areas on site or process through the Water Conditioning Plant to produce fresh water raffinate and concentrated brine.	Ongoing.
	7.11	Construct storages for saline groundwater (Dam A1) and brine (Dams A2, A3, B2 and BR1 to BR5 [as required]) using in-situ material which have an average depth of 5m and batter slopes of ~1:3 (V:H).	Dams A2, A3 and B2 Prior to commencement of mine dewatering and BR1 to BR5 as required.
	7.12	Line all dams to be used to store groundwater or brine with HDPE liner (permeability <1 x 10^{-14}m/sec).	Prior to commencement of mine dewatering.

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Desired Outcome	Action		Timing
7. Surface Water (Cont'd)			
Prevention of discharge of saline water from the Pit Top Area. (cont'd)	7.13	Maintain at least 0.5m freeboard in each brine storage (sufficient to cater for design 1 in 100 year ARI event).	Ongoing.
	7.14	Commence construction of brine storage ponds from 12 months prior to the anticipated requirement to accept brine discharge.	As required.
	7.15	Ensure all storages used for the storage of treated raffinate are constructed using a compacted clay lining, to an average depth of 5m and with batter slopes of ~1:3 (V:H).	Prior to commencement of use for raffinate storage.
	7.16	Maintain discharge water quality from the Water Conditioning Plant at the 100%ile limit of 350mg/L TDS.	During discharge events to the Namoi River.
	7.17	Develop, in consultation with the DECCW, a routine discharge quality and continuous discharge volume monitoring program and incorporate these requirements into a revised Site Water Management Plan.	At least 6 months prior to initial discharge.
	7.18	Maintain the pH level of water discharged beyond ML1609 within the range 6.5-8.0.	During discharge events r

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Desired Outcome	Action	Timing
7. Surface Water (Cont'd)		
Prevention of discharge of dirty, contaminated or saline water from the progressive disturbance areas of the Mining Area.	7.19 Prepare and implement a general Erosion and Sediment Control Plan (ESCP) (in accordance with the requirements of Landcom, 2004) to manage surface water flows within each gas drainage or ventilation shaft area. The ESCP will provide for the following management. – Prior to disturbance, the area will be marked out and 'no-go' zones identified. – If located on or adjacent to a natural drainage line, a diversion bank will be constructed up-slope of the area to be disturbed. – the requirement for a sediment basin will be determined, using the Revised Universal Soil Loss Equation (RUSLE). – If a sediment basin is required, ie. soil loss >200t/ha/year, the sediment basin design capacity will be calculated. – Soil will stockpiled away from natural drainage lines. – Sediment fencing will be installed along the down-slope boundaries of the disturbed areas. – All sediment control structures will be regularly inspected and repaired.	Prior to the commencement of gas drainage or ventilation shaft construction.
	7.20 Store potential contaminants, eg. drilling fluid, hydrocarbons, within bunded areas away from natural drainage lines.	Ongoing.
	7.21 Ensure all contaminated liquids are contained in lined sumps at each drill site.	Ongoing.
	7.22 Discharge any groundwater to a lined sump, with this water immediately directed to Dam A1 within the Pit Top Area.	Ongoing.
Minimisation of impact from dirty water contamination event.	7.23 Sample water discharging from licensed discharge points and analyse the water for suspended solids, turbidity, electrical conductivity, oil and grease, and pH.	With 24 hours of discharge.

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Desired Outcome	Action	Timing
7. Surface Water (Cont'd)		
Minimisation of impact from dirty water contamination event. (cont'd)	7.24 In the event monitoring confirms pollution has occurred, one or more of the following measures will be adopted. – The DECCW will be advised. Salient preceding weather information will also be provided. – Additional flocculants will be used to expedite settlement of sediments. – Plans will be set for the subject sediment dam will be enlarged or an additional sediment dam will be constructed downstream which will become the new site discharge point and monitoring location.	Within 7 days.
Minimisation of impact from hydrocarbon contaminated water event.	7.25 Undertake the following actions (in the event of a major hydrocarbon spill). – Collect the contaminated soil at the site of the spill and transport to an approved waste depot or designated 'land farming' area of the Mine Site. – Construct pits around the spill with sufficient hydraulic gradient to capture seepage water and contaminated material. – Pump out water captured in pits. – Monitor the local groundwater for signs of contamination.	As required.

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Desired Outcome	Action	Timing
7. Surface Water (Cont'd)		
Minimisation of impact from saline contamination event.	7.26 Prepare a formal contingency plan for a saline contamination event. The plan may include one or a combination of the following measures. – Dewatering from the underground workings will be transferred to an intact and lined storage structure (or ceased) along with any water remaining in the breached pond. – The breached pond or pipe will be repaired immediately and inspected by a suitably qualified person prior to re-integration into the saline water management system. – The water cart will be used to transfer non-saline water to the area of the spill to flush and dilute the water discharged. As far as practical, at least 4 times the volume of the spilled water will be used to flush the downstream environment. – Downstream vegetation will be monitored for any impacts of increased salinity and treated appropriately.	Prior to commencement of longwall mining.
Minimisation of erosion and sedimentation.	7.27 Maintain a ground cover of vegetation at 70% or better over areas disturbed but no longer required by the project	Ongoing.
	7.28 Armour the banks of the rail loop with ballast in flood zone (larger diameter competent rock).	Ongoing.
	7.29 Inspect the banks of the rail loop and remediate erosion damage within Kurrajong Creek Tributary 1.	Following flood events.
Ensure no additional salt load is added to the Namoi River catchment as a consequence of the Longwall Project.	7.30 Participate in, as required, the development of a salt accounting protocol with the DoP, DECCW and NOW.	Prior to any discharge to the Namoi River.
	7.31 Enter into an agreement for, and contribute sufficient funds to the 'Cap and Pipe the Bores' Program to ensure that there is a sufficient salt 'credit' for the Proponent to offset all planned salt discharges over the life of the mine. (Any agreement that NCOPL enters in relation to this matter will include the opportunity to 'trade' or otherwise dispose of salt credit in excess of that required to offset salt load attributable to mine water discharges.)	Prior to any discharge to the Namoi River.

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Desired Outcome	Action		Timing
7. Surface Water (Cont'd)			
Ensure no additional salt load is added to the Namoi River catchment as a consequence of the Longwall Project. (cont'd)	7.32	Should the Cap and Pipe Bores Program prove not to be viable, develop an alternate Green Offset program in consultation with NOW and DECCW	Prior to any discharge to the Namoi River.
Identification of alternative methods of disposal/use of brine.	7.33	Initiate a study by a recognised firm of engineering consultants to investigate the technical and economic viability of alternative methods of disposal (or use) of brine and raffinate produced by the on-site Water Conditioning Plant	Initial report to be developed within 3 years of project approval, with a revised report prepared every 5 years thereafter.
Implement a comprehensive and ongoing surface water monitoring program.	7.34	Monitor surface water quality for: pH, EC, TDS, TSS, Total Organic Carbon at locations upstream and downstream of the Pit Top Area on Kurrajong and Pine Creeks and their tributaries.	Quarterly during surface flow events
	7.35	Record the volume and quality (pH, EC, TDS, TSS, Total Organic Carbon) of water extracted and discharged to the Namoi River.	Weekly.
	7.36	Monitor the quality of water within of the Brine Storage Ponds	Quarterly
	7.37	Prepare and implement contingency plans in the event elevated levels of heavy metals are recorded.	Quarterly.
Avoidance of structures in drainage lines to prevent fish passage.	7.38	Construction of drainage line crossings will be undertaken in accordance with the policy and guideline document of I&I NSW "Why do fish need to cross the road?"	As Required.
8. Ecology			
Manage disturbance within the Pit Top Area to minimise disturbance to flora and fauna of conservation significance.	8.1	Clearly identify the boundaries of disturbance within the Pit Top Area and progressive disturbance associated with ventilation and gas drainage infrastructure. Ensure no clearing occurs outside these boundaries.	Prior to clearing. (see also *Commitments 1.1* and *1.2*).
	8.2	Avoid disturbance to the vegetation of Community 3 along Kurrajong Creek Tributary 1.	During clearing.
	8.3	Disperse and spread cleared native vegetation around disturbed areas to provide habitat, increase the seed bank and to provide a mulch material for nutrient cycling and water retention purposes.	Ongoing.
	8.4	Strip all groundcover vegetation with the topsoil to ensure maximum retention of nutrients and native seeds to facilitate rapid vegetation of the soil stockpiles.	Ongoing.

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Desired Outcome	Action		Timing
	8. Ecology (Cont'd)		
Manage progressive disturbance over the Mine Site to minimise disturbance to flora and fauna of conservation significance.	8.5	Clearly identify the boundaries of proposed disturbance. As far as practicable avoid disturbance to the vegetation of Community 3 along watercourses of the Mine Site.	Prior to clearing in the nominated area(s).
	8.6	Commission a qualified ecologist to complete a pre-clearance survey of nominated areas of disturbance (to identify whether any threatened species, population or community or their habitat is present).	Prior to clearing in the nominated area(s).
	8.7	Include an assessment of whether aquatic or fish habitat is present within the drainage features to be traversed by the access road and/or power line corridors. The location of access tracks will be determined in conjunction with an ecologist after inspecting each proposed route and determining the path with least impact on environmental values	Prior to clearing in the nominated area(s).
	8.8	(In the event that an EEC or threatened species or population is identified), relocate or reorientate proposed disturbance, if practicable.	Prior to clearing in the nominated area(s).
	8.9	If the relocation or re-orientation of the area to be disturbed is not practicable (for reasons of mine / operational safety), the consultant ecologist will relocate any fauna species residing within the area to be cleared.	
	8.10	Retain all substantial habitat trees, wherever possible.	During construction.
	8.11	Undertake any tree-felling in accordance with a Tree Felling Protocol. The Tree Felling Protocol will be developed by a qualified ecologist and will include, but not necessarily be limited to a description of: – the best time of the year for felling; – pre-felling mapping of habitat trees; – inspections of trees on the day of felling; – procedures for the safe removal of fauna species; – a relocation/release protocol; and – a protocol for the assessment and salvaging of tree hollows.	During construction.

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Desired Outcome	Action		Timing
8. Ecology (Cont'd)			
Manage progressive disturbance over the Mine Site to minimise disturbance to flora and fauna of conservation significance. (cont'd)	8.12	Disperse and spread cleared native vegetation around disturbed areas to provide habitat, increase the seed bank and to provide a mulch material for nutrient cycling and water retention purposes.	Following clearing if areas available, otherwise when revegetation area available.
	8.13	Strip all groundcover vegetation with the topsoil to ensure maximum retention of nutrients and native seeds to facilitate rapid vegetation of the soil stockpiles.	Ongoing.
	8.14	Re-site all hollows from hollow-bearing trees removed where practicable.	Ongoing.
Minimise long term impact on flora and fauna on and around the Mine Site.	8.15	Implement a weed management strategy, in consultation with the Livestock Health and Pest Authority and the Narrabri Shire Council weeds officer, for the retained or rehabilitated natural vegetation within the Mine Site.	To be developed in the Landscape Management Plan for the Project in accordance with the Stage 1 conditional requirement.
	8.16	Implement a feral animal management program to lower the predator impact upon small terrestrial native species.	In accordance with Landscape Management Plan.
	8.17	Inspect the sediment dams, evaporation ponds and brine storage ponds for fauna during the course of regular maintenance and operational inspections.	Ongoing.
	8.18	Undertake regular reviews of the revegetation program to ensure it remains relevant.	Annually.
	8.19	Time clearing within woodland communities, where practicable, to avoid fauna breeding seasons.	Ongoing.
	8.20	Undertake progressive and final rehabilitation across the Project Site to recreate a final land use of agriculture and native vegetation.	Ongoing.
Ensure the biodiversity value of the Mine Site and surrounding areas is maintained or improved.	8.21	Establish and implement a Biodiversity Offset Management Plan to the satisfaction of DoP (and in consultation with DECCW), to account for that area disturbed by the Longwall Project and in particular regard for Bertya Opponens, the Superb Parrot and Inland Grey Box EEC.	Within 9 months of Project Approval.
9. Indigenous Heritage			
Employees and contractors who are sensitive to, and respectful of, the Aboriginal heritage on the Mine Site.	9.1	Involve all site employees and contractors in an awareness program re: Aboriginal heritage issues.	At Site Induction (and re-induction).

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Desired Outcome	Action		Timing
9. Indigenous Heritage (Cont'd)			
Ensure protection of Aboriginal sites and artefacts of scientific significance (Aboriginal Sites 10, 19, 38 and 39).	9.2	Identify the boundaries of Aboriginal Sites 10, 19, 38 and 39 in conjunction with the Aboriginal stakeholders and the archaeologist and fence off (with fluorescent para-webbing (or similar material)).	Prior to any surface disturbance within 100m of the nominated sites.
	9.3	Erect a sign on the fencing identifying an "Environmental Protection Zone".	Prior to any surface disturbance within 100m of the nominated sites.
	9.4	Prohibit access to these sites by locating all surface disturbance (including roads) at least 10m from these fenced off areas.	Prior to any surface disturbance within 100m of the nominated sites.
	9.5	Remove the fencing (erected as nominated in *Commitment 9.3*) to allow the return of grazing to reduce the potential grass-fire hazard.	Following the completion of surface disturbance in the vicinity of the protected site.
Manage identified Aboriginal sites and artefacts (of Panels 1 to 7) in accordance with agreed management principles.	9.6	For Aboriginal Sites 10, 19, 38 and 39, design surface disturbing activities such as gas drainage operation, ventilation and access road construction to provide a buffer of at least 10m from the site fencing.	Prior to any surface disturbance.
	9.7	For all other Aboriginal sites, design surface disturbing activities such as gas drainage operations, ventilation and access road construction to avoid wherever possible the identified Aboriginal sites.	Prior to any surface disturbance within 100m of any other Aboriginal site.
	9.8	In the event that one of the Aboriginal sites (other than Aboriginal Sites 10, 19, 38 and 39) cannot be avoided, commission an archaeologist and invite representatives of registered Aboriginal stakeholders (Gomeroi and Narrabri LALC) to salvage the artefacts identified at the affected site ("the Salvage Area").	Prior to salvage.
	9.9	Undertake a full analysis of the material salvaged from within the Salvage Area by allowing the archaeologist to take the artefacts for further analysis.	Following salvage and prior to any surface disturbance.
	9.10	Return the salvaged artefacts to the authorised Aboriginal organisation.	Within 21 days of salvage.

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Desired Outcome	Action		Timing
9. Indigenous Heritage (Cont'd)			
Manage identified Aboriginal sites and artefacts (of Panels 1 to 7) in accordance with agreed management principles. (cont'd)	9.11	Place the salvaged artefacts in the care and control of the Aboriginal organisation agreed to by Narrabri LALC and Gomeroi. (The Proponent (if required) has agreed to provide an interim 'keeping place' in a designated storage facility within the Pit Top Area until such time as a suitable location is identified and agreed to by Narrabri LALC and Gomeroi).	Following salvage.
	9.12	Commission the preparation of a report ("Salvage Report") including full descriptions of the salvaged material, and an interpretation of the archaeological record within the Salvage Area.	Following salvage
	9.13	Provide copies of the Salvage Report to Narrabri LALC, Gomeroi and the DECCW	Within 3 months of salvage
Manage Aboriginal sites and artefacts (within the remaining Mining Area) in accordance with agreed management principles.	9.14	As mining approaches the completion of Panels 1 to 7, undertake a further detailed field survey, involving representatives of the registered Aboriginal stakeholders, above the Mining Area to be disturbed over the ensuing 7 years.	At least 12 Months prior to completion of mining in Panel 7.
	9.15	Identify and protect through fencing and signage, those sites determined to be of high scientific significance as agreed and determined in consultation between the Proponent, the registered Aboriginal stakeholders and the archaeologist.	Prior to any surface disturbance associated with Panel 8.
	9.16	In the event that an identified site cannot be avoided, commission an archaeologist and invite representatives of registered Aboriginal stakeholders (Gomeroi and Narrabri LALC) to salvage the identified artefacts. All salvage is to be undertaken as per *Commitments 9.9* to *9.13* above.	Prior to any surface disturbance

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Desired Outcome	Action		Timing
9. Indigenous Heritage (Cont'd)			
Manage Aboriginal heritage values in accordance with agreed management principles.	9.17	Prepare, in consultation with the registered Aboriginal stakeholders and the DECCW, an updated Aboriginal Heritage Cultural Management Plan (AHCMP). The ACHMP will include: – protocols and procedures to ensure that all commitments (see *Commitments 9.1* to *9.20*) are implemented in full; – consultation and communication framework between the Proponent, registered Aboriginal stakeholders and the DECCW; – the accountabilities and responsibilities of the Proponent and registered Aboriginal stakeholders; and – All legal reporting requirements nominated by the DECCW.	Within 6 months of receiving Project Approval
Appropriate protection and/or salvage of Aboriginal sites and artefacts identified beyond the Aboriginal sites defined during previous field surveys.	9.18	Ensure that if any further Aboriginal artefacts are uncovered at any time during the life of the mine, work in the vicinity of the subject area ceases and the Proponent follows the procedures recorded in the ACHMP.	In the event of an Aboriginal site or artefact being identified.
	9.19	Wherever possible, if a tree is identified as having culturally made scars, it is retained *in situ* and protected.	In the event of a scarred tree being identified.
	9.20	Ensure that, where it is not possible to retain a scarred tree *in-situ,* the tree is cut down to preserve the scar, and relocated into a designated protected area. All activity associated with cutting of the tree and preservation of the scar is to be conducted in consultation with the Aboriginal stakeholders and the archaeologist.	In the event of a scarred tree being identified.

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Desired Outcome	Action		Timing
10. Noise			
All activities are undertaken in such a manner as to reduce the noise level generated and minimise impacts on surrounding landholders and/or residents.	10.1	Ensure that the approved hours of operation are adhered to.	Ongoing.
	10.2	Use equipment with lower sound power levels in preference to more noisy equipment.	Ongoing.
	10.3	Regularly service all equipment used on-site to ensure the sound power levels remain at or below the levels used in the modelling to assess generated noise levels and compliance with the criteria.	Ongoing.
	10.4	Maintain a dialogue between the Proponent and surrounding neighbours and the local community to ensure any concerns over construction, operational or transport noise are addressed.	Ongoing.
Noise generated by construction activities does not exceed DECCW nominated criteria nor significantly impact on neighbouring landowners and/or residents.	10.5	Ensure that all equipment emits sound power levels consistent with the schedules in *Appendix A* of Spectrum Acoustics (2009).	Ongoing.
	10.6	Restrict the operation of a maximum of two (2) scrapers during construction operations under temperature inversion conditions, to one of the following areas only. • the longwall unit assembly area; • the ROM coal pad area; • the Reject Emplacement Area; or • the Brine Storage Area.	During construction phase.
	10.7	Undertake noise monitoring at the private residences most likely to be affected by construction noise.	As required during construction works with real time noise monitoring and attended quarterly monitoring.
	10.8	In the event that noise monitoring confirms exceedance of noise criteria at privately owned residences, where noise mitigation measures prove ineffective, negotiated agreements will be sought with the affected parties in accordance with the Industrial Noise Policy	As required if exceedances cannot be mitigated.
	10.9	In accordance with the Noise Management Plan and to account for inversion impacts, develop an operational protocol in consultation with the DECCW to clearly define operational procedures to be adopted during inversion conditions to minimise impact at adjoining privately owned residences	Within 3 months of approval.

Statement of Commitments for Site Operations and Management

Desired Outcome	Action		Timing
10. Noise (Cont'd)			
Noise generated by operational activities does not exceed DECCW nominated criteria nor significantly impact on neighbouring landowners and/or residents.	10.10	Fully enclose the rotary breaker within a shed (or similar) clad with tilt-up aerated concrete panels, or similar.	Prior to commencement of coal processing.
	10.11	Enclose the coal processing plant with clad steel sheeting and line 50% of the internal surface with acoustic insulation.	Prior to commencement of coal processing.
	10.12	Refrain from using the bulldozer on the Reject Emplacement Area in both the morning and evening periods.	During temperature inversion conditions.
	10.13	Limit the number of truck movements to the Reject Emplacement Area to 1 load per 15 minute period.	During temperature inversion conditions
	10.14	Ensure specific noise attenuation is provided to surface drills when operating over LW1 to LW3 and LW24 to LW26 to achieve a sound power level of 109dB(A).	Prior to surface drilling (under inversion conditions) above the nominated longwall panels
	10.15	Update the existing Noise Management Plan.	Within 6 months of approval
Noise generated by transport activities does not exceed DECCW nominated criteria nor significantly impact on neighbouring landowners and/or residents.	10.16	Ensure strict adherence to hours of operation, including transport activities.	Ongoing.
	10.17	Instruct all project employees and contractors to enter and exit the Mine Site in a courteous manner and without causing undue traffic noise.	On induction (and re-induction).
	10.18	Maintain the on-site road network to limit body noise from empty trucks travelling on internal roads.	Ongoing.
Blasting undertaken that complies with the nominated DECCW criteria.	10.19	Ensure that all blasts are designed by a suitably qualified and experienced blasting engineer or shot-firer and that each blast is designed to ensure compliance with the relevant assessment criteria or conditional requirements	As required.
Implementation of an appropriate noise monitoring program to ensure continuing compliance with DECCW guideline levels during longwall mining operations.	10.20	Undertake attended noise monitoring at the residences most likely to be affected by Longwall Project generated noise. "Bow Hills" "Belah Park" "Naroo" "Matilda"[1] "Oakleigh" "Haylin View"[1] "Newhaven" "Merrilong"[1]	Quarterly.

[1] Monitoring to commence as surface activities approach the eastern end of the southern longwall panels.

Statement of Commitments for Site Operations and Management

Desired Outcome	Action		Timing
10. Noise (Cont'd)			
Implementation of an appropriate noise monitoring program to ensure continuing compliance with DECCW guideline levels during longwall mining operations. (within the remaining Mining Area). (cont'd)	10.21	Increase the frequency of monitoring during the first winter (May to September) of mining operations proposed under this approval. This will also incorporate real time noise monitoring as required under the Stage 1 modification approval.	Monthly.
	10.22	Review and submit noise monitoring results to the DECCW.	Annually.
11. Air Quality			
Site activities are undertaken without exceeding DECCW air quality criteria or goals.	11.1	Minimise the extent of clearing across the Mine Site including the campaigns to construct the area for reject emplacement and construct brine storage ponds.	Ongoing.
	11.2	Retain cleared trees and branches on the margins of cleared areas for use in stabilising disturbed areas once they are no longer required.	Ongoing.
	11.3	Undertake soil stripping at times when most appropriate (such as when there is sufficient soil moisture to prevent significant lift-off of dust and at times other than periods of high winds).	Ongoing.
	11.4	Operate water sprays on all continuous miners, the longwall unit and the breaker feeder to minimise dust creation underground.	Ongoing.
	11.5	Apply water to the coal at the feed hopper, crusher and at all conveyor transfer and discharge points.	Ongoing.
	11.6	Fit all surface conveyors with appropriate cleaning and collection devices to minimise the amount of material falling from the return conveyor belts.	Prior to commencement of coal processing.
	11.7	Enclose the rotary breaker . (see *Commitment 10.10*)	Prior to commencement of coal processing.
	11.8	Partially enclose all surface conveyors to minimise dust lift off.	Prior to commencement of coal processing.
	11.9	Cease construction of the brine storage ponds when the prevailing winds are from the northwest quadrant.	Ongoing.
	11.10	Apply water onto stockpiles and hardstand areas.	Ongoing.

Statement of Commitments for Site Operations and Management

Desired Outcome	Action		Timing
11. Air Quality (Cont'd)			
Site activities are undertaken without exceeding DECCW air quality criteria or goals. (cont'd)	11.11	Progressively rehabilitate areas of disturbance including gas drainage areas.	Ongoing.
	11.12	Progressively rehabilitate areas no longer required for operational purposes.	Ongoing.
Minimise the potential for spontaneous combustion of the coal stored and handled on site.	11.13	Minimise the length of time coal is held in stockpiles.	Ongoing.
	11.14	Monitor coal stockpiles for signs of spontaneous combustion.	Ongoing.
	11.15	Immediately report incidents to the appropriate authorities.	Ongoing.
	11.16	Extinguish fire by removal from stockpile, spreading and saturation with water.	In the event of ignition.
Ensure no employee's health is adversely affected as a result of employment at the Longwall Project.	11.17	Install underground ventilation system to provide fresh air to employees.	Ongoing and as required.
Minimise greenhouse gas, other gas and odour emissions through reduction in diesel consumption.	11.18	Optimise and schedule vehicle operations to minimise vehicle movements.	Ongoing.
	11.19	Maintain engines according to manufacturers' guidelines and keep tyres at optimum pressure.	Ongoing.
	11.20	Minimise vehicle idling time.	Ongoing.
	11.21	Prepare an updated Energy Savings Action Plan (ESAP).	Within 12 months of Project Approval.
Implementation of an appropriate air quality monitoring program to ensure continuing compliance with DECCW guideline levels.	11.22	Monitor deposited dust levels at 8 sites (ND1 to ND8).	Monthly.
	11.23	Monitor PM_{10} levels at 2 sites (ND9 to ND10).	1 in 6 days as per DECCW schedule.
	11.24	Review and submit dust monitoring results to relevant government agency.	Annually.
12. Soils and Land Capability			
Maintenance of soil value for rehabilitation and minimisation of soil loss though erosion.	12.1	Strip topsoil to a depth of 15cm and strip subsoil to a depth of 25cm (where sufficient soil depths are available).	During soil stripping operations.
	12.2	Avoid stripping or replacing under wet conditions.	During soil stripping operations.
	12.3	Stockpile topsoil and subsoil separately with topsoil stockpiles not exceeding 2m in height and subsoil stockpiles not exceeding 3m in height.	During stockpiling operations.
	12.4	Carefully select soil stockpile locations to avoid subsequent movement, to ensure that the soil structure is not degraded.	During soil stripping operations.

Statement of Commitments for Site Operations and Management

Desired Outcome	Action		Timing
12. Soils and Land Capability (Cont'd)			
Maintenance of soil value for rehabilitation and minimisation of soil loss though erosion. (cont'd)	12.5	Position soil stockpiles to prevent surface water runoff coming into contact with the soil stockpiles.	During soil stockpiling operations.
	12.6	Construct soil stockpiles with a 'rough' surface to assist in runoff control and seed retention and germination.	During soil stockpiling operations.
	12.7	Construct up slope water diversion banks to direct overland surface water flow away from soil stockpiles.	During soil stockpiling operations.
	12.8	Install protective earthworks such as straw bale or contour bank protection to protect the soil stockpile from overland flow as required.	Following stockpile construction.
	12.9	Install silt-stop fencing or similar protection immediately down slope of stockpiles and retain until such time as they develop a stable cover of vegetation.	Following stockpile construction.
	12.10	Sow soil stockpiles with stabilising groundcover species.	Following stockpile construction.
	12.11	Retain soil conservation structures, or if disturbed, reinstate these structures to maintain pre-mining soil and water management on the Mine Site.	Ongoing.
Minimise erosion on the Mine Site as a consequence of subsidence.	12.12	Inspect drainage lines, predicted surface cracking zones and other areas of the Mine Site susceptible to erosion, ie. soils of the Purlawaugh Formation on slopes >10°.	At least quarterly.
	12.13	Undertake remedial actions on areas of accelerated erosion, eg. reinstatement or realignment of contour banks, regrading of channels, sowing of cover crops, etc.	Ongoing and as required.
Ensure no tunnelling erosion occurs as a consequence of pipeline channel excavation and backfill.	12.14	Replace soil material in the reverse order to that removed, ie. lower subsoil layers, upper subsoil layers then topsoil	When under construction.
Remediate contaminated soils.	12.15	Excavate and remove soils contaminated with hydrocarbons or saline water.	Within one month of contamination occurring.
	12.16	(If the contamination is widespread) Remove contaminated material to facility licensed to accept the nominated contamination.	Within one month of contamination occurring.
	12.17	(If the hydrocarbon contamination is limited in area) Remove to a designated 'land farming' location (away from natural drainage) for bio-remediation of hydrocarbon contaminated material.	Within one month of contamination occurring.

Statement of Commitments for Site Operations and Management

Desired Outcome	Action		Timing
13. Transportation			
All motorists travel safely to and from the Mine Site with minimal disruption to Kamilaroi Highway or Kurrajong Creek Road traffic.	13.1	Transport coal entirely by rail.	Ongoing.
	13.2	Erect appropriate road signage.	As required.
	13.3	Ensure all employees and contractors are regularly informed about the safe driving requirements to and from the Mine Site.	On induction and ongoing.
	13.4	Instruct all employees regarding the possible scenario where the rail crossing is closed at shift change-over and requirement for patience whilst the crossing is closed	On induction.
	13.5	Transport all oversize loads with all necessary permits.	As required.
	13.6	Manage the maintenance of the Mine Access Road, Kurrajong Creek Road, North Western Branch Railway Crossing.	Ongoing for the life of the mine.
An improved understanding of the cumulative impacts of increased rail traffic on all stakeholders impacted by increased rail traffic to Port Newcastle.	13.7	Work co-operatively with the relevant authorities, and as required ARTC, in terms of financial and in kind commitment of resources (to be agreed with the relevant authority and on an equitable basis with other rail users) in a study into the cumulative impacts of increased rail traffic from all sources.	When commissioned by the relevant authority.
An understanding of the implications of the cumulative impacts of increased rail traffic, on traffic flow in and about the township of Gunnedah.	13.8	Work co-operatively with Gunnedah Shire Council in terms of financial and in-kind commitment of resources (to be agreed with Gunnedah Shire Council and on an equitable basis with other rail users) in an Integrated Traffic Management Study to be commissioned by Gunnedah Shire Council.	When commissioned by Gunnedah Shire Council.
14. Visual			
The operation of the Siding Springs Observatory is not affected by project operations.	14.1	Use soft lighting on the Pit Top Area to minimise impact on surrounding residents while allowing for evening maintenance and deliveries / night train loading activities.	Night-time operations.
Restriction of vantage points of project activities from neighbouring residences and public roads.	14.2	Maintain the perimeter amenity bund and vegetate with native grasses, shrubs and trees.	During the site establishment phase.
	14.3	Construct and vegetate a bund wall around the ventilation shaft areas to restrict the visibility of the activities from neighbouring residences.	During the site establishment phase.

Statement of Commitments for Site Operations and Management

Desired Outcome	Action		Timing
14. Visual (Cont'd)			
Restriction of vantage points of project activities from neighbouring residences and public roads. (cont'd)	14.4	Rehabilitate and revegetate all areas no longer required for site operations to ensure the maximum area of grassed paddock is present.	Ongoing.
	14.5	Construct/paint the load-out bin above the rail load-out area and site buildings in a grey/green hue to limit their overall visibility	During the site establishment phase.
15. Community Contributions			
Keep surrounding land owners and land users informed about site activities	15.1	Maintain the Community Consultative Committee or similar and include local community representatives.	Ongoing.
	15.2	Provide regular newsletters regarding project progress and operations.	Ongoing.
Contribute to the Local Community through appropriate contributions to Community Enhancement Activities	15.3	Provide funding of $100,000 to the Gunnedah Shire Council Community Enhancement fund. Funding to be spread out equally over 5 annual instalments.	For 5 Years.
	15.4	Provide funding of $1 500 000 to the Narrabri Shire Council Community Enhancement Fund. Funding to be provided in two instalments over two years.	2 Years.
16. Environmental Monitoring			
Implement a comprehensive and ongoing surface water monitoring program.	16.1	Monitor surface water quality for: pH, EC, TDS, TSS, Total Organic Carbon at locations upstream and downstream of the Pit Top Area on Kurrajong and Pine Creeks and their tributaries. (See also *Commitment 7.27*)	Quarterly during surface flows.
	16.2	Record the volume and quality (pH, EC, TDS, TSS, Total Organic Carbon) of water extracted and discharged to the Namoi River. (See also *Commitment 7.28*)	Weekly.

Statement of Commitments for Site Operations and Management

Desired Outcome	Action		Timing
16. Environmental Monitoring (Cont'd)			
Implement a comprehensive and ongoing groundwater monitoring program. (cont'd) (cont'd)	16.3	Record extraction volumes including weekly totals from all pumping bores, and weekly totals from underground and open cut sump. (see also *Commitment 6.4*)	Weekly.
	16.4	Record Volumes of water introduced to the mine for longwall operation and other requirements. (see also *Commitment 6.5*)	Weekly.
	16.5	Record the groundwater quality (EC and pH) discharged from the underground workings and water supply bores. (see also *Commitment 6.6*)	Monthly.
	16.6	Sample and analyse water from all pumping bores and underground for the following parameters. • EC, TDS, TSS and pH. • Calcium, magnesium, sodium and potassium. • Carbonate, bicarbonate, sulphate and chloride. • Aluminium, arsenic, boron, cobalt, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, selenium, zinc. • Ammonia, nitrate, phosphorus, reactive phosphorus. (see also *Commitment 6.7*)	Quarterly
	16.7	Record (by manual monitoring, or continuous automated monitoring) the standing water levels of piezometers P1 to P27 and WB1 to WB8 (and others as constructed). (see also *Commitment 6.8*)	Monthly initially and Quarterly after first 12 months
	16.8	Monitor the flow rate and water quality of the spring discharge from "Mayfield Spring". (see also *Commitment 6.9*)	Monthly initially and Quarterly after first 12 months.
	16.9	Install additional multi-level vibrating wire piezometers over LW1 to LW3 to obtain detailed data as to the impact of mine subsidence on the groundwater of the various strata above the underground workings. (see also *Commitment 6.10*)	Prior to commencement of longwall mining.
	16.10	Collect data from the vibrating wire piezometers and compare against initial groundwater and subsidence modelling predictions. (see also *Commitment 6.11*)	Data collected continuously and downloaded and analysed quarterly.

Statement of Commitments for Site Operations and Management

Desired Outcome	Action	Timing
16. Environmental Monitoring (Cont'd)		
Implement a comprehensive and ongoing groundwater monitoring program. (cont'd)	16.11 Commission an experienced hydrogeologist to collate and review the monitoring data collected annually in order to assess the impacts of the project on the groundwater environment, and to compare any observed impacts with those predicted from groundwater modelling. (see also *Commitment 6.12*)	Annually
	16.12 Develop the groundwater monitoring program in consultation with the Proponent's consultant hydrogeologist, the Department of Environment, Climate Change and Water – Office of Water and those groundwater users potentially affected by the project. (see also *Commitment 6.13*)	Prior to commencement of longwall mining.
Implementation of an appropriate noise monitoring program to ensure continuing compliance with DEC guideline levels.	16.13 Undertake attended noise monitoring at the residences most likely to be affected by Longwall Project generated noise. "Bow Hills" "Belah Park" "Naroo" "Matilda"[2] "Oakleigh" "Haylin View"[2] "Newhaven" "Merrilong"[2] (see also *Commitment 10.20*)	Quarterly
	16.14 Increase the frequency of monitoring during the first winter (May to September) of construction or mining operations. (see also *Commitment 10.21*) This will also incorporate real time noise monitoring in accordance with requirements under the Stage 1 modification approval.	Monthly
	16.15 Review and submit noise monitoring results to the DECCW. (see also *Commitment 10.22*)	Annually
Implementation of an appropriate air quality monitoring program to ensure continuing compliance with DEC guideline levels.	16.16 Monitor deposited dust levels at 8 sites (ND1 to ND8). (see also *Commitment 11.22*)	Monthly
	16.17 Monitor PM_{10} levels at 2 sites (ND9 to ND10). (see also *Commitment 11.23*)	1 in 6 days as per DECCW schedule.
	16.18 Review and submit dust monitoring result to relevant government agency. (see also Commitment 11.24)	Annually.

[2] Monitoring to commence as surface activities approach the eastern end of the southern longwall panels.

Statement of Commitments for Site Operations and Management

Desired Outcome	Action		Timing
17. Documentation			
A systematic set of documents are in place to guide the planning and implementation of all environmental management strategies.	17.1	Incorporate the environmental procedures in an on-site management system.	Prior to relevant activity.
	17.2	Prepare or update the following management and monitoring plans; • Mining Operations Plan • Aboriginal Cultural Heritage Management Plan • Energy Savings Action Plan • Waste Management Plan • Water Management Plan • Landscape Management Plan • Greenhouse Gas Minimisation Plan • Gas Drainage & Outburst Management Plan • Major Hazard Management Plan • Salinity Contamination Contingency Plan • Extraction Management Plan • Erosion & Sediment Control Plan • Noise Monitoring Program	Various and as nominated by project approval.
	17.3	Incorporate relevant environmental data / information in Annual Environmental Management Reports.	Annually.
18. General			
All buildings meet necessary building codes and specifications.	18.1	Construct all buildings with certification by Narrabri Shire Council.	During site establishment phase.
All employees and contractors are trained and assessed as competent to undertake those activities influencing the environment.	18.2	Implement a policy encouraging employment of local district personnel, with arrangements for training and certification.	Prior to commencement of project.
	18.3	Include environmental issues in the site induction process for new employees and/or contractors.	Prior to commencement of project.
	18.4	Develop and incorporate an environmental training program to ensure all employees and contractors are environmentally responsible and follow all relevant site-specific procedures.	Prior to commencement of project.
	18.5	Include environmental issues in the agenda for toolbox meetings with employees and/or contractors.	Ongoing.

APPENDIX 4
GENERAL TERMS OF PLANNING AGREEMENTS

Continuation of Stage 1 Planning Agreements

Funding Area	Minimum Proponent Contribution	Funding Time Frame
Narrabri Shire Upgrade and seal Kurrajong Creek Road, adjacent to the Project site	7.0 kilometres length of Kurrajong Creek Road to be upgraded and sealed.	Works to be completed within 12 months of Stage 1 project approval (17 November 2007).
Narrabri Shire Monetary Contribution – Provision of bush fire services	$7,000	One instalment to be paid within 12 months of Stage 1 project approval (17 November 2007).
Narrabri Shire Community Infrastructure Contribution	$93,000	An initial instalment of $13,000 to be paid within 12 months of Stage 1 project approval (17 November 2007) with $20,000 to paid for a period of four years on the anniversary of the initial payment.
Gunnedah Shire Monetary Contribution – Gunnedah Urban Riverine Scheme	$100,000	$20,000 each year for a period of 5 years with the first instalment to be paid within 12 months of Stage 1 project approval (17 November 2007).

Notes:

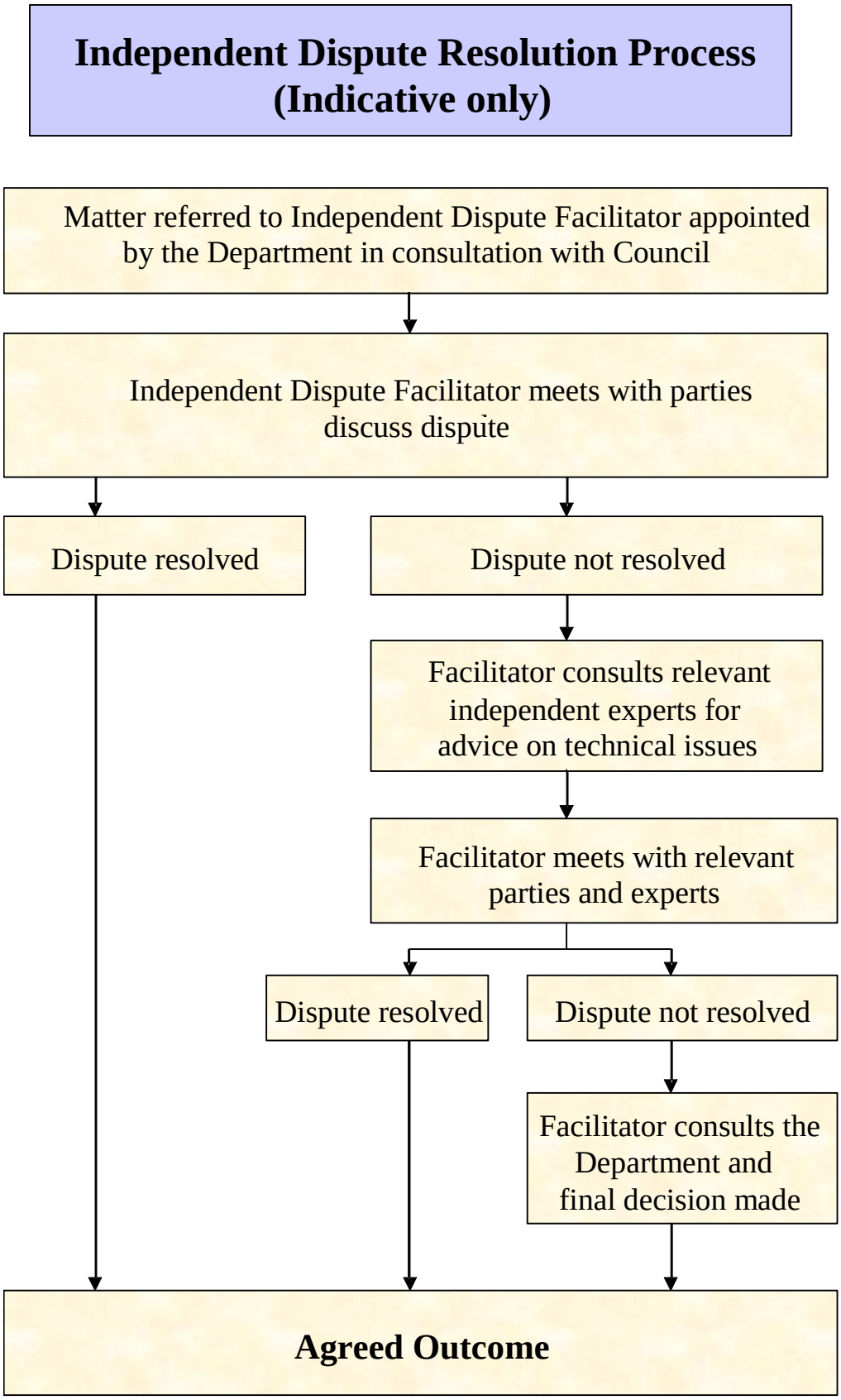
- The Gunnedah Urban Riverine Scheme Contributions must be reviewed and adjusted to take into account any increase in the CPI over time, in accordance with the Planning Agreement between the Proponent and Gunnedah Shire Council required under this approval.
- The Community Infrastructure Contribution must be reviewed and adjusted to take into account any increase in the CPI over time, in accordance with the Planning Agreement and Narrabri Shire Council required under this approval.

Stage 2 Planning Agreements

Funding Area	Minimum Proponent Contribution	Funding Time Frame
Narrabri Shire Narrabri Swimming Complex	$1,500,000	First contribution of $750,000 to be made in conjunction with the 2010 Stage 1 community enhancement contribution. Second contribution of $750,000 to be paid in conjunction with the 2011 Stage 1 community enhancement contribution.
Gunnedah Shire Monetary Contribution	$100,000	$20,000 each year for a period of 5 years with the first instalment to be paid in conjunction with the 2010 Stage 1 community enhancement contribution.

Notes: The notes for Stage 1 Community Enhancement Program contributions apply to Stage 2 Community Enhancement contributions.

APPENDIX 5
INDEPENDENT DISPUTE RESOLUTION PROCEDURE



Appendix 2

ENVIRONMENT PROTECTION LICENCE 12789

Environment Protection Licence

Licence - 12789

Licence Details	
Number:	12789
Anniversary Date:	20-February

Licensee
NARRABRI COAL OPERATIONS PTY LTD
LOCKED BAG 1002
NARRABRI NSW 2390

Premises
NARRABRI COAL OPERATIONS
10 KURRAJONG CREEK ROAD
BAAN BAA NSW 2390

Scheduled Activity
Coal Works
Mining for Coal

Fee Based Activity	Scale
Coal works	> 5000000 T handled
Mining for coal	> 5000000 T produced

Region
North West - Armidale
Level 1, NSW Govt Offices, 85 Faulkner Street ARMIDALE NSW 2350
Phone: (02) 6773 7000
Fax: (02) 6772 2336
PO Box 494 ARMIDALE
NSW 2350

Environment Protection Licence

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Environment Protection Licence

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Environment Protection Licence

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Information about this licence

Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

Responsibilities of licensee

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 - 132 of the Act); and
- report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

Duration of licence

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

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The EPA publication “A Guide to Licensing” contains information about how to calculate your licence fees. The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

Usually the licence fee period is the same as the reporting period.

Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
- licence conditions and variations;
- statements of compliance;
- load based licensing information; and
- load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been submitted to the EPA by licensees.

This licence is issued to:

NARRABRI COAL OPERATIONS PTY LTD
LOCKED BAG 1002
NARRABRI NSW 2390

subject to the conditions which follow.

Environment Protection Licence

Licence - 12789

1 Administrative Conditions

A1 What the licence authorises and regulates

A1.1 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.

Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity	Fee Based Activity	Scale
Coal Works	Coal works	> 5000000 T handled
Mining for Coal	Mining for coal	> 5000000 T produced

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
NARRABRI COAL OPERATIONS
10 KURRAJONG CREEK ROAD
BAAN BAA
NSW 2390
LOCATION OF PREMISES IS SHOWN ON FIGURES TITLED "FIGURE 1.1 PROJECT SITE LOCATION" AND "FIGURE 2.1 (PREFERRED) INDICATIVE PROJECT SITE LAYOUT" SUBMITTED BY LICENSEE WITH LICENCE APPLICATION DATED 21-09-07. COPY ON FILE 25147A1/03

A2.2 The licence applies to the following premises:

Lot 1 DP 816020; Lot 152 DP 816020; Lot 60 DP 757124; Part Lot 60 DP 757124; Part Lots 151 & 152 DP 816020; Part Lot 152 DP 816020; Part Lots 57, 58, 63, 64, 65, 81, 82, 83, 83 &115 DP 757124; Lot 61 DP 757124; Part Lot 1 DP 811171; Lot 2 DP 811171; Part Lots 3, 8, 25, 67 & 68 DP 757104; Lot 7 DP 757104; Part Lot 152 DP 816020; Lot 1 DP 659899; Part Lot 3 DP 1005608; Lots 381 & 382 DP 1028753; Part Lot 1 DP 798487; Part Lots 57,58,60,63,64,65,81,82,83,84 & 115 DP 757124; Part Lots 3, 8, 10, 25, 67 & 68 DP 757104; Part Lots 151 & 152 DP 816020

A3 Information supplied to the EPA

A3.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:

a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

2 Discharges to Air and Water and Applications to Land

P1 Location of monitoring/discharge points and areas

P1.1 The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.

Air

EPA identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
3	Ambient Air Quality Monitoring		Monitoring point located at "Bow Hills" and labelled ND3 as shown on map titled "Current Non- Project Related Monitoring Locations- Narrabri Mine" dated 23 November 2011 sent to EPA on 24 November 2011 (DOC11/56033).
23		Gas Drainage Network	Pre- drainage and Goaf gas drainage network associated with the underground mining operations.

P1.2 The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.

P1.3 The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.

Water and land

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
11	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Discharge point on northern side of mine boundary labelled as "SD4" on Figure titled "Wet Weather Discharge Monitoring Locations" provided with licence variation application dated 10 February 2009.

Environment Protection Licence

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12	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Discharge point on eastern side of mine boundary labelled as "SD5" on Figure titled "Wet Weather Discharge Monitoring Locations" provided with licence variation application dated 10 February 2009.
13	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Discharge point on south eastern side of mine boundary labelled as "SD2" on Figure titled "Wet Weather Discharge Monitoring Locations" provided with licence variation application dated 10 February 2009.
14	Ambient Water Quality Monitoring		Upstream of mine discharge point on Kurrajong Creek Tributary 1 labelled as "KC1US" on Figure titled "Wet Weather Discharge Monitoring Locations" provided with licence variation application dated 10 February 2009.
15	Ambient Water Quality Monitoring		Downstream of mine discharge point on Kurrajong Creek Tributary 1 labelled as "KC1DS" on Figure titled "Wet Weather Discharge Monitoring Locations" provided with licence variation application dated 10 February 2009.
16	Ambient Water Quality Monitoring		Upstream of mine discharge point on Kurrajong Creek Tributary 2 labelled as "KC2US" on Figure titled "Wet Weather Discharge Monitoring Locations" provided with licence variation application dated 10 February 2009.
17	Ambient Water Quality Monitoring		Downstream of mine discharge point on Kurrajong Creek Tributary 2 labelled as "KC2DS" on Figure titled "Wet Weather Discharge Monitoring Locations" provided with licence variation application dated 10 February 2009.
18	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Discharge point on western side of mine boundary labelled as "SD7" on figure titled "Figure 3- Discharge Location SD7" provided with licence variation application dated 2 September 2011 (DOC11/41455).
19	Ambient Water Quality Monitoring		Upstream location of Kurrajong Creek labelled as "KCUS" on figure titled "Figure 1: Surface Water Monitoring Locations" provided with licence variation application dated 2 September 2011 (DOC11/41455).

20	Ambient Water Quality Monitoring	Upstream location of Kurrajong Creek labelled as "KCDS" on figure titled "Figure 1: Surface Water Monitoring Locations" provided with licence variation application dated 2 September 2011 (DOC11/41455).
21	Ambient Water Quality Monitoring	Northern portion of mining area in Pine Creek labelled as "PCa" on figure titled "Current Environmental Monitoring Locations" provided by licence via email dated 20 October 2011 (DOC11/48204).
22	Ambient Water Quality Monitoring	Monitoring point in Pine Creek Tributary 1 labelled as "PC1" on figure titled "Figure 1: Surface Water Monitoring Locations" provided with licence variation application dated 2 September 2011 (DOC11/41455).

P1.4 The following point(s) in the table are identified in this licence for the purpose of the monitoring of weather parameters at the point.

EPA identification number	Type of Monitoring Point	Description of Location
W1	Weather analysis	Weather station identified as "Meteorological station" on map titled "Figure B Environmental Monitoring" submitted with the Final Statement of Commitments, dated June 2007.

3 Limit Conditions

L1 Pollution of waters

L1.1 Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.

L2 Concentration limits

L2.1 For each monitoring/discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.

L2.2 Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.

L2.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant

other than those specified in the table\s.

L2.4 Water and/or Land Concentration Limits

POINT 12,13,11,18

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Oil and Grease	milligrams per litre	-	-	-	10
pH	pH	-	-	-	6.5-8.5
Total suspended solids	milligrams per litre	-	-	-	50

L2.5 The Total Suspended Solids concentration limits specified for Points 11, 12, 13 and 18 may be exceeded for water discharged provided that:

(a) the discharge occurs solely as a result of rainfall measured at the premises that exceeds 38.4 millimetres over any consecutive 5 day period immediately prior to the discharge occurring; and
(b) all practical measures have been implemented to dewater all sediment dams within 5 days of rainfall such that they have sufficient capacity to store run off from a 38.4 millimetre, 5 day rainfall event.

Note: 38.4 mm equates to the 5 day 90%ile rainfall depth for Gunnedah sourced from Table 6.3a Managing Urban Stormwater: Soils and Construction Volume 1: 4th edition, March 2004.

L3 Noise limits

L3.1 Noise generated at the premises must not exceed the noise limits in the table below.

Locality and Location	Day- LAeq (15 minute)	Evening- LAeq (15 minute)	Night- LAeq (15 minute)	Night- LA1 (1 minute)
All privately-owned residences	35	35	35	45

L3.2 For the purpose of the table above:

a) Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays;
b) Evening is defined as the period from 6pm to 10pm;

c) Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

L3.3 **Determining Compliance**

To determine compliance:
a) with the Leq(15 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located:
i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
ii) within 30 metres of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
iii) within approximately 50 metres of the boundary of a National Park or a Nature Reserve.
b) with the LA1(1 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located within 1 metre of a dwelling façade.
c) with the noise limits in the Noise Limits table, the noise measurement equipment must be located:
i) at the most affected point at a location where there is no dwelling at the location; or
ii) at the most affected point within an area at a location prescribed by part (a) or part (b) of this condition.

L3.4 The noise limits set out in the Noise Limits table apply under all meteorological conditions except for the following:
a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
c) Stability category G temperature inversion conditions.

For the purposes of this condition:
a) Data recorded by the meteorological station identified as EPA Identification Point(s) W1 must be used to determine meteorological conditions; and
b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

L3.5 For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

L4 Blasting

L4.1 The overpressure level from blasting operations at the premises must not exceed 115dB (Lin Peak) for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L4.2 The overpressure level from blasting operations at the premises must not exceed 120dB (Lin Peak) at any time. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been

exceeded.

L4.3 The airblast overpressure level from blasting operations listed in Conditions L7.1 and L7.2 must not be exceeded at any point within 30 metres of any non-project related residential building or other noise sensitive location.

L4.4 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 5mm/sec for more than five per cent of the total number of blasts over each reporting period. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L4.5 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 10mm/sec at any time. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

L4.6 The ground vibration peak particle velocity limits listed in Conditions L7.3 and L7.4 must not be exceeded at any point within 3.5 metres of any non-project related residential building or other noise sensitive location.

L4.7 Blasting operations at the premises may only take place between 10:00am-4:00pm Monday to Friday. (Where compelling safety reasons exist, the Authority may permit a blast to occur outside the abovementioned hours. Prior written (or facsimile) notification of any such blast must be made to the Authority).

L4.8 Blasting at the premises is limited to:

a) A maximum of two (2) blasts per day;
b) Five (5) blasts a week, averaged over a twelve month period;

on each day on which blasting is permitted.

4 Operating Conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.
This includes:
a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

O2 Maintenance of plant and equipment

O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:

a) must be maintained in a proper and efficient condition; and
b) must be operated in a proper and efficient manner.

O3 Dust

O3.1 All operations and activities occurring at the premises must be carried out in a manner that will minimise the emission of dust from the premises.

5 Monitoring and Recording Conditions

M1 Monitoring records

M1.1 The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.

M1.2 All records required to be kept by this licence must be:
a) in a legible form, or in a form that can readily be reduced to a legible form;
b) kept for at least 4 years after the monitoring or event to which they relate took place; and
c) produced in a legible form to any authorised officer of the EPA who asks to see them.

M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence:
a) the date(s) on which the sample was taken;
b) the time(s) at which the sample was collected;
c) the point at which the sample was taken; and
d) the name of the person who collected the sample.

M2 Requirement to monitor concentration of pollutants discharged

M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:

M2.2 Air Monitoring Requirements

POINT 3

Pollutant	Units of measure	Frequency	Sampling Method
Particulates - Deposited Matter	grams per square metre per month	Once a month (min. of 4 weeks)	AM-19

M2.3 Water and/ or Land Monitoring Requirements

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POINT 12,13,11,18

Pollutant	Units of measure	Frequency	Sampling Method
Conductivity	microsiemens per centimetre	Special Frequency 1	In situ
Oil and Grease	milligrams per litre	Special Frequency 1	Grab sample
pH	pH	Special Frequency 1	In situ
Total organic carbon	milligrams per litre	Special Frequency 1	Grab sample
Total suspended solids	milligrams per litre	Special Frequency 1	Grab sample

POINT 14,17,16,15,19,20,21,22

Pollutant	Units of measure	Frequency	Sampling Method
Conductivity	microsiemens per centimetre	Special Frequency 2	In situ
Oil and Grease	milligrams per litre	Special Frequency 2	Grab sample
pH	pH	Special Frequency 2	In situ
Total organic carbon	milligrams per litre	Special Frequency 2	Grab sample
Total suspended solids	milligrams per litre	Special Frequency 2	Grab sample

M2.4 For the purposes of the table(s) above Special Frequency 1 means the collection of samples as soon as practicable after each discharge commences and in any case not more than 12 hours after each discharge commences.

M2.5 For the purposes of the table(s) above Special Frequency 2 means the collection of samples quarterly (in the event of flow during the quarter) at a time when there is flow and as soon as practicable after each wet weather discharge from points 11, 12, 13 or 18 commences and in any case not more than 12 hours after each discharge commences.

M2.6 Note: Groundwater monitoring has not been formally included in the licence. However, the licensee is required to undertake groundwater monitoring in accordance with the Department of Planning and Infrasturcture approved "Stage 2 Water Management Plan" required under Schedule 4, condition 18 of the Project Approval (08_0144) for the Stage 2 project. The results of this monitoring are required to be reported in the Annual Environmental Management Report (AEMR).

M3 Testing methods - concentration limits

M3.1 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:
a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or
b) if no such requirement is imposed by or under the Act, any methodology which a condition

of this licence requires to be used for that testing; or
c) if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.

M3.2 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.

Note: The *Protection of the Environment Operations (Clean Air) Regulation 2010* requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".

M3.3 *Clause 18 (1), (1A) and (2) of the Protection of the Environment Operations (General) Regulation 2009* requires that monitoring of actual loads of assessable pollutants listed in L2.2 must be carried out in accordance with the testing method set out in the relevant load calculation protocol for the fee-based activity classification listed in condition A1.1.

M3.4 Noise Monitoring

For each monitoring points specified below, the Licensee must monitor the noise parameter specified in Column 1. The Licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.

POINTS: N1, N3, N5, N6, N7, and N8

Parameter	Units of measure	Frequency	Sampling Method
Ambient Noise	LAeq (15 minute) LAmax LA1 LA10 LA90 LAmin	Quarterly frequency of monitoring as detailed in the most recently approved “Noise Management Plan" for the premises.	As detailed in the most recently approved “Noise Management Plan" for the premises.

M3.5 POINT: N10

Parameter	Units of Measure	Frequency	Sampling Method
Ambient noise	LAeq (15 minute) LAmax LA1 LA10 LA90 LAmin	Continuous real time noise monitoring as detailed in the most recently approved “Noise Management Plan" for the premises.	As detailed in the most recently approved “Noise Management Plan" for the premises.

M3.6 For the purpose of this condition, the noise monitoring locations are described as:

EPA Identification No.	Description of Location

N1	Within 30m of the residence on property “Bow Hills”
N3	Within 30m of the residence on property “Naroo”
N5	Within 30m of the residence on property “Oakleigh”
N6	Within 30m of the residence on property “Newhaven”
N7	Within 30m of the residence on property “Belah Park”
N8	Within 30m of the residence on property “Haylin View”
N10	Portable monitor

M3.7 Note: Monitoring at N8 to commence when surface activities approach the eastern end of the southern longwall panels.

M3.8 Note: N10 is a potable monitor enabling the monitor to be relocated to areas of potential greatest impact. The licensee is responsible to ensure that it is located at the most suitable location.

M4 Weather monitoring

M4.1 Requirement to monitor weather

For each monitoring point specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the parameter specified in Column 1. The licensee must use the sampling method, units of measure, averaging period and sample at the frequency, specified opposite in the other columns:

POINT W1

Parameter	Units of Measure	Frequency	Averaging Period	Sampling Method
Rainfall	mm	Continuous	1 hour	AM-4
Wind speed @ 10 metres	m/s	Continuous	15 minute	AM-2 & AM-4
Wind direction @ 10 metres	°	Continuous	15 minute	AM-2 & AM-4
Temperature @ 2 metres	°C	Continuous	15 minute	AM-4
Temperature @ 10 metres	°C	Continuous	15 minute	AM-4
Sigma theta @ 10 metres	°	Continuous	15 minute	AM-2 & AM-4
Solar radiation	W/m2	Continuous	15 minute	AM-4
Additional requirements - siting - measurement				AM-1 & AM-4 AM-2 & AM-4

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M5 Recording of pollution complaints

M5.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.

M5.2 The record must include details of the following:
a) the date and time of the complaint;
b) the method by which the complaint was made;
c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
d) the nature of the complaint;
e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
f) if no action was taken by the licensee, the reasons why no action was taken.

M5.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M5.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M6 Telephone complaints line

M6.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

M6.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

M6.3 The preceding two conditions do not apply until 3 months after:
a) the date of the issue of this licence or
b) if this licence is a replacement licence within the meaning of the Protection of the Environment Operations (Savings and Transitional) Regulation 1998, the date on which a copy of the licence was served on the licensee under clause 10 of that regulation.

M7 Other monitoring and recording conditions

M7.1 To assess compliance with the noise limits presented in the Noise Limits table, attended noise monitoring must be undertaken in accordance with the condition titled Determining Compliance, outlined above, and:
a) at each one of the locations listed in the Noise Limits table;
b) occur quarterly in a reporting period;
c) occur during each day, evening and night period as defined in the NSW Industrial Noise Policy for a minimum of:
i) 1.5 hours during the day;
ii) 30 minutes during the evening; and

iii) 1 hour during the night.
d) occur for three consecutive operating days.

6 Reporting Conditions

R1 Annual return documents

R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:
a) a Statement of Compliance; and
b) a Monitoring and Complaints Summary.
At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.

R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

R1.3 Where this licence is transferred from the licensee to a new licensee:
a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:
a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

R1.5 The Annual Return for the reporting period must be supplied to the EPA by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

R1.6 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.

R1.7 Within the Annual Return, the Statement of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:
a) the licence holder; or
b) by a person approved in writing by the EPA to sign on behalf of the licence holder.

R1.8 A person who has been given written approval to certify a certificate of compliance under a licence issued under the Pollution Control Act 1970 is taken to be approved for the purpose of this condition until the date of first review of this licence.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R2 Notification of environmental harm

R2.1 Notifications must be made by telephoning the Environment Line service on 131 555.

R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.

R3 Written report

R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:
a) where this licence applies to premises, an event has occurred at the premises; or
b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,
and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.

R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.

R3.3 The request may require a report which includes any or all of the following information:
a) the cause, time and duration of the event;
b) the type, volume and concentration of every pollutant discharged as a result of the event;
c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
g) any other relevant matters.

R3.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

R4 Other reporting conditions

R4.1 A noise compliance assessment report must be submitted to the EPA within thirty (30) days of the completion of the quarterly noise monitoring. The assessment must be prepared by a suitably qualified and experienced acoustical consultant and include:
a) an assessment of compliance with noise limits detailed in the limit conditions of this licence; and
b) an outline of any management actions taken within the monitoring period to address any exceedences of the limits detailed in the limit conditions of this licence.

7 General Conditions

G1 Copy of licence kept at the premises or plant

G1.1 A copy of this licence must be kept at the premises to which the licence applies.

G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.

G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

8 Pollution Studies and Reduction Programs

U1 Coal Mine Particulate Matter Control Best Practice

U1.1 The Licensee must conduct a site specific Best Management Practice (BMP) determination to
identify the most practicable means to reduce particle emissions.

U1.2 The Licensee must prepare a report which includes, but is not necessarily limited to, the following:
- identification, quantification and justification of existing measures that are being used to minimise particle emissions;
- identification, quantification and justification of best practice measures that could be used to minimise particle emissions;
- evaluation of the practicability of implementing these best practice measures; and
- a proposed timeframe for implementing all practicable best practice measures.
In preparing the report, the Licensee must utilise the document entitled Coal Mine Particulate Matter
Control Best Practice – Site Specific Determination Guideline - November 2011.

U1.3 All cost related information is to be included as Appendix 1 of the Report required by condition
U1.2 above.

U1.4 The report required by condition U1.2 must be submitted by the Licensee to the EPA's Regional Manager, Simon Smith, at PO Box 494 Armidale NSW 2350 by 29 June 2012.

U1.5 The report required by condition U1.2 above, except for cost related information contained in Appendix 1 of the Report, must be made publicly available by the Licensee on the Licensee's website by 6 July 2012.

9 Special Conditions

E1 Quality assurance and verification report

E1.1 Prior to the commissioning of the Brine Storage Ponds (approved per Stage 2 Development Consent 08_0144), the licensee must provide the EPA Armidale office with an "as constructed" report, produced by an experienced and qualified engineer. The report must include detailed design plans for the ponds and illustrate the use of low permeability layers to manage mine waters generated by the project. The report also must include a detailed Quality Assurance/Quality Control program that was used throughout the construction of the ponds.

E2 Noise Impacts

E2.1 Noise impacts where wind speed exceeds 3 metres per second at 10 metres above the ground must be addressed by:

a) documenting noise complaints received to identify any higher level of impacts or wind patterns;

where levels of noise complaints indicated a higher level of impact then actions to quantify and ameliorate any enhanced impacts where wind speed exceeds 3 metres per second at 10 metres above the ground should be developed and implemented.

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Dictionary

General Dictionary

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991
EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 2009.
general solid waste (non-putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997

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flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
general solid waste (putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environmen t Operations Act 1997
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
licensee	Means the licence holder describe d at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 mo nths. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
restricted solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
special waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TM	Together with a number, means a test method of that number prescribed by the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.

Environment Protection Licence

Licence - 12789

TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements
utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste type	Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non-putrescible), special waste or hazardous waste

Mr Robert O'Hern

Environment Protection Authority

(By Delegation)

Date of this edition: 20-February-2008

End Notes

1	Condition A1.3 Not applicable varied by notice issued on <issue date> which came into effect on <effective date>
2	Licence varied by notice 1100826, issued on 18-Aug-2009, which came into effect on 18-Aug-2009.
3	Licence varied by notice 1126956, issued on 13-Jul-2011, which came into effect on 13-Jul-2011.
4	Licence varied by notice 1502129 issued on 20-Dec-2011
5	Licence transferred through application 1506423 approved on 29-May-2012 , which came into effect on 31-May-2012
6	Licence varied by notice 1506890 issued on 19-Jun-2012

Appendix 3

COMPLIANCE REVIEW

PA 05_0102 MOD 1 (Table A3-1)

PA 08_0144 MOD 2 (Table A3-2)

EPL 12789 (Table A3-3)

ML 1609 (Table A3-4)

TABLE A3-1

PROJECT APPROVAL 05_0102 MOD 1

Condition	PA 05_0102 MOD 1 – Conditional Requirement	Compliance	Comments
Schedule 2: Administrative Conditions			
1.	The Applicant shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the project.	Yes	As per condition.
2.	The Applicant shall carry out the development generally in accordance with the: (a) EA; (b) statement of Commitments (see Appendix 3); (c) modification application 05_0102 MOD 1, supporting Environmental Assessment title "Narrabri Coal Mine – Section 75W Modification", dated October 2009 and Proponent's Response to Submissions dated 10 February 2010; and (d) conditions of this approval.	Yes	The activities on site were generally being undertaken in accordance with the nominated documents.
3.	If there is any inconsistency between the above documents, that later document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.	Yes	As per condition.
4.	The proponent shall comply with any reasonable and feasible requirements of the Director General arising from the Department's assessment of: (a) any reports, plans, programs, strategies or correspondence that are submitted in accordance with the conditions of this approval; and (b) the implementation of any actions or measures contained in these reports, plans, programs strategies or correspondence.	Yes	All requests complied with.
5.	Mining Operations may take place on the site for 21 years from the grant of the mining lease for the project.	Yes	Mining Lease granted in January 2008.
6.	The proponent shall not extract more than 2.5 million tonnes of ROM coal a year from the site.	Yes	2,986,527t coal produced during reporting period, refer to Table A3-2.

Condition	PA 05_0102 MOD 1 – Conditional Requirement	Compliance	Comments
7.	The proponent shall transport all coal from the site by rail.	Yes	Refer to Table A3-2 in relation to one off transport by road.
8.	With the approval of the Director General, the Proponent may submit any management plan or monitoring program required by this approval on a progressive basis.	Yes	As per condition.
8A.	The proponent shall prepare revisions of any strategies, plans or programs required under this approval if directed to do so by the Director-General. Such revisions shall be prepared to the satisfaction of, and within a timeframe approved by, the Director- General.	Yes	As per condition.
9.	The proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures are constructed in accordance with relevant requirements of the BCA.	Yes	All buildings on site constructed in accordance with Council certification.
10.	The proponent shall ensure that all demolition work is carried out in accordance with *Australian Standards AS 2601-2001: The Demolition of Structures*, or its latest version.	N/A	No demolition works required.
11.	The proponent shall ensure that all plant and equipment used on site is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	Yes	All equipment used subject to 'Introduction to Site' inspections and also daily pre-start checks.
12.	Within 12 months of this approval, the Proponent shall enter into a planning agreement with Narrabri Shire Council, Gunnedah Shire Council and the Minister in accordance with: (a) Division 6 of Part 4 of the EP&A Act; and (b) the terms of the Proponents offer to the Minister on 7 September 2007, which includes the matters set out in Appendix 4.	Yes	As per condition.
Schedule 3: Specific Environmental Conditions			

Condition	PA 05_0102 MOD 1 – Conditional Requirement	Compliance	Comments
1.	Within 5 years of the date of this approval, the proponent shall ensure that any loss of water flow into the Great Artesian Basin aquifers (equal to the maximum predicted impact, or the measured impact of the project, whichever is the greater), is managed, licensed or offset to the satisfaction of the NOW.	N/A	Not yet triggered
2.	Within 12 months of the commencement of mining operations, the Proponent shall undertake a transient calibration of the groundwater model presented in the EA, in consultation with NOW and DECCW, and to the satisfaction of the Director-General.	No	Mining commenced end June 2010. Refer to PA 08_0144 MOD 2, Schedule 4, Condition 9, in relation to calibration required within 24 months of commencement of longwall mining.
3.	Following the completion of the transient calibration of the groundwater model……	N/A	Calibration not yet required.
4.	The proponent must commence construction of the water conditioning plant identified in condition 10(d) when daily mine dewatering volumes exceed 0.88 megalitres, or an alternative trigger point based on review of the water balance and model and established in consultation with NOW and DECCW, and approved by the Director General.	Yes	Not triggered by dewatering rate, however, Water Conditioning Plant constructed and commissioned as main water supply for operations.
5.	Except as may be expressly provided for by an EPL, the Proponent shall not discharge any surface waters from the site. However, product water from the water conditioning plant may be transferred to water users in accordance with an approved Water Management Plan.	No	Refer to Section 3.3 of AEMR/Annual Review. No transfer of water to date to other water users.
6.	The Proponent shall: (a) construct evaporation/storage ponds incorporating the use of low permeability layers to manage minewater generated by the project. (b)prior to commencement of construction, submit pond designs and a construction QA/QC program to DECCW; and (c)prior to commissioning the ponds, submit an "as constructed" report, produced by an experienced and qualified engineer, to DECCW; to the satisfaction of the Director General.	Yes Yes No	Ponds constructed to design criteria as approved by DECCW. "As Constructed" report provided on 5th September 2011.

Condition	PA 05_0102 MOD 1 – Conditional Requirement	Compliance	Comments
7.	The proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Director General. This plan must be submitted to the Director General for approval prior to the commencement of construction activities (not including the construction of the Kamilaroi Highway intersection) in consultation with DECCW and NOW by suitably qualified expert/s whose appointments have been approved by the Director General and include a: (a)site water balance; (b)Erosion and Sediment Control Plan (c)Surface Water Monitoring Program; and (d)Surface and Groundwater Response Plan, setting out procedures for:……	Yes	The Site Water Management Plan (SWMP) for the operational phase was submitted to DECCW, DoP and NOW on the 17th March 2010 and was approved by DoP on the 13th July 2010.
8.	The Site Water Balance must….	Yes	As per condition.
9.	The Erosion and Sediment Control Plan must….	Yes	As per condition.
10.	The Surface Water Monitoring Plan must….	Yes	As per condition.
11.	The Groundwater monitoring program must……..	Yes	As per condition.
12.	The proponent shall ensure that the noise generated by the project does not exceed the levels set out in Table 1 at any privately owned residence.	Yes	No noise exceedances recorded during the reporting period.
12A.	If the noise generated by the project exceeds the criteria in Table 1A at any residence on privately-owned land, or on more than 25% of any privately-owned land, then the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 5-7 of schedule 3A.	N/A	No exceedances during reporting period and no requests from landowners.
12B.	If the noise generated by the project is equal to or exceeds the criteria in Table 1B at any residence on privately-owned land, then the Proponent shall, upon receiving a written request from the landowner, implement reasonable and feasible noise mitigation measures (such as double glazing, insulation, and/or air conditioning) at the residence in consultation with the landowner…..	N/A	No exceedances during reporting period and no requests from landowners.

Condition	PA 05_0102 MOD 1 – Conditional Requirement	Compliance	Comments
13.	The Proponent shall: (a)implement all reasonable and feasible best practice noise mitigation measures; (b)investigate ways to reduce the noise generated by the project, including off-site road and rail noise and maximum noise levels which may result in sleep disturbance; and (c)report on these investigations and the implementation and effectiveness of these measures in the AEMR; to the satisfaction of the Director General.	Yes	Access road sealed. Rail loop and loading point cut below surface level to assist noise reduction. Real time noise monitoring and inversion monitoring included in updated Noise Management Plan. See Section 3.10 for noise discussions.
13A.	The Proponent shall prepare and implement a Noise Management Plan for the mine's activities to the satisfaction of the Director-General. This Plan shall: (a) be prepared in consultation with DECCW by a suitably qualified expert whose appointment has been approved by the DG; (b)be submitted to the DG for approval by 31 May 2010; (c)include a Noise Monitoring Program incorporating real-time noise and temperature inversion monitoring; and (d)include reactive noise control measures to manage noise impacts for sensitive receivers.	Yes	Issued to DoP 28th May 2010.
14.	The Proponent shall prepare and implement a Noise Monitoring Program for the project to the satisfaction of the Director-General. This program must: (a)be submitted to the Director-General for approval prior to the commencement of construction activities; (b)be prepared in consultation with the DECCW; (c)use attended noise monitoring measures to monitor the performance of the project; (d)include a protocol to establish whether the project is complying with the noise impact assessment criteria in Table 1.	Yes	Noise monitoring program conducted in accordance with the Noise Monitoring Program approved by DG on 15th January 2008.
15.	The proponent shall ensure that the airblast overpressure level from blasting at the project does not exceed the criteria in Table 2 at any residence on privately owned land.	N/A	No surface or near surface blasting during the reporting period.

Condition	PA 05_0102 MOD 1 – Conditional Requirement	Compliance	Comments
16.	The proponent shall ensure that the ground vibration level from blasting, or any other activity at the project does not exceed the criteria in Table 3 at any residence on privately owned land.	N/A	No surface or near surface blasting during the reporting period.
17.	The proponent shall only carry out blasting associated with construction activities on site between 10am and 4pm Monday to Friday.	N/A	No surface or near surface blasting during the reporting period.
18.	The proponent may carry out: (a)a maximum of 2 blasts a day associated with construction activities; and (b)5 blasts a week associated with construction activities, average over a 12 month period; on site without the written approval of the Director General.	N/A	No surface or near surface blasting during the reporting period.
19.	Before carrying out any blasting, the Proponent shall advise all landowners within 2km of proposed blasting activities, and any other landowner nominated by the Director-General, that they are entitled to a property inspection.	N/A	No surface or near surface blasting during the reporting period.
20.	If the proponent receives a written request for a property inspection from any landowner with 2km of proposed blasting activities, or any other landowner nominated by the Director General, the proponent shall within 3 months of receiving this request: (a)commission a suitably qualified person, whose appointment has been approved by the Director General, to inspect the condition of any building or structure on the land, and recommend measures to mitigate any potential blasting impacts; and (b)give the landowner a copy of this property inspection report.	N/A	No surface or near surface blasting during the reporting period..
21.	If any landowner within 2km of proposed blasting activities or any other landowner as nominated by the Director General claims that his/her property, including vibration sensitive infrastructure……..	N/A	No surface or near surface blasting during the reporting period.
22.	Prior to the commencement of blasting, the proponent shall prepare and implement a detailed Blasting Monitoring Program for the project to the satisfaction of the Director General.	N/A	No surface or near surface blasting during the reporting period.

Condition	PA 05_0102 MOD 1 – Conditional Requirement	Compliance	Comments
23.	The proponent shall ensure that dust emissions generated by the project does not cause additional exceedances of the criteria listed in Tables 4 to 6 at any residence on privately owned land, or on more than 25% of privately owned land.	Yes	No exceedances during the reporting period, refer to AEMR/Annual Review Section 3.1.3 for details.
24.	The proponent shall prepare and implement an Air Quality Monitoring Program for the project to the satisfaction of the Director General. This program must: (a)be submitted to the Director-General prior to the commencement of construction activities; (b)be prepared in consultation with the DECCW; and (c)use a combination of high volume air samplers and dust deposition gauges to monitor the performance of the project.	Yes	Air Quality Monitoring program in place and approved by the DG on 15th January 2008.
25.	During the project, the Proponent shall ensure there is a suitable meteorological station on site that complies with the requirements in *Approved Methods for Sampling of Air Pollutants in New South Wales (DECCW, 2007)*, or its latest version.	Yes	As per condition.
26.	The proponent shall ensure that the project does not result in subsidence impacts of greater than 20mm vertical subsidence on any land.	Yes	No subsidence impacts to date from first workings.
27.	Six months prior to mining occurring under each privately owned property, the proponent shall notify the relevant landowners of the extent of planned mining operations under their property.	Yes	No mining under privately owned property at this stage.
28.	The Proponent shall rehabilitate the site to the satisfaction of the Director General.	Yes	As per condition.
29.	The proponent shall prepare and implement a detailed Landscape Management Plan for the site to the satisfaction of the Director-General and I&I NSW. This plan must: (a)be submitted to the Director-General for approval within 12 months of this approval; (b)be prepared by suitably qualified expert/s whose appointment have been endorsed by the Director General; (c)be prepared in consultation with NOW, DECCW and NSC; and (d)include a Rehabilitation Management Plan and Mine Closure Plan.	No	Landscape Management Plan approved in March 2010.

Condition	PA 05_0102 MOD 1 – Conditional Requirement	Compliance	Comments
30.	The Rehabilitation Management Plan must……..	No	See response to 29 above.
31.	The mine closure plan must…….	No	See response to 29 above.
32.	The proponent shall not destroy any known Aboriginal objects (as defined in the NPWA 1974) without the written approval of the Director General.	Yes	No known objects destroyed.
32A.	The proponent shall protect all known Aboriginal sites by fencing or signage prior to commencing surface disturbance activities within 50m.	Yes	As per condition.
33.	The proponent shall prepare and implement an Aboriginal Cultural Heritage Management Plan to the satisfaction of the Director General. This plan must: (a)be submitted to the Director General prior to the commencement of construction activities; (b)be prepared in consultation with DECCW and the Narrabri Local Aboriginal Land Council; (c)include a protocol for the ongoing consultation and involvement of Aboriginal communities in the conservation and management of Aboriginal heritage on site; (d)describe the measures that would be implemented to protect Aboriginal sites on site, or if any new Aboriginal objects or skeletal remains are discovered during the project.	Yes	ACHMP prepared and implemented, approved by DG on 4th February 2008.
34.	The Proponent shall construct the Kamilaroi Highway intersection in consultation with NSC and to the satisfaction of RTA. This intersection must: (a)be completed, other than for items listed in (c) below, prior to the commencement of construction activities on site; (b)be constructed in accordance with a Traffic Management Plan approved by NSC and RTA; (c)include boom gates, flashing lights and warning bells for the Kurrajong Creek Road level crossing, to the satisfaction of ARTC and NSC; (d)include illumination of the Kurrajong Creek Road level crossing during construction of the intersection; (e)provide an information sign on Kurrajong Creek Road to inform road users of likely delays due to train traffic; and (f)maintain permanent access for the “Bow Hills” quarry.	Yes	As per condition.

Condition	PA 05_0102 MOD 1 – Conditional Requirement	Compliance	Comments
35.	Within 12 months of commencement of mining operations, the proponent shall bitumen seal Kurrajong Creek Road for a distance of 7km south of the Kamilaroi Highway intersection, to the satisfaction of the NSC.	Yes	Kurrajong Creek Road sealed.
36.	The proponent shall minimise the visual impacts of the project to the satisfaction of the Director-General.	Yes	Disturbed areas managed to reduce visual impact with completed areas rehabilitated to extent practicable.
37.	The proponent shall ensure that: (a)no outdoor lights shine above the horizontal; and (b)all external lighting associated with the project complies with *Australian Standard AS4282(INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting.*	Yes	Lighting maintained in accordance with these provisions.
38.	The proponent shall prepare and implement an Energy Savings Action Plan for the project to the satisfaction of the Director General. This plan must: (a)be prepared in consultation with DECCW; (b)be prepared in accordance with the *Guidelines for Energy Savings Action Plans (DEUS, 2005)*, or its latest version; (c)be submitted to the Director-General for approval within 3 months of this approval; and (d)include a program to monitor the effectiveness of measures to reduce energy on site.	No	Energy Savings Action Plan developed and approved by DG on 13th October 2008.
39.	The proponent shall implement all reasonable and feasible measures to minimise the greenhouse gas emissions from the underground mining operations to the satisfaction of the Director General.	Yes	Gas drainage measures being thoroughly investigated to determine most feasible method to reduce impact. Composition of gas significantly minimises options.

Condition	PA 05_0102 MOD 1 – Conditional Requirement	Compliance	Comments
40.	Prior to carrying out underground coal mining operations, the Proponent shall submit a Greenhouse Gas Minimisation Plan to the Director General. This plan must: (a)identify options for minimizing greenhouse gas emissions from underground mining operations, with a particular focus on capturing and/or using these emissions; (b)investigate the feasibility of implementing each option; (c)propose the measures that would be implemented in the short to medium term on site; and (d)include a research program to inform the continuous improvement of the greenhouse gas minimization measures on site.	No	A draft Greenhouse Gas Minimisation Plan was prepared by Heggies Pty Ltd and submitted to DoP on 24/11/09. Subsequent verbal discussions with the DoP identified that the supplied plan was inadequate in meeting the requirements of the condition. It was agreed that a revised plan would issue in conjunction with the Stage 2 Project Approval requirements.
41.	The proponent shall prepare and implement a Waste Management Plan for the project to the satisfaction of the Director-General. This plan must: (a)be submitted to the Director General for approval prior to commencing construction; (b)identify the various waste streams for the project; (c)describe what measures would be implemented to reuse, recycle or minimize the waste generated by the project; (d)ensure irrigation of treated wastewater is undertaken in accordance with *Environmental Guidelines: Use of Effluent by Irrigation (DEC, 2004)*, or its latest version; and (e)include a program to monitor the effectiveness of these measures,	Yes	Waste Management Plan approved by DG on 15th January 2008.
Schedule 3A: Additional Procedures			
1.	If the results of the monitoring required in schedule 3 identify that impacts generated by the project are greater than the relevant impact assessment criteria, except where a negotiated agreement has been entered into in relation to that impact then the Proponent shall, within 2 weeks of obtaining the monitoring results, notify the DG, the affected landowners and tenants (including tenants in mine-owned properties) accordingly, and provide quarterly monitoring results to each of these parties until the results show that the project in complying with the criteria in schedule 3.	Yes	No exceedances occurred during the reporting period, refer to Section 3.1.3 of the 2012/2013 AEMR/Annual Review.

Condition	PA 05_0102 MOD 1 – Conditional Requirement	Compliance	Comments
2.	If the results of monitoring required in Schedule 3 identify that the impacts generated by the project are greater than the relevant air quality impact assessment criteria in schedule 3, then the Proponent shall send the relevant landowners and tenants (including tenants of mine-owned properties) a copy of the NSW Health fact sheet "Mine Dust and You" (and associated updates) in conjunction with the notification required in condition 1.	Yes	No exceedances occurred during the reporting period, refer to Section 3.1.3 of the 2012/2013 AEMR/Annual Review.
3.	If a landowner considers the project to be exceeding the impact assessment criteria in schedule 3, then he/she may ask the DG in writing for an independent review of the impacts of the project on his/her land. (see consent for independent review process).	N/A	No requests during reporting period.
4.	If the independent review determines that the project is complying….. then the Proponent may discontinue the independent review with the approval of the DG. If the independent review determines that the project is not complying…. (see consent for further details).	N/A	No requests during reporting period.
5.	Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent shall make a binding written offer to the landowner based on:……..	N/A	No requests during reporting period.
6.	The Proponent shall pay all reasonable costs associated with the land acquisition process described in condition 5 above.	N/A	No requests during reporting period.
7.	If the Proponent and landowner agree that only part of the land shall be acquired, then the Proponent shall also pay all reasonable costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of the plan at the Office of the Registrar-General.	N/A	No requests during reporting period.
Schedule 4: Environmental Management, Monitoring, Auditing and Reporting			
1.	The proponent shall prepare and implement and Environmental Management Strategy for the project to the satisfaction of the Director General. This strategy must be submitted to the Director General prior to the commencement of construction activities and……	Yes	Environmental Management Strategy approved by DG on 15th January 2008.

Condition	PA 05_0102 MOD 1 – Conditional Requirement	Compliance	Comments
2.	The proponent shall prepare and implement an Environmental Monitoring Program for the project to the satisfaction of the Director General. This program must be submitted to the Director General within 6 months of this approval and consolidate the various monitoring requirements in Schedule 3 of this approval into a single document.	No	To be submitted as part of Stage 2 consent requirements.
3.	As soon as practicable, and in any event within 24 hours of detecting an exceedance of the limits/performance criteria in the approval, or the occurrence of an incident that causes (or may cause) material harm to the environment, the proponent shall notify the Department and other relevant agencies of the exceedance/incident.	Yes	As per condition.
4.	Within 6 days of notifying the Department and other relevant agencies….	Yes	As per condition.
5.	Within 12 months of this approval, and annually thereafter, the proponent shall submit an AEMR to the Director General and to all relevant agencies. This report must: (a)identify the standards and performance measures that apply to the project; (b)describe works carried out in last 12 months; (c)describe the works that would be carried out in the next 12 months; (d)include a summary of complaints received during the past year, and compare this to complaints from 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 EA; (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.	Yes	As per condition.

Condition	PA 05_0102 MOD 1 – Conditional Requirement	Compliance	Comments
6.	Within 2 years of this approval, and every 3 years thereafter, unless the Director General directs otherwise, the proponent shall commission and pay the full cost of an Independent Environmental Audit of the project	Yes	Narrabri Mine requested in early February 2010 that the independent audit be postponed until 12 months after the commencement of mining (i.e. audit due in June 2011). Audit undertaken by Umwelt Australia and reported during April 2011. Next Audit planned for 2013 in accordance with original timeframes.
7.	Within 6 weeks of completing this audit….	Yes	As per condition.
8.	Within 3 months of submitting the audit….	Yes	As per condition.
9.	Within 3 months of this approval, the Proponent shall establish a Community Consultative Committee (CCC) for the project to the satisfaction of the Director-General, in general accordance with the *Guideline for Establishing and Operating Community Consultative Committees for Mining Projects (Department of Planning, 2007)* or its latest version.	Yes	CCC established and operating as per guidelines.
10.	Within 3 months of the approval of any strategy/plan/program required under this approval, or the completion of audits or AEMR's required under this approval, the Proponent shall: (a)provide a copy of the relevant documents to the relevant agencies and CCC; and (b)put a copy of the relevant documents on its website.	Yes	As per condition.
11.	During the project, the proponent shall: (a)make a summary of monitoring results required under this approval publicly available at the mine and on its website; and (b)update these results on a regular basis (at least every three months)	Yes	As per condition.

TABLE A3-2

Compliance Review – Project Approval 08_0144 MOD 2

Condition	PA 08_0144 MOD 2 – Conditional Requirement	Compliance	Comments
Schedule 2: Administrative Conditions			
1	The Proponent shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation, or rehabilitation of the project.	Yes	As per condition.
2	The Proponent shall carry out the project generally in accordance with the: (a) EA; (b) statement of commitments (see Appendix 3); (c) the modification application 08_0144 MOD 1 and accompanying letter prepared by Narrabri Coal Operations Pty Ltd; (d) the modification application 08_01 44 MOD 2 and accompanying letter dated 12 December 2011, prepared by Whitehaven Coal Mining Limited; and (e) conditions of this approval.	Yes	As per condition.
3	If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.	Yes	As per condition.
4	The Proponent shall comply with any reasonable and feasible requirements of the Director-General arising from the Department's assessment of: (a) any reports, plans, programs, strategies or correspondence that are submitted in accordance with the conditions of this approval; and (b) the implementation of any actions or measures outlined in these reports, plans, programs, strategies or correspondence.	Yes	As per condition.
5	The Proponent may undertake mining operations on the site for 21 years from the date of this approval.	Yes	As per condition.
6	The Proponent shall not extract more than 8.0 million tonnes of ROM coal from the site per calendar year.	Yes	Coal extracted for the reporting period was 2,986,527t.
7	The Proponent shall transport all coal from the site by rail.	No	On December 11 and 12 2012 Narrabri Mine undertook a trial of transporting coal to Whitehaven's CHPP in Gunnedah. This

Condition	PA 08_0144 MOD 2 – Conditional Requirement	Compliance	Comments
			was done in response to a train derailment during late November 2012 and while awaiting the determination on a modification to the Project Approval to allow emergency trucking during service interruptions. The trial was stopped after 1½ days due to safety concerns and as directed by the Department of Planning and Infrastructure. A letter, dated 17 January 2013, was issued by the Department outlining the exceptional circumstances leading to the trial but highlighted the trucking was in breach of the Project Approval. No further action was taken by the Department. Narrabri Mine withdrew the modification application on 12 February 2013.
7A	The Proponent may undertake a one off transport of coal by road of an approximate 600 tonne bulk sample of coal in accordance with the procedures, vehicle traffic route and transport operating hours as specified in the modification application 08_0144 MOD 2 and accompanying letter dated 12 December 2011 from Whitehaven Coal Mining Limited.	Yes	As per condition.
8	The Proponent shall not transport any coal reject from the site.	Yes	As per condition.
9	Within 6 months of this approval, the Proponent shall enter into planning agreements with Narrabri Shire Council (NSC), Gunnedah Shire Council (GSC) and the Minister in accordance with….	Yes	As per condition.
10	Within 12 months of the date of this approval, the Proponent shall surrender its previous project approval for the Narrabri Coal Mine to the satisfaction of the Director-General, in accordance with section 75YA of the EP&A Act. Prior to the surrender of the Stage 1 approval, if there is any inconsistency between the Stage 1 and Stage 2 approvals, the conditions of the Stage 2 approval shall prevail to the extent of any inconsistency.	Yes	Narrabri Mine submitted a letter requesting the surrender of the Stage 1 consent within the required timeframe, however no response was received from the Department of Planning and Infrastructure during the reporting period.
11	With the approval of the Director-General, the Proponent may submit any management plan or monitoring program required by this approval on a progressive basis.	Yes	As per condition.
12	Stage 1 strategies, plans or programs continue to have effect until replaced by an equivalent approved strategy, plan or program prepared and approved under this approval.	Yes	As per condition.

Condition	PA 08_0144 MOD 2 – Conditional Requirement	Compliance	Comments
13	The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.	Yes	As per condition.
14	The Proponent shall ensure that all demolition work is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures*, or its latest version.	N/A	No demolition works required.
15	The Proponent shall ensure that all plant and equipment used on site is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	Yes	As per condition.
Schedule 3: Specific Environmental Conditions - Mining Area			
1	The Proponent shall ensure that mine subsidence does not cause any exceedances of the performance measures in Table 1, in relation to the Great Artesian Basin and Flora and Fauna.	Yes	As per condition.
2	The Proponent shall ensure that the project does not cause any exceedances of the performance measures in Table 2, to the satisfaction of the Director-General of I&I NSW.	Yes	As per condition.
3	Any dispute between the Proponent and the owner of any built feature over the interpretation, application or implementation of the performance measures is to be settled by the Director-General of I&I NSW.	Yes	As per condition.
4	The Proponent shall prepare and implement Extraction Plans for any second workings to the satisfaction of the Director-General. Each Extraction Plan must….	Yes	As per condition. Extraction Plan for longwall panels 101 to 105 approved by DP&I on 27 March 2012 and DRE on 5 June 2012.
5	The Proponent shall ensure the management plans required by condition 4(h) include….	Yes	As per condition.
6	The Proponent may carry out first workings within the underground mining area, other than in accordance with an approved extraction plan, provided that I&I NSW is satisfied that the workings are designed to remain stable and non-subsiding in the long-term	Yes	As per condition.
7	The Proponent shall pay all reasonable cost incurred by the Department to engage independent experts to review the adequacy of any aspect of the Extraction Plan.	Yes	As per condition.
Schedule 4: Specific Environmental Conditions - Surface Facilities Area and General			

Condition	PA 08_0144 MOD 2 – Conditional Requirement	Compliance	Comments
1	The Proponent shall ensure that the noise generated by the project does not exceed the levels set out in Table 1 at any privately-owned residence.	Yes	As per condition.
2	If the noise generated by the project exceeds the criteria in Table 2 at any residence on privately-owned land, or on more than 25% of any privately-owned land, then the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 5-7 of schedule 7.	N/A	No written requests received.
3	If the noise generated by the project is equal to or exceeds the criteria in Table 3 at any residence on privately-owned land, then the Proponent shall, upon receiving a written request from the landowner, implement reasonable and feasible noise mitigation measures (such as double-glazing, insulation, and/or air conditioning) at the residence in consultation with the landowner.....	Yes	No written requests received.
4	The Proponent shall revise the Noise Management Plan for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with noise management (Stages 1 and 2) and subsequently implement this revised version of the Noise Management Plan to the satisfaction of the Director-General. This Plan shall: (a) be prepared in consultation with DECCW by a suitably qualified expert whose appointment has been approved by the Director-General; (b) be submitted to the Director-General for approval by 30 June 2011; (c) include a Noise Monitoring Program incorporating: - real-time noise and temperature inversion monitoring; and - attended noise monitoring to monitor the performance of the project; (d) include reactive noise control measures to manage noise impacts for sensitive receivers; and (e) include a protocol to establish whether the project is complying with the noise impact assessment criteria in Table 1.	Yes	The revised Noise Management Plan was submitted to the Department on 24 June 2011 and approved on 6 December 2011.

Condition	PA 08_0144 MOD 2 – Conditional Requirement	Compliance	Comments
5	The Proponent shall: (a) implement all reasonable and feasible best practice noise mitigation measures; (b) investigate ways to reduce the noise generated by the project, including off-site road and rail noise and maximum noise levels which may result in sleep disturbance. (c) report on these investigations and the implementation and effectiveness of these measures in the Annual Review; to the satisfaction of the Director-General.	Yes	As per condition.
6	The Proponent shall ensure that dust emissions generated by the project do not cause additional exceedances of the criteria listed in Tables 4 to 6 at any residence on privately owned land, or on more than 25 percent of any privately-owned land.	Yes	As per condition. Refer to Section 3.1.3 of the 2012/2013 AEMR/Annual Review.
7	The Proponent shall revise the Air Quality Monitoring Program for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with air quality (Stages 1 and 2) and subsequently implement this revised version of the Air Quality Monitoring Program to the satisfaction of the Director-General. This program must: (a) be submitted to the Director-General for approval prior to 30 June 2011; (b) be prepared in consultation with DECCW; and (c) use a combination of high volume samplers and dust deposition gauges to monitor the performance of the project.	Yes	The revised Air Quality Monitoring Program was submitted to the Department on 30 June 2011 and approved on 6 December 2011.
8	During the project, the Proponent shall ensure there is a suitable meteorological station on site that complies with the requirements in *Approved Methods for Sampling of Air Pollutants in New South Wales* (DECC, 2007), or its latest version.	Yes	As per condition.
9	Within 2 years of the commencement of longwall coal extraction, and every 5 years thereafter, the Proponent shall undertake a transient calibration of the groundwater model presented in the EA, in consultation with NOW, and to the satisfaction of the Director-General.....	N/A	Not triggered
10	Except as may be expressly provided for by an EPL, the Proponent shall not discharge any waters from the disturbed areas of the site. However, raffinate from the water conditioning plant may be transferred to water users in accordance with an approved Water Management Plan (see below).	Yes	As per condition.

Condition	PA 08_0144 MOD 2 – Conditional Requirement	Compliance	Comments
11	Any raffinate from the water conditioning plant discharged to the Namoi River must be discharged in accordance with the conditions of an EPL and meet the following criteria: (a) 50 percentile of all samples (volume based) are below 250mg/l of Total Dissolved Solids; (b) 100 percentile of all samples (volume based) are below 350mg/l of Total Dissolved Solids; and (c) pH values of all sampled water to be between 6.5 and 8.5.	N/A	Not triggered.
12	Within 3 years of the date of this approval, or otherwise agreed by the Director-General, the Proponent must commission the water conditioning plant identified in the EA, to the satisfaction of the Director-General.	Yes	Water Treatment Plant commissioned during the reporting period.
13	Prior to 30 June 2011, the Proponent shall revise the Water Management Plan for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with water management (Stages 1 and 2) and subsequently implement this revised version of the Water Management Plan to the satisfaction of the Director-General. This revised plan must be produced in consultation with DECCW and NOW by suitably qualified expert/s whose appointments have been approved by the Director-General and include a: (a) Site Water Balance; (b) Erosion and Sediment Control Plan; (c) Surface Water Monitoring Plan; (d) Raffinate Discharge and Transfer Control and Monitoring Plan; (e) Groundwater Monitoring Program; and (f) Surface and Groundwater Response Plan, setting out the procedures for: - investigating, and if necessary mitigating, any exceedances of the surface or groundwater assessment criteria (see conditions 16(b) and 18(c) ; and - responding to any unforeseen impacts of the project.	Yes	The revised Water Management Plan was submitted to the Department on 30 June 2011. NOW approved the plan on 24 April 2012 and DP&I approved the plan on 5 April 2013.
14	The Site Water Balance must…..	Yes	As per condition.
15	The Erosion and Sediment Control Plan must….	Yes	As per condition.
16	The Surface Water Monitoring Plan must include….	Yes	As per condition.
17	The Raffinate Discharge Control and Monitoring Plan must….	Yes	As per condition.
18	The Groundwater Monitoring Program must include….	Yes	As per condition.

Condition	PA 08_0144 MOD 2 – Conditional Requirement	Compliance	Comments
19	The Proponent shall ensure that the integrity of the low permeability layers lining the evaporation/storage ponds is maintained and achieves a permeability of less than $1x10^{-14}$ m/s whenever these ponds are in use for the storage of saline waters and less than $1x10^{-9}$m/s when being used to store raffinate or captured surface waters.	Yes	As per condition.
20	The Proponent shall ensure that the integrity of the low permeability layers lining the brine storage ponds is maintained and achieves a permeability of less than $1x10^{-14}$ m/s whenever these storage ponds are in use.	N/A	Brine storage ponds not constructed.
21	Within 2 years of commissioning the water conditioning plant, and every 5 years thereafter, unless otherwise directed by the Director-General, the Proponent shall engage suitably qualified experts approved by the Director-General to review brine management and beneficial use options for raffinate, brine and minewater produced by the project....	N/A	Not triggered.
22	The Proponent shall not destroy damage or deface any known Aboriginal objects (as defined in the *National Parks and Wildlife Act 1974*) without the written approval of the Director-General.	Yes	As per condition.
23	The Proponent shall revise the Aboriginal Cultural Heritage Management Plan for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with Aboriginal cultural heritage management for the site (Stages 1 and 2) and subsequently implement this revised version of the Aboriginal Cultural Heritage Management Plan to the satisfaction of the Director-General. This plan must: (a) be submitted to the Director-General by 30 June 2011; (b) be prepared in consultation with the DECCW, the Narrabri Local Aboriginal Land Council and the Narrabri Goomerai Aboriginal Corporation; (c) include a protocol for the ongoing consultation and involvement of Aboriginal communities in the conservation and management of Aboriginal heritage on site; and (d) describe the measures that would be implemented to protect Aboriginal sites on the mine site, (in particular all known Aboriginal sites on lands overlying Longwalls 1-3 and sites 10b, 38, 39 and 106-112, or any new Aboriginal objects or skeletal remains that are identified during the project.	Yes	The revised Aboriginal Cultural Heritage Management Plan was submitted to the Department on 27 June 2011 and approved on 6 December 2011.

Condition	PA 08_0144 MOD 2 – Conditional Requirement	Compliance	Comments
24	Prior to undertaking any activities involving surface disturbance or vegetation removal for the lands overlying Longwalls 8-26, the Proponent shall undertake a detailed Aboriginal cultural heritage survey in consultation with the local Aboriginal community and DECCW, and to the satisfaction of the Director-General. The Director-General may approve this survey being undertaken in several stages, as mining progresses.	Yes	As per condition.
25	The Proponent shall maintain the Mine Access Road Intersection with Kurrajong Creek Road and the Kamilaroi Highway in consultation with NSC and to the satisfaction of RTA.	Yes	As per condition.
26	Prior to using Greylands and Scratch Roads to construct mine-related infrastructure, the Proponent shall enter into an agreement with NSC to: (a) construct watercourse crossings (either culverts or concrete causeways) on those sections of these roads that it uses in a manner that does not restrict fish passage, in consultation with I&I NSW (Fisheries) and to the satisfaction of NSC; and (b) fund the maintenance of those sections of these roads that it uses to an all-weather unsealed road standard.	Yes	Narrabri Mine is in negotiations with NSC to purchase a portion of Greylands Road to control access and safety. A management plan was developed to manage the subsidence impacts to Greylands Road in consultation with NSC. Scratch Road has not been utilised to date except for environmental monitoring purposes.
27	The Proponent shall contribute, on an equitable basis with other coal project rail users, to the costs of an independent Traffic Management Study analysing the impacts of increased rail traffic on road safety and congestion due to increased closure of rail level crossings within Gunnedah, prepared to the satisfaction of GSC.	Yes	As per condition.
28	The Proponent shall minimise visual impacts of the project to the satisfaction of the Director-General.	Yes	As per condition.
29	The Proponent shall ensure that:(a) no outdoor lights shine above the horizontal; and(b) all external lighting associated with the project complies with *Australian Standard AS4282 (INT) 1995 - Control of Obtrusive Effects of Outdoor Lighting*.	Yes	As per condition.

Condition	PA 08_0144 MOD 2 – Conditional Requirement	Compliance	Comments
30	The Proponent shall revise the Energy Savings Action Plan for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with energy management for the site (Stages 1 and 2) and subsequently implement this revised version of the Energy Savings Action Plan to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with DECCW; (b) be prepared in accordance with the Guidelines for Energy Savings Action Plans (DEUS, 2005), or its latest version; (c) be submitted to the Director-General for approval prior to 30 June 2011; and (d) include a program to monitor the effectiveness of measures to reduce energy use on site.	No	The revised Energy Savings Action Plan was submitted late to the Department on 11 August 2011 but was subsequently approved on 6 December 2011.
31	The Proponent shall implement all reasonable and feasible measures to minimise the greenhouse gas emissions from the underground mining operations to the satisfaction of the Director-General.	Yes	As per condition.
32	Prior to carrying out longwall coal mining operations, the Proponent shall submit a Greenhouse Gas Minimisation Plan for the approval of the Director-General. This plan must: (a) be prepared in consultation with DECCW; (b) identify options for minimising greenhouse gas emissions from underground mining operations, with a particular focus on capturing and/or using these emissions; (c) investigate the feasibility of implementing each option; (d) propose the measures that would be implemented in the short to medium term on site; and (e) include a research program to inform the continuous improvement of the greenhouse gas minimisation measures on site.	Yes	As per condition. Approved by DP&I on 12 June 2012.

Condition	PA 08_0144 MOD 2 – Conditional Requirement	Compliance	Comments
33	The Proponent shall revise the Waste Management Plan for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with waste management for the site (Stages 1 and 2) and subsequently implement this revised version of the Waste Management Plan to the satisfaction of the Director-General. This plan must be: (a) be submitted to the Director-General for approval prior to 30 June 2011; (b) identify the various waste streams of the project; (c) describe what measures would be implemented to reuse, recycle, or minimise the waste generated by the project; (d) ensure irrigation of treated wastewater is undertaken in accordance with Environmental Guidelines: Use of Effluent by Irrigation (DEC, 2004), or its latest version; and (e) include a program to monitor the effectiveness of these measures.	Yes	The revised Waste Management Plan was submitted to the Department on 27 June 2011 and was approved on 6 December 2011.
Schedule 5: Rehabilitation and Offsets			
1	The Proponent shall rehabilitate the site to the satisfaction of the Director-General and I&I NSW.	Yes	As per condition.
2	To the extent that mining operations permit, the Proponent shall carry out rehabilitation progressively, that is, as soon as reasonably practicable following the disturbance.	Yes	As per condition.
3	The Proponent shall revise the Landscape Management Plan for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with landscape management for the site (Stages 1 and 2) and subsequently implement this revised version of the Landscape Management Plan to the satisfaction of the Director-General and I&I NSW. This plan must: (a) be submitted to the Director-General for approval by 30 June 2011; (b) be prepared by suitably qualified expert/s whose appointment/s have been endorsed by the Director-General; (c) be prepared in consultation with NOW, DECCW and NSC and (d) include a:- Rehabilitation Management Plan; and- Mine Closure Plan.	Yes	The revised Landscape Management Plan, including the Rehabilitation Management Plan and Mine Closure Plan, was submitted to the Department on 27 June 2011 and was subsequently approved on 6 December 2011. A revision to the Landscape Management Plan, required by the Extraction Plan, this submitted to the Department during November 2012, re-submitted during February 2013 and was subsequently approved on 27 March 2013.
4	The Rehabilitation Management Plan must include….	Yes	Refer to 3 above.
5	The Mine Closure Plan must….	Yes	Refer to 3 above.

Condition	PA 08_0144 MOD 2 – Conditional Requirement	Compliance	Comments
6	The Proponent shall provide a suitable biodiversity offset strategy to compensate for the impacts of Stages 1 and 2 of the project. This offset strategy must: (a) be prepared in consultation with DECCW; (b) be submitted to the Director-General for approval by 31 December 2010, or as otherwise agreed by the Director-General; (c) provide a detailed assessment of offset proposal/s involving the property/ies (agreed to by DECCW) adjoining Mt Kaputar National Park to confirm the ability of either of these property/ies to meet "like for like or better' and "maintain or improve" conservation outcomes; (d) include and assess proposals to offset impacts to the Inland Grey Box EEC, *Bertya opponens*, and foraging habitat for the Superb Parrot; (e) include proposals on offsetting both direct and indirect impacts (ie. edge effects) of the project; and (f) determine the best overall combination of lands to provide a suitable offset.	No	Biodiversity Offset Strategy submitted 12th June 2012 after the Department authorised an extension.
7	The Proponent shall make suitable arrangements to provide appropriate long-term security for the offset areas by 31 December 2011, or other date agreed by the Director-General, to the satisfaction of the Director-General.	No	Once strategy has been finalised and approved arrangements will be made for long term security of the offset areas. Narrabri Mine currently has an approved extension to 31 December 2013 to finalise the security arrangements.
Schedule 6: Environmental Management, Monitoring, Auditing and Reporting			

Condition	PA 08_0144 MOD 2 – Conditional Requirement	Compliance	Comments
1	The Proponent shall revise the Environmental Management Strategy for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with environmental management for the site (Stages 1 and 2) and subsequently implement this revised version of the Environmental Management Strategy to the satisfaction of the Director-General. This strategy must: (a) be submitted to the Director-General for approval prior to 30 June 2011; (b) provide the strategic context for environmental management of the project; (c) identify the statutory requirements that apply to the project; (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project (e) describe the procedures that would be implemented to: - keep the local community and relevant agencies informed about the operation and environmental performance of the project; - receive, handle, respond to, and record complaints; - resolve any disputes that may arise during the course of the project; - respond to any non-compliance; and - respond to emergencies; and (f) include a clear plan depicting all the monitoring currently being carried out in the project area.	Yes	The revised Environmental Management Strategy was submitted to the Department on 30 June 2011 and was approved on 6 December 2011.
2	The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include…..	Yes	As per condition.
3	Within 3 months of the submission of an audit, incident report, annual review or any modification to the approval the proponent shall review, and if necessary, revise the strategies, plans, and programs required under this condition…	Yes	As per condition.
4	The Proponent shall notify the Director-General and any other relevant agencies of any incident associated with the project as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Director-General and any relevant agencies with a detailed report on the incident.	Yes	As per condition.

Condition	PA 08_0144 MOD 2 – Conditional Requirement	Compliance	Comments
5	The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval, and to the satisfaction of the Director-General.	Yes	As per condition.
6	Within 12 months of this approval, and annually thereafter, the Proponent shall review the environmental performance of the project to the satisfaction of the Director-General. This review must:	Yes	As per condition.
	(a) describe the works that were carried out in the past year, and the works that are proposed to be carried out over the next year;		
	(b) include a comprehensive review of the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against:		
	the relevant statutory requirements, limits or performance measures/criteria;		
	the monitoring results of previous years; and		
	the relevant predictions in the EA and Extraction Plan;		
	(c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;		
	(d) identify any trends in the monitoring data over the life of the project;		
	(e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and		
	(f) describe what measure will be implemented over the next year to improve the environmental performance of the project.		
7	Prior to 13 September 2010, and every 3 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project (Stages 1 and 2).	Yes	Independent Audit reported during April 2011.
8	Within 6 weeks of the completing of this audit….	No	Submitted late during July 2011.

Condition	PA 08_0144 MOD 2 – Conditional Requirement	Compliance	Comments
9	The Proponent shall maintain a Community Consultative Committee (CCC) for the project to the satisfaction of the Director-General, in general accordance with the *Guideline for Establishing and Operating Community Consultative Committees for Mining Projects (Department of Planning, 2007)*, or its latest version.	Yes	CCC established and operating as per guidelines.
10	The Proponent shall make the following information publicly available on its website:……	Yes	As per condition.
Schedule 7: Additional Procedures for Air Quality and Noise Management			
1	If the results of the monitoring required in schedule 4 identify that impacts generated by the project are greater than the relevant impact assessment criteria, except where a negotiated agreement has been entered into in relation to that impact, then the Proponent shall, within 2 weeks of obtaining the monitoring results, notify the Director-General, the affected landowners and tenants (including tenants of mine-owned properties) accordingly, and provide quarterly monitoring results to each of those parties until the results show that the project is complying with the criteria in schedule 4.	Yes	Dust impacted properties, all mined owned, have negotiated agreements in place.
2	If the results of monitoring required in schedule 4 identify that impacts generated by the project are greater than the relevant air quality impact assessment criteria in schedule 4, then the Proponent shall send the relevant landowners and tenants (including tenants of mine-owned properties) a copy of the NSW Health fact sheet entitled "Mine Dust and You" (and associated updates) in conjunction with the notification required in condition 1.	Yes	As per condition.
3	If a landowner considers the project to be exceeding the impact assessment criteria in schedule 4, then he/she may ask the Director-General in writing for an independent review of the impacts of the project on his/her land. If the Director-General is satisfied that an independent review is warranted, the Proponent shall within 2 months of the Director-General's decision...	N/A	No reviews requested.

Condition	PA 08_0144 MOD 2 – Conditional Requirement	Compliance	Comments
4	If the independent review determines that the project is complying with the relevant impact assessment criteria in schedule 4, then the Proponent may discontinue the independent review with the approval of the Director-General. If the independent review determines that the project is not complying with the relevant impact assessment criteria in schedule 4, and that the project is primarily responsible for this non-compliance, then the Proponent shall...	N/A	No reviews requested.
5	Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent shall make a binding written offer to the landowner based on…	N/A	No written requests received.
6	The Proponent shall pay all reasonable costs associated with the land acquisition process described in condition 5 above.	N/A	No written requests received.
7	If the Proponent and landowner agree that only part of the land shall be acquired, then the Proponent shall pay all reasonable costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of the plan at the Office of the Registrar-General.	N/A	No written requests received.

TABLE A3-3

Compliance Review – Environment Protection License (EPL) 12789

Condition	EPL 12789 – Conditional Requirement	Compliance	Comments
A1.1	Carry out Coal Mining > 5,000,000t (handled and produced)	Yes	Coal production during the reporting period – 2,986,527 t, in ramp up phase.
A3.1	Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.	Yes	As per condition.
P1.3-P1.4	Comply with monitoring/discharge points and areas. Setting of limits for the emission of pollutants.	Yes	As per condition. Refer to Section 3.3 of the 2012/2013 AEMR/Annual Review.
L1.1	Comply with Section 120 of the POEO Act 1997 (re water quality)	Yes	As per condition.
L2.1-L2.5	Discharge water quality must not exceed the parameters specified.	Yes	As per condition. Refer to Section 3.3 of the 2012/2013 AEMR/Annual Review.
L3.1	Ensure noise compliance: 35 dB(A) $LA_{eq\,(15\ minute)}$ during the day (7am to 6pm), evening (6pm to 10pm) and night (10pm to 7am).	Yes	As per condition. Refer to Section 3.1 of the 2012/2013 AEMR/Annual Review.
L3.3	To determine compliance, measure noise within 30m of noise sensitive residences or receptors.	Yes	As per condition.
O1.1	Carry out licensed activities in a competent manner, i.e. (a) Processing, handling, movement and storage of materials and substances; & (b) Treatment, storage, processing, reprocessing, transport and disposal of generated waste.	Yes	As per condition.
O2.1	Maintain and operate all plant and equipment at premises in proper and efficient condition.	Yes	As per condition.
O3.1	Minimise or prevent emission of dust	Yes	As per condition.
M1.1	Record and retain monitoring results required as per this licence.	Yes	As per condition.
M1.2	Keep all monitoring records associated with this licence: (a) In a legible form; (b) For at least 4 years; and (c) for production to any EPA authorised officer.	Yes	As per condition.

Condition	EPL 12789 – Conditional Requirement	Compliance	Comments
M1.3	The following records must be kept in respect of any samples collected as required by this licence: (a) sampling date; (b) Sampling time; (c) Sampling location; and (d) Sample collectors name.	Yes	As per condition.
M2.1	Monitor each monitoring point for pollutants as specified in licence	Yes	As per condition.
M3.1	Monitor air pollutants in accordance with the Approved Methods publication or as approved by EPA.	Yes	As per condition.
M3.4	Monitor specified noise parameters at nominated properties	Yes	As per condition.
M4.1	Monitor weather parameters specified	Yes	As per condition.
M5.1	Keep a legible record of all complaints re pollution arising from licenced activity.	Yes	As per condition.
M5.2	Keep the following records of complaint. (a) Date and time of complaint; (b) Method complaint made; (c) Any personal details of complaint; (d) Nature of complaint; (e) Licensee's action in response, any follow up contact; and (f) If no action-reason why.	Yes	As per condition. Refer to Section 4.1 of the 2012/2013 AEMR/Annual Review.
M5.3	Keep records of complaints for 4 years	Yes	As per condition.
M5.4	Present records to EPA on request	Yes	As per condition.
M6.1	Operate telephone complaints line for receipt of complaints from the public	Yes	As per condition.
M6.2	Notify the public of the complaints telephone line	Yes	As per condition.
M7.1	To determine compliance with Noise Limits table, monitoring must be undertaken as follows:	Yes	As per condition.

Condition	EPL 12789 – Conditional Requirement	Compliance	Comments
	(a) At each one of the locations listed in the Noise Limits table; (b) Occur quarterly in a reporting period; (c) Occur during each day, evening and night period as defined in the NSW Industrial Noise Policy for a minimum of: i) 1.5 hours during the day; ii) 30 minutes during the evening; and iii) 1 hour during the night. (d) Occur for three consecutive operating days.		
R1.1	Complete and supply Annual Return to EPA comprising: (a) Statement of Compliance; and (b) Monitoring & Complaints Summary.	Yes	As per condition.
R1.5	Provide EPA with Annual Return no later than 60 days after end each reporting period.	Yes	As per condition.
R1.6	Retain copy of Annual Return for 4 years.	Yes	As per condition.
R1.7	Certify the Statement of Compliance within the Annual Return and sign the Monitoring and Complaints Summary by: (a) Licence holder; or (b) Approved person.	Yes	As per condition.
R2.1	Notify EPA of threatening or harmful incidents as soon as practicable by phoning EPA's Pollution Line Service	Yes	As per condition.
R2.2	Provide written details of the incident to EPA within 7 days of incident	Yes	As per condition.
R3.1	Upon an EPA officer suspecting that an event is causing or likely to cause environmental harm: (a) At the premises; or (b) In connection with vehicles or plant associated with the licenced activities. A request may be made for a written report of the event.	Yes	As per condition.
R3.2	The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within the time specified	Yes	As per condition.

Condition	EPL 12789 – Conditional Requirement	Compliance	Comments
R3.3	The report may be required to include: (a) Event cause, time and duration; (b) Type, volume and concentration of every pollutant discharged; (c) Contact details of employees or agents of licensee who witnessed event; (d) Contact details of any other persons witnessing the event; (e) The action taken and follow-up action with complainants in relation to event; (f) Mitigation measures proposed to prevent recurrence; and (g) Any other relevant matters.	Yes	As per condition.
R3.4	EPA may request further details-must be supplied within specified time	Yes	As per condition.
R4.1	Noise compliance assessment report to be submitted within 30 days of the completion of quarterly noise monitoring. The assessment must be prepared by a suitably qualified noise consultant and include: (a) An assessment of compliance with noise limits; and (b) An outline of any management actions taken within the monitoring period to address any exceedances.	Yes	As per condition.
G1.1	Retain a copy of this licence at premises to which the licence applies	Yes	As per condition.
G1.2	Produce licence to EPA officer on request	Yes	As per condition.
G1.3	The licence must be available for inspection by any employee or agent of the licensee working at the premises.	Yes	As per condition.
U1.1	Licensee must conduct a site specific Best Management Practice (BMP) determination to identify practical means to reduce particle emissions	Yes	As per condition.
U1.2	The Licensee must prepare a report which includes, but is not necessarily limited to, the following: - identification, quantification and justification of existing measures that are being used to minimise particle emissions; - identification, quantification and justification of best practice measures that could be used to minimise particle emissions; - evaluation of the practicability of implementing these best practice measures; and - a proposed timeframe for implementing all practicable best practice	Yes	As per condition.

Condition	EPL 12789 – Conditional Requirement	Compliance	Comments
	measures. In preparing the report, the Licensee must utilise the document entitled Coal Mine Particulate Matter Control Best Practice – Site Specific Determination Guideline - November 2011.		
U1.4	Must be submitted to the EPA by 29 June 2012	Yes	As per condition.
U1.5	Must be made available on the Licensee's website by 6 July 2012	Yes	As per condition.
E1.1	Prior to the commissioning of the evaporation and storage ponds, the licensee must provide the EPA Armidale office with an "as constructed" report	No	Report supplied but not prior to commissioning.
E2.1	Noise impacts where wind speed exceeds 3 meters per second at 10 meters above the ground must be addressed by: (a) Documenting noise complaints received to identify any higher level of impacts or wind patterns where levels of noise complaints indicated a higher level of impact then actions to quantify and ameliorate any enhanced impacts where wind speed exceeds 3 meters per second at 10 meters above the ground should be developed and implemented.	Yes	As per condition.

TABLE A3-4

Compliance Review – Mining Lease (ML) 1609

Condition	ML 1609 – Conditional Requirement	Compliance	Comments
1	Within a period of three months from the date of grant/renewal of the lease a notice in writing must be served on each landholder.	Yes	As per condition.
2	All practicable measures to prevent and/or minimise any harm to the environment.	Yes	As per condition.
3	Conduct mining operations in accordance with a MOP.	Yes	As per condition.
4	EMR to be lodged with the DG annually.	Yes	EMR supplied annually.
7	Disturbed land must be rehabilitated to a sustainable/agreed end land use to the satisfaction of the DG.	Yes	Areas disturbed have been rehabilitated to the extent practicable.
8(a)	Prepare a Subsidence Management Plan prior to commencing any underground mining operations.	Yes	Subsidence Management Plan approval received from the Department on 5 June 2012. Submitted as part of the Extraction Plan for longwall panels 101 to 105.
9(a)	Ensure that at least 212 competent people are efficiently employed on the lease area on each week day except Sunday or Public Holiday; or	Yes	As per condition.
9(b)	Expend on operations carried out in the course of prospecting or mining the lease area, an amount of not less than $3,710,000 per annum whilst the lease is in force.	Yes	As per condition.
11	Exploration Report to be submitted to the DG each year within 28 days of the anniversary.	Yes	Submitted annually.
15(a)	Monitor ground vibration generated by any blasting that it does not exceed 10mm/second in more than 5% of the total blasts over a period of 12 months.	N/A	No blasting undertaken during reporting period
15(b)	Overpressure noise level generated by any blast is not to exceed 120 dB (linear) and 115 dB (linear) in more than 5% of the total blasts over a period of 12 months.	N/A	No blasting undertaken during reporting period
16	Ensure the safety of persons or stock.	Yes	Safety measures a priority onsite.

Condition	ML 1609 – Conditional Requirement	Compliance	Comments
17(2)	Exploratory drill holes must satisfy the DG: (a) Cored holes surveyed; (b) Cored Holes sealed to prevent collapse; (c) Drill holes permanently sealed with cement plugs; (d) If drill hole meets natural or noxious gases it is plugged or sealed; (e) If drill hole meets an artesian or sub-artesian flow it is effectively sealed. (f) Unused drill holes are to be sealed in accordance with Department guidelines. (g) Once any drill hole ceases to be used the land and its immediate vicinity is left in a clean, tidy and stable condition.	Yes	As per condition.
18	Operations must be carried out in a manner that does not cause or aggravate air pollution, water pollution or soil contamination or erosion.	Yes	As per condition.
19	Transmission line, communication line, pipeline or any other utility must not be interfered with without permission from DG.	Yes	As per condition.
20	Fences must not be damaged or interfered with. Gates must be closed or left open in accordance with the requirements of the landholder.	Yes	As per condition.
21(a)	Operations must not affect any road.	Yes	No roads affected, unless in consultation with NSC.
21(b)	The cost incurred in fixing any damage to roads must be paid to the designated authority.	Yes	As per condition.
22	Access tracks must be kept to a minimum.	Yes	As per condition.
23(a)	The lease holder must not fell trees, strip bark or cut timber on the lease without the consent of the landholder.	Yes	As per condition.
23(b)	The lease holder must not cut, destroy, ringbark or remove any timber or other vegetative cover on the lease area except such as directly obstructs or prevents the carrying on of operations.	Yes	As per condition.
23(c)	The lease holder must obtain all necessary approvals or licences before using timber from any Crown land within the lease area.	N/A	No timber removed from Crown land.

Condition	ML 1609 – Conditional Requirement	Compliance	Comments
27(a)	A security of $100,000 must be given and maintained with the Minister by the lease holder for the purpose of ensuring the fulfillment by the lease holder of obligations under this lease.	Yes	Security paid.
27(b)	Security: Cash or Security Certificate	Yes	Security Certificate in place.
28	A person must not remove, damage, destroy, displace, obliterate or deface any marks in connection with any trigonometrical station, permanent mark or survey mark.	Yes	As per condition.

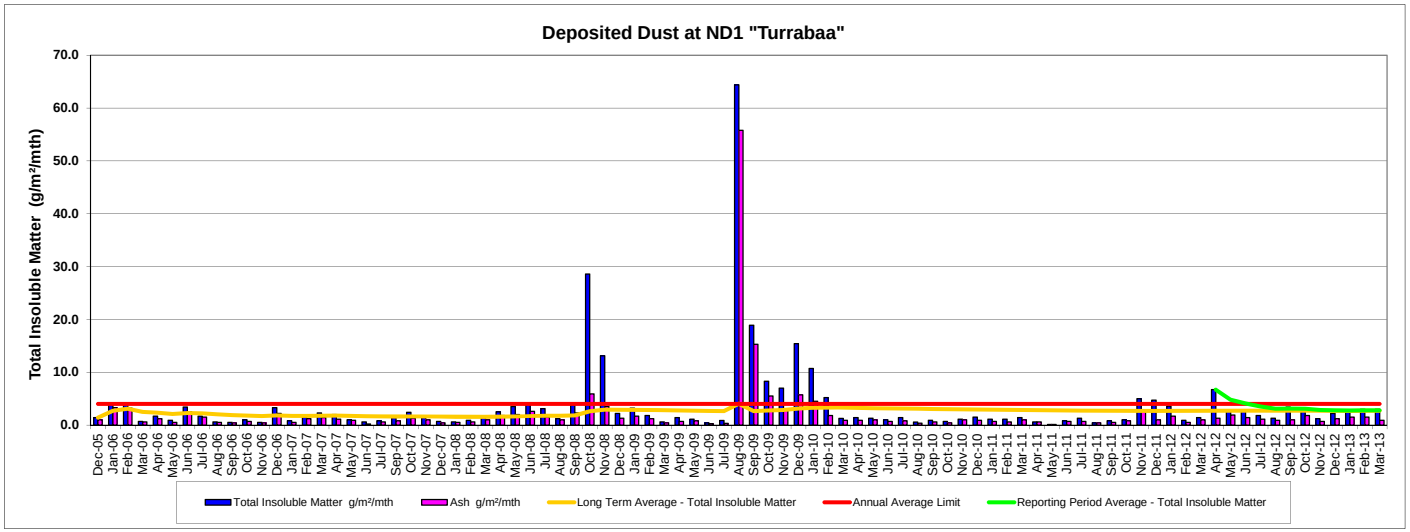
Appendix 4

DUST MONITORING RESULTS

Deposited Dust - ND1 "Turrabaa"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected (ml)	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
21959.01	ND1	05-Jan-06	Dec-05	Client	1045	2710	1.4		1.4	4.0	1.0	
22569.01	ND1	03-Feb-06	Jan-06	Client	1045	205	4.0		2.7	4.0	3.3	
22720.01	ND1	09-Mar-06	Feb-06	Client	1310	1135	3.9		3.1	4.0	3.2	
23204.01	ND1	03-Apr-06	Mar-06	Client	1035	135	0.7		2.5	4.0	0.6	
23295.01	ND1	02-May-06	Apr-06	Client	0905	650	1.7		2.3	4.0	1.2	
23630.01	ND1	02-Jun-06	May-06	Client	0825	<10	0.9		2.1	4.0	0.5	
23882.01	ND1	28-Jun-06	Jun-06	Client	1641	660	3.4		2.3	4.0	2.5	
24078.01	ND1	31-Jul-06	Jul-06	Client	0920	1600	1.7		2.2	4.0	1.5	
24412.01	ND1	30-Aug-06	Aug-06	Client	1357	40	0.6		2.0	4.0	0.5	
24689.01	ND1	03-Oct-06	Sep-06	Client	1410	550	0.5		1.9	4.0	0.4	
24973.01	ND1	02-Nov-06	Oct-06	Client	1344	375	1.0		1.8	4.0	0.7	
25439.01	ND1	04-Dec-06	Nov-06	Client	1340	375	0.5		1.7	4.0	0.4	
25536.01	ND1	02-Jan-07	Dec-06	Client	1145	510	3.3		1.8	4.0	2.2	
25839.01	ND1	02-Feb-07	Jan-07	Client	1215	380	0.8		1.7	4.0	0.5	
26116.01	ND1	05-Mar-07	Feb-07	Client	1445	940	1.5		1.7	4.0	1.2	
26423.01	ND1	03-Apr-07	Mar-07	Client	1200	<50	2.3		1.8	4.0	1.4	
26626.01	ND1	02-May-07	Apr-07	Client	1200	395	2.0		1.8	4.0	1.1	
26955.01	ND1	05-Jun-07	May-07	Client	1245	1250	1.0		1.7	4.0	0.9	
27229.01	ND1	02-Jul-07	Jun-07	Client	1205	1350	0.6		1.7	4.0	0.2	
27526.01	ND1	03-Aug-07	Jul-07	Client	0815	155	0.8		1.6	4.0	0.6	
28113.01	ND1	04-Oct-07	Sep-07	Client	1245	70	1.4		1.6	4.0	0.8	
28392.01	ND1	05-Nov-07	Oct-07	Client	1445	680	2.4		1.7	4.0	1.3	
28656.01	ND1	04-Dec-07	Nov-07	Client	1120	1380	1.4		1.6	4.0	1.0	
28917.01	ND1	03-Jan-08	Dec-07	Client	1430	1770	0.7		1.6	4.0	0.4	
29219.01	ND1	04-Feb-08	Jan-08	Client	1315	1480	0.6		1.6	4.0	0.5	
29519.01	ND1	03-Mar-08	Feb-08	Client	1035	2485	0.9		1.5	4.0	0.6	
29767.01	ND1	02-Apr-08	Mar-08	Client	1155	140	1.6		1.5	4.0	1.0	
30049.01	ND1	09-May-08	Apr-08	Client	0945	530	2.5		1.6	4.0	1.8	
30380-01	ND1	02-Jun-08	May-08	Client	1342	320	3.5		1.6	4.0	2.0	
30654.01	ND1	01-Jul-08	Jun-08	Client	1330	1115	4.2		1.7	4.0	2.6	
30896.01	ND1	04-Aug-08	Jul-08	Client	1000	640	3.1		1.8	4.0	1.5	
31204.01	ND1	01-Sep-08	Aug-08	Client	1030	890	1.2		1.8	4.0	1.0	
31522.01	ND1	02-Oct-08	Sep-08	Client	0830	1925	3.8		1.8	4.0	2.3	
31769.01	ND1	03-Nov-08	Oct-08	Client	1049	1365	28.6		2.6	4.0	5.9	
32017.01	ND1	03-Dec-08	Nov-08	Client	1115	1525	13.1		2.9	4.0	3.5	
32512.01	ND1	05-Jan-09	Dec-08	Client	0935	2770	2.2		2.9	4.0	1.3	
32240.01	ND1	02-Feb-09	Jan-09	Client	0930	595	3.2		2.9	4.0	1.7	
32857.01	ND1	02-Mar-09	Feb-09	Client	0815	2600	1.8		2.9	4.0	1.2	
2600 1003-00	ND1	01-Apr-09	Mar-09	ALS		15	0.6		2.8	4.0	0.4	Insects, Bird droppings
2600 1021-00	ND1	01-May-09	Apr-09	ALS		1000	1.4		2.8	4.0	0.7	Bird droppings
2600 1031-01	ND1	01-Jun-09	May-09	ALS		900	1.1		2.7	4.0	0.8	
2600 1041-01	ND1	06-Jul-09	Jun-09	ALS		350	0.4		2.7	4.0	0.3	Insects
2600 1053-01	ND1	03-Aug-09	Jul-09	ALS	0915	600	0.9		2.6	4.0	0.3	Insects, Bird Droppings, Plant Material
2600 1065-00	ND1	31-Aug-09	Aug-09	ALS	0925	100	64.4		4.0	4.0	55.8	Insects, Bird Droppings, Plant Material
2600 1065-00	ND1	28-Sep-09	Sep-09	ALS	0925	800	18.9		2.6	4.0	15.3	Insects, Bird Droppings, Plant Material
2600 1125-00	ND1	03-Nov-09	Oct-09	ALS	1007	900	8.3		2.8	4.0	5.5	Insects, Bird Droppings, Plant Material
2600 1204-115	ND1	01-Dec-09	Nov-09	ALS	0950	100	7.0		2.9	4.0	2.9	Insects, Bird droppings
2600 1222-00	ND1	31-Dec-09	Dec-09	ALS	0955	2200	15.4		3.1	4.0	5.7	Insects, Plant Material

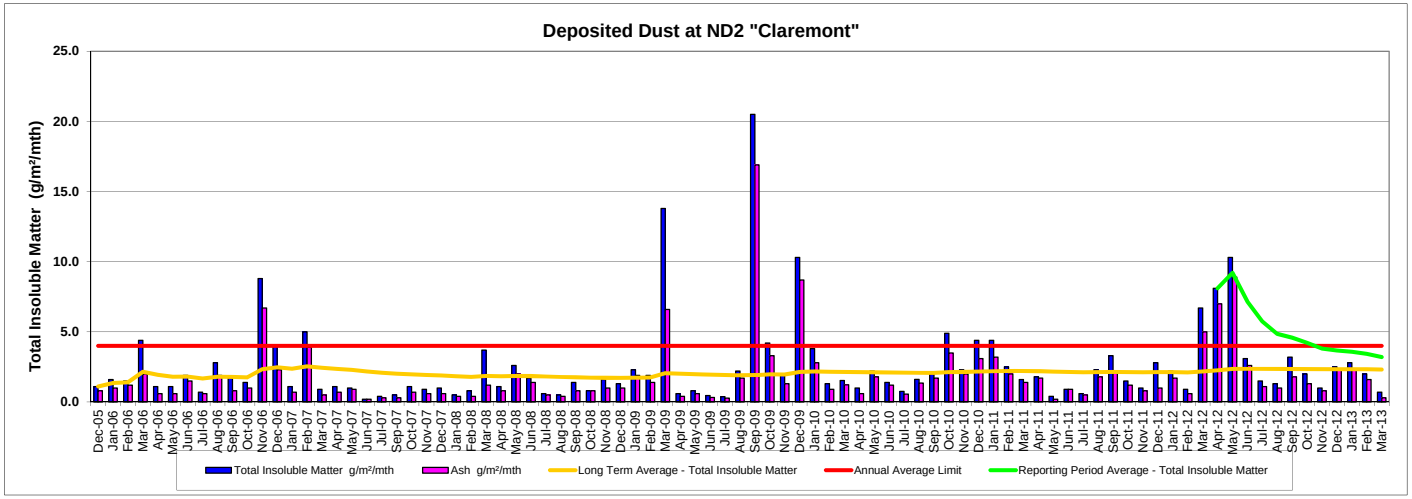
Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected (ml)	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
2600 1234-00	ND1	01-Feb-10	Jan-10	ALS	1120	2200	10.7		3.3	4.0	4.5	Insects, Bird Droppings, Plant Material
2600 1247-00	ND1	03-Mar-10	Feb-10	ALS	1030	1100	5.2		3.3	4.0	1.8	Insects, Bird Droppings, Plant Material
2600 1260	ND1	31-Mar-10	Mar-10	ALS	0945	500	1.3		3.3	4.0	0.9	Insects, Plant Material
2600 1268	ND1	28-Apr-10	Apr-10	ALS	0920	200	1.4		3.2	4.0	0.9	Insects, Plant Material
26001277	ND1	26-May-10	May-10	ALS	0905	300	1.3		3.2	4.0	1.0	Insects, Bird Droppings, Plant Material
2600-1288	ND1	23-Jun-10	Jun-10	ALS	1115	300	1.0		3.2	4.0	0.7	Insects, Bird Droppings, Plant Material
26001298	ND1	21-Jul-10	Jul-10	ALS	0940	800	1.4		3.1	4.0	0.8	Insects, Bird Droppings,Plant Material
26001309915	ND1	20-Aug-10	Aug-10	ALS	1355	2300	0.6		3.1	4.0	0.4	Insects, Plant material
26001319	ND1	20-Sep-10	Sep-10	ALS	1205	1200	0.9		3.0	4.0	0.6	Insects, Plant material
2600-1340-18	ND1	20-Oct-10	Oct-10	ALS	1135	800	0.7		3.0	4.0	0.4	
EN1002881-001	ND1	19-Nov-10	Nov-10	ALS	1208	1800	1.1		3.0	4.0	1.0	
EN1003078-001	ND1	21-Dec-10	Dec-10	ALS	0900	2000	1.5		2.9	4.0	0.9	
EN1100178-001	ND1	20-Jan-11	Jan-11	ALS	0945	750	1.1		2.9	4.0	0.7	
EN1100432-001	ND1	21-Feb-11	Feb-11	ALS	0915	200	1.1		2.9	4.0	0.6	
EN1100689-001	ND1	23-Mar-11	Mar-11	ALS	0930	600	1.4		2.9	4.0	1.0	
EN1100923-001	ND1	20-Apr-11	Apr-11	ALS	9:50	800	0.6		2.8	4.0	0.6	
EN1101164-001	ND1	19-May-11	May-11	ALS	9:40	0	0.1		2.8	4.0	0.1	Bird Droppings/Dry
EN1101450-001	ND1	17-Jun-11	Jun-11	ALS	9:40	1100	0.8		2.8	4.0	0.7	Plant material
EN1101813-001	ND1	18-Jul-11	Jul-11	ALS	9:45	80	1.3		2.7	4.0	0.7	Bird droppings
EN1102302-001	ND1	17-Aug-11	Aug-11	ALS	11:00	300	0.4		2.7	4.0	0.4	Insects, plant material
EN1102771-001	ND1	16-Sep-11	Sep-11	ALS	10:46	800	0.8		2.7	4.0	0.5	Insects, plant material
EN1103120-001	ND1	17-Oct-11	Oct-11	ALS	10:50	1100	1.0		2.6	4.0	0.8	Insects, plant material
EN1103469-001	ND1	15-Nov-11	Nov-11	ALS	9:45	900	5.0		2.7	4.0	2.8	Insects, bird droppings, plan material
EN1104231-001	ND1	15-Dec-11	Dec-11	ALS	10:00	2500	4.7		2.7	4.0	1.0	Insects, bird droppings, plan material
EN1200254-001	ND1	16-Jan-12	Jan-12	ALS	9:50	1200	3.6		2.7	4.0	1.7	Insects, plant material
EN1200646-001	ND1	15-Feb-12	Feb-12	ALS	9:50	2500	0.9		2.7	4.0	0.5	Insects, plant material
EN1201072-001	ND1	16-Mar-12	Mar-12	ALS	11:00	800	1.4		2.7	4.0	1.0	Insects, plant material
EN1201470-001	ND1	17-Apr-12	Apr-12	ALS	11:10	200	6.7	6.7	2.7	4.0	1.3	Insects, bird droppings, plan material
EN1201863-001	ND1	17-May-12	May-12	ALS	12:20	600	2.9	4.8	2.7	4.0	1.9	Insects, plant material
EN1202257-001	ND1	18-Jun-12	Jun-12	ALS	11:00	900	2.7	4.1	2.7	4.0	1.4	Insects, plant material
EN1202680-001	ND1	18-Jul-12	Jul-12	ALS	12:30	1100	1.8	3.5	2.7	4.0	1.1	Insects, plant material
EN1203132-001	ND1	17-Aug-12	Aug-12	ALS	10:50	100	1.3	3.1	2.7	4.0	0.9	Insects, bird droppings, plan material
EN1203603-001	ND1	18-Sep-12	Sep-12	ALS	13:40	100	3.4	3.1	2.7	4.0	1.0	Insects, plant material
EN1203994-001	ND1	18-Oct-12	Oct-12	ALS	12:30	500	2.9	3.1	2.7	4.0	1.8	Insects, plant material
EN1204421-001	ND1	19-Nov-12	Nov-12	ALS	13:20	250	1.2	2.9	2.7	4.0	0.7	Insects, plant material
EN1204843-001	ND1	19-Dec-12	Dec-12	ALS	12:00	100	2.2	2.8	2.7	4.0	1.2	Insects, bird droppings, plant material
EN1300222-001	ND1	17-Jan-13	Jan-13	ALS	14:15	400	2.5	2.8	2.7	4.0	1.5	Insects, bird droppings, plant material
EN1300661-001	ND1	15-Feb-13	Feb-13	ALS	11:30	1900	3.0	2.8	2.7	4.0	1.5	Insects, plant material
EN1301080-001	ND1	15-Mar-13	Mar-13	ALS	14:00	1500	3.0	2.8	2.7	4.0	0.9	Insects, plant material



Deposited Dust - ND2 "Claremont"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected (ml)	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
21959.02	ND2	05-Jan-06	Dec-05	Client	1105	2750	1.1		1.1	4.0	0.8	
22569.02	ND2	03-Feb-06	Jan-06	Client	1355	475	1.6		1.4	4.0	1.0	
22720.02	ND2	09-Mar-06	Feb-06	Client	1245	1175	1.5		1.4	4.0	1.2	
23204.02	ND2	03-Apr-06	Mar-06	Client	1055	225	4.4		2.2	4.0	2.0	
23295.02	ND2	02-May-06	Apr-06	Client	0900	775	1.1		1.9	4.0	0.6	
23630.02	ND2	02-Jun-06	May-06	Client	0840	<10	1.1		1.8	4.0	0.6	
23882.02	ND2	28-Jun-06	Jun-06	Client	1650	800	1.9		1.8	4.0	1.5	
24078.02	ND2	31-Jul-06	Jul-06	Client	0923	1700	0.7		1.7	4.0	0.6	
24412.02	ND2	30-Aug-06	Aug-06	Client	1407	40	2.8		1.8	4.0	1.9	
24689.02	ND2	03-Oct-06	Sep-06	Client	1422	750	1.7		1.8	4.0	0.8	
24973.02	ND2	02-Nov-06	Oct-06	Client	1341	450	1.4		1.8	4.0	1.0	
25439.02	ND2	04-Dec-06	Nov-06	Client	1310	950	8.8		2.3	4.0	6.7	
25536.02	ND2	02-Jan-07	Dec-06	Client	1155	750	4.0		2.5	4.0	2.3	
25839.02	ND2	02-Feb-07	Jan-07	Client	1220	320	1.1		2.4	4.0	0.7	
26116.02	ND2	05-Mar-07	Feb-07	Client	1345	1080	5.0		2.5	4.0	3.9	
26423.02	ND2	03-Apr-07	Mar-07	Client	0955	200	0.9		2.4	4.0	0.5	
26626.02	ND2	02-May-07	Apr-07	Client	1100	400	1.1		2.4	4.0	0.7	
26955.02	ND2	05-Jun-07	May-07	Client	1145	1350	1.0		2.3	4.0	0.9	
27229.02	ND2	02-Jul-07	Jun-07	Client	1215	1565	0.2		2.2	4.0	0.2	
27526.02	ND2	03-Aug-07	Jul-07	Client	0835	210	0.4		2.1	4.0	0.3	
28113.02	ND2	04-Oct-07	Sep-07	Client	1140	50	0.5		2.0	4.0	0.3	
28392.02	ND2	05-Nov-07	Oct-07	Client	1500	635	1.1		2.0	4.0	0.7	
28656.02	ND2	04-Dec-07	Nov-07	Client	1130	1140	0.9		1.9	4.0	0.6	
28917.02	ND2	03-Jan-08	Dec-07	Client	1440	1800	1.0		1.9	4.0	0.6	
29219.02	ND2	04-Feb-08	Jan-08	Client	1325	1410	0.5		1.8	4.0	0.4	
29219.02	ND2	03-Mar-08	Feb-08	Client	1045	2065	0.8		1.8	4.0	0.4	
29767.02	ND2	02-Apr-08	Mar-08	Client	1110	85	3.7		1.9	4.0	1.2	
30049.02	ND2	09-May-08	Apr-08	Client	0855	480	1.1		1.8	4.0	0.8	
30380-02	ND2	02-Jun-08	May-08	Client	1230	175	2.6		1.9	4.0	2.0	
30654.02	ND2	01-Jul-08	Jun-08	Client	1225	1075	1.7		1.9	4.0	1.4	
30896.02	ND2	04-Aug-08	Jul-08	Client	1010	625	0.6		1.8	4.0	0.5	
31204.02	ND2	01-Sep-08	Aug-08	Client	1040	980	0.5		1.8	4.0	0.4	
31522.02	ND2	02-Oct-08	Sep-08	Client	0840	1815	1.4		1.8	4.0	0.8	
31769.02	ND2	03-Nov-08	Oct-08	Client	1106	1080	0.8		1.7	4.0	0.8	
32017.02	ND2	03-Dec-08	Nov-08	Client	1200	1675	1.6		1.7	4.0	1.0	
32512.02	ND2	05-Jan-09	Dec-08	Client	0943	2765	1.3		1.7	4.0	1.0	
32240.02	ND2	02-Feb-09	Jan-09	Client	0950	635	2.3		1.7	4.0	1.9	
32857.02	ND2	02-Mar-09	Feb-09	Client	0845	2580	1.9		1.7	4.0	1.4	
2600 1003-00	ND2	01-Apr-09	Mar-09	ALS		15	13.8		2.0	4.0	6.6	Insects, Bird droppings
2600 1021-00	ND2	01-May-09	Apr-09	ALS		1000	0.6		2.0	4.0	0.4	Insects, Bird droppings
2600 1031-01	ND2	01-Jun-09	May-09	ALS		900	0.8		2.0	4.0	0.6	
2601 1041-01	ND2	06-Jul-09	Jun-09	ALS		400	0.5		1.9	4.0	0.3	Insects
2601 1053-01	ND2	03-Aug-09	Jul-09	ALS	0920	550	0.4		1.9	4.0	0.3	Insects, Bird Droppings, Plant Material
2600 1065-00	ND2	31-Aug-09	Aug-09	ALS	0935	100	2.2		1.9	4.0	1.7	Insects, Plant Material
2600 1065-00	ND2	28-Sep-09	Sep-09	ALS	1300	1000	20.5		1.9	4.0	16.9	Insects, Plant Material
2600 1125-00	ND2	03-Nov-09	Oct-09	ALS	1012	900	4.2		2.0	4.0	3.3	Insects, Bird Droppings

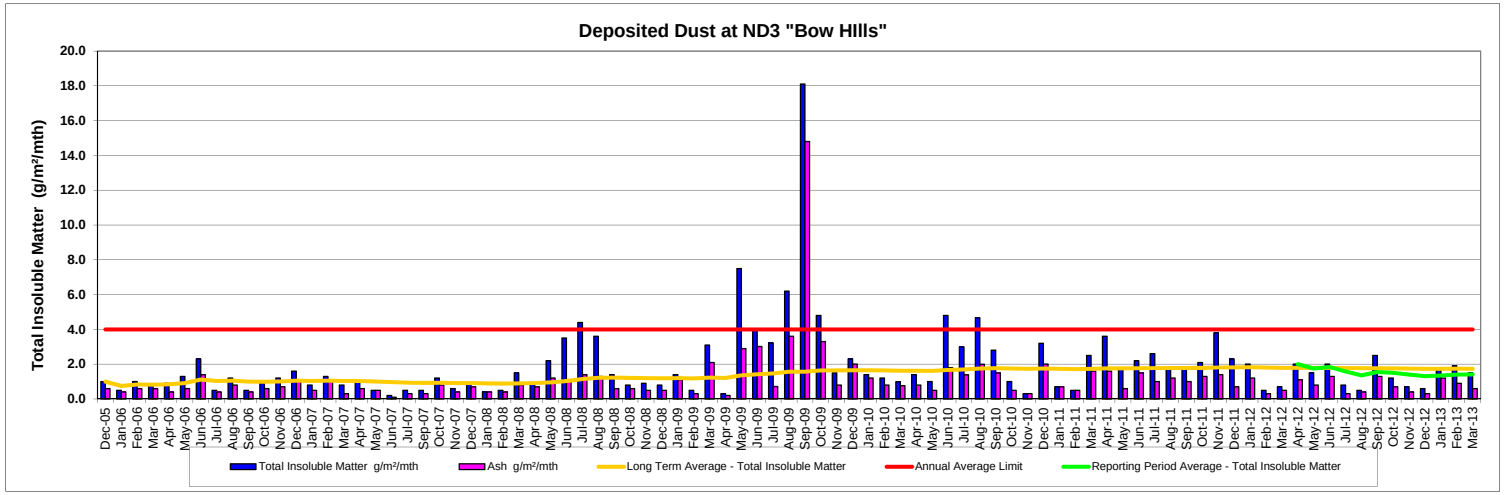
Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected (ml)	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
2600 1204-115	ND2	01-Dec-09	Nov-09	ALS	0956	100	1.9		2.0	4.0	1.3	Insects
2600 1222-00	ND2	31-Dec-09	Dec-09	ALS	1030	2400	10.3		2.1	4.0	8.7	Insects
2600 1234-00	ND2	01-Feb-10	Jan-10	ALS	1125	2200	3.8		2.2	4.0	2.8	Insects, Plant Material
2600 1247-00	ND2	03-Mar-10	Feb-10	ALS	1035	1100	1.3		2.2	4.0	0.9	Insects, Plant Material
2600 1260	ND2	31-Mar-10	Mar-10	ALS	0955	600	1.5		2.1	4.0	1.2	Insects, Plant Material
2600 1268	ND2	28-Apr-10	Apr-10	ALS	0925	150	1.0		2.1	4.0	0.6	Insects, Plant Material
26001277	ND2	26-May-10	May-10	ALS	0920	300	2.2		2.1	4.0	1.8	Insects
2600-1288	ND2	23-Jun-10	Jun-10	ALS	1110	300	1.4		2.1	4.0	1.2	Plant Material
26001298	ND2	21-Jul-10	Jul-10	ALS	0945	800	0.8		2.1	4.0	0.6	Insects,Plant Material
26001309915	ND2	20-Aug-10	Aug-10	ALS	1405	2300	1.6		2.1	4.0	1.3	Insects, Plant material
26001319	ND2	20-Sep-10	Sep-10	ALS	1220	1400	2.0		2.1	4.0	1.7	Insects, Plant material
2600-1340-18	ND2	20-Oct-10	Oct-10	ALS	1150	800	4.9		2.1	4.0	3.5	
EN1002881-002	ND2	19-Nov-10	Nov-10	ALS	1215	1800	2.3		2.1	4.0	2.0	
EN1003078-002	ND2	21-Dec-10	Dec-10	ALS	0910	2000	4.4		2.2	4.0	3.1	
EN1100178-002	ND2	20-Jan-11	Jan-11	ALS	0955	500	4.4		2.2	4.0	3.2	
EN1100432-002	ND2	21-Feb-11	Feb-11	ALS	0920	300	2.5		2.2	4.0	2.0	
EN1100689-002	ND2	23-Mar-11	Mar-11	ALS	1020	400	1.6		2.2	4.0	1.4	
EN1100923-002	ND2	20-Apr-11	Apr-11	ALS	10:00	600	1.8		2.2	4.0	1.7	
EN1101164-002	ND2	19-May-11	May-11	ALS	9:55	0	0.4		2.2	4.0	0.2	Dry
EN1101450-002	ND2	17-Jun-11	Jun-11	ALS	10:00	1100	0.9		2.1	4.0	0.9	Insects, plant material
EN1101813-002	ND2	18-Jul-11	Jul-11	ALS	10:20	50	0.6		2.1	4.0	0.5	Insects, plant material
EN1102302-002	ND2	17-Aug-11	Aug-11	ALS	11:20	300	2.3		2.1	4.0	1.8	Insects, bird droppings, plant material
EN1102771-002	ND2	16-Sep-11	Sep-11	ALS	10:54	800	3.3		2.1	4.0	2.2	Insects, plant material
EN1103120-002	ND2	17-Oct-11	Oct-11	ALS	11:00	1300	1.5		2.1	4.0	1.2	Insects, plant material
EN1103469-002	ND2	15-Nov-11	Nov-11	ALS	9:55	900	1.0		2.1	4.0	0.8	Insects, plant material
EN1104231-002	ND2	15-Dec-11	Dec-11	ALS	10:10	2500	2.8		2.1	4.0	1.0	Insects, bird droppings, plan material
EN1200254-002	ND2	16-Jan-12	Jan-12	ALS	10:10	1200	2.2		2.1	4.0	1.7	Insects, plant material
EN1200646-002	ND2	15-Feb-12	Feb-12	ALS	10:10	2500	0.9		2.1	4.0	0.6	Insects, plant material
EN1201072-002	ND2	16-Mar-12	Mar-12	ALS	11:10	800	6.7		2.2	4.0	5.0	Insects, plant material
EN1201470-002	ND2	17-Apr-12	Apr-12	ALS	11:20	200	8.1	8.1	2.3	4.0	7	Insects, plant material
EN1201863-002	ND2	17-May-12	May-12	ALS	11:35	600	10.3	9.2	2.4	4.0	8.9	Insects, plant material
EN1202257-002	ND2	18-Jun-12	Jun-12	ALS	11:10	900	3.1	7.2	2.4	4.0	2.6	Insects, plant material
EN1202680-002	ND2	18-Jul-12	Jul-12	ALS	12:45	1100	1.5	5.8	2.4	4.0	1.1	Insects, plant material
EN1203132-002	ND2	17-Aug-12	Aug-12	ALS	11:00	100	1.3	4.9	2.3	4.0	1.0	Insects, plant material
EN1203603-002	ND2	18-Sep-12	Sep-12	ALS	13:20	100	3.2	4.6	2.4	4.0	1.8	Insects, plant material
EN1203994-002	ND2	18-Oct-12	Oct-12	ALS	12:00	500	2.0	4.2	2.3	4.0	1.3	Insects, plant material
EN1204421-002	ND2	19-Nov-12	Nov-12	ALS	12:50	250	1.0	3.8	2.3	4.0	0.8	Insects, plant material
EN1204843-002	ND2	19-Dec-12	Dec-12	ALS	11:40	200	2.5	3.7	2.3	4.0	2.3	Insects, plant material
EN1300222-002	ND2	17-Jan-13	Jan-13	ALS		400	2.8	3.6	2.3	4.0	2.3	Insects, plant material
EN1300661-002	ND2	15-Feb-13	Feb-13	ALS	12:20	2000	2.0	3.4	2.3	4.0	1.6	Insects, plant material
EN1301080-002	ND2	15-Mar-13	Mar-13	ALS	13:50	1600	0.7	3.2	2.3	4.0	0.3	Insects, plant material



Deposited Dust - ND3 "Bow Hills"

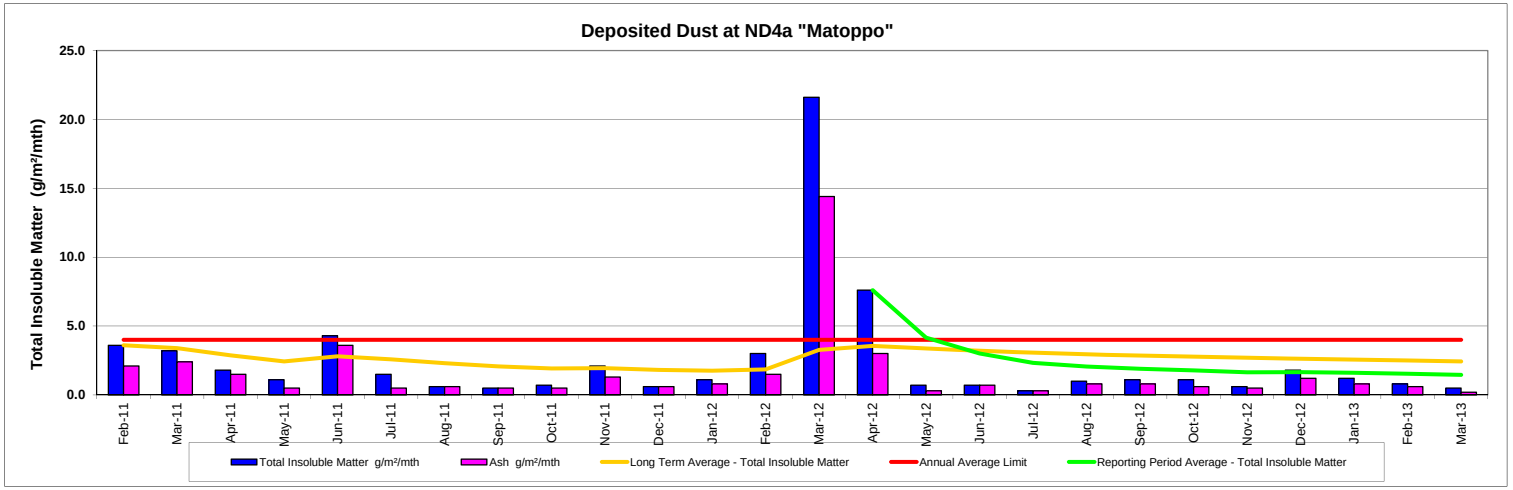
Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected (ml)	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
21959.03	ND3	05-Jan-06	Dec-05	Client	1040	2550	1.0		1.0	4.0	0.6	
22569.03	ND3	03-Feb-06	Jan-06	Client	1340	475	0.5		0.8	4.0	0.4	
22720.03	ND3	09-Mar-06	Feb-06	Client	1235	1285	1.0		0.8	4.0	0.6	
23204.03	ND3	03-Apr-06	Mar-06	Client	1100	350	0.8		0.8	4.0	0.6	
23295.03	ND3	02-May-06	Apr-06	Client	0845	700	0.9		0.8	4.0	0.4	
23630.03	ND3	02-Jun-06	May-06	Client	0815	<10	1.3		0.9	4.0	0.6	
23882.03	ND3	28-Jun-06	Jun-06	Client	1630	660	2.3		1.1	4.0	1.4	
24078.03	ND3	31-Jul-06	Jul-06	Client	0930	1550	0.5		1.0	4.0	0.4	
24412.03	ND3	30-Aug-06	Aug-06	Client	1502	75	1.2		1.1	4.0	0.8	
24689.03	ND3	03-Oct-06	Sep-06	Client	1059	700	0.5		1.0	4.0	0.4	
24973.03	ND3	02-Nov-06	Oct-06	Client	1352	365	0.9		1.0	4.0	0.6	
25439.03	ND3	04-Dec-06	Nov-06	Client	1215	770	1.2		1.0	4.0	0.7	
25536.03	ND3	02-Jan-07	Dec-06	Client	1130	600	1.6		1.1	4.0	1.1	
25839.03	ND3	02-Feb-07	Jan-07	Client	1115	560	0.8		1.0	4.0	0.5	
26116.03	ND3	05-Mar-07	Feb-07	Client	1255	890	1.3		1.1	4.0	1.0	
26423.03	ND3	03-Apr-07	Mar-07	Client	0900	220	0.8		1.0	4.0	0.3	
26626.03	ND3	02-May-07	Apr-07	Client	1050	500	1.0		1.0	4.0	0.6	
26955.03	ND3	05-Jun-07	May-07	Client	1100	1285	0.5		1.0	4.0	0.5	
27229.03	ND3	02-Jul-07	Jun-07	Client	1405	1350	0.2		1.0	4.0	0.1	
27526.03	ND3	03-Aug-07	Jul-07	Client	0950	265	0.5		0.9	4.0	0.3	
28113.03	ND3	04-Oct-07	Sep-07	Client	1250	25	0.5		0.9	4.0	0.3	
28392.03	ND3	05-Nov-07	Oct-07	Client	1545	785	1.2		0.9	4.0	0.8	
28656.03	ND3	04-Dec-07	Nov-07	Client	1255	1370	0.6		0.9	4.0	0.4	
28917.03	ND3	03-Jan-08	Dec-07	Client	1545	1560	0.9		0.9	4.0	0.7	
29219.03	ND3	04-Feb-08	Jan-08	Client	1400	1365	0.4		0.9	4.0	0.4	
29219.03	ND3	03-Mar-08	Feb-08	Client	1630	1885	0.5		0.9	4.0	0.4	
29767.03	ND3	02-Apr-08	Mar-08	Client	1210	130	1.5		0.9	4.0	0.8	
30049.03	ND3	09-May-08	Apr-08	Client	1005	405	0.9		0.9	4.0	0.7	
30380-03	ND3	02-Jun-08	May-08	Client	1400	220	2.2		0.9	4.0	1.2	
30654.03	ND3	01-Jul-08	Jun-08	Client	1350	1060	3.5		1.0	4.0	1.0	
30896.03	ND3	04-Aug-08	Jul-08	Client	1055	685	4.4		1.1	4.0	1.4	
31204.03	ND3	01-Sep-08	Aug-08	Client	1147	945	3.6		1.2	4.0	1.3	
31522.03	ND3	02-Oct-08	Sep-08	Client	1000	1645	1.4		1.2	4.0	0.6	
31769.03	ND3	03-Nov-08	Oct-08	Client	1222	1395	0.8		1.2	4.0	0.6	
32017.03	ND3	03-Dec-08	Nov-08	Client	1106	1710	0.9		1.2	4.0	0.5	
32512.03	ND3	05-Jan-09	Dec-08	Client	1108	2760	0.8		1.2	4.0	0.5	
32240.03	ND3	02-Feb-09	Jan-09	Client	1145	465	1.4		1.2	4.0	1.1	
32857.03	ND3	02-Mar-09	Feb-09	Client	1118	2420	0.5		1.2	4.0	0.3	
2600 1003-00	ND3	01-Apr-09	Mar-09	ALS		100	3.1		1.2	4.0	2.1	Insects
2600 1021-00	ND3	01-May-09	Apr-09	ALS		800	0.3		1.2	4.0	0.2	
2600 1031-01	ND3	01-Jun-09	May-09	ALS		800	7.5		1.4	4.0	2.9	Bird droppings, plant material
2602 1041-01	ND3	06-Jul-09	Jun-09	ALS		350	4.0		1.4	4.0	3.0	Bird Droppings, Insects
2602 1053-01	ND3	03-Aug-09	Jul-09	ALS	1100	450	3.2		1.5	4.0	0.7	Insects, Bird Droppings, Plant Material
2600 1065-00	ND3	31-Aug-09	Aug-09	ALS	1155	100	6.2		1.6	4.0	3.6	Insects, Bird Droppings, Plant Material
2600 1065-00	ND3	28-Sep-09	Sep-09	ALS	1451	600	18.1		1.6	4.0	14.8	Insects, Bird Droppings
2600 1125-00	ND3	03-Nov-09	Oct-09	ALS	1111	700	4.8		1.6	4.0	3.3	Insects, Plant Material

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected (ml)	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
2600 1204-115	ND3	01-Dec-09	Nov-09	ALS	1155	100	1.5		1.6	4.0	0.8	Bird droppings, Plant Material
2600 1222-00	ND3	31-Dec-09	Dec-09	ALS	1142	2300	2.3		1.7	4.0	2.0	Insects
2600 1234-00	ND3	01-Feb-10	Jan-10	ALS	1220	2200	1.4		1.6	4.0	1.2	Insects
2600 1247-00	ND3	03-Mar-10	Feb-10	ALS	1240	1200	1.2		1.6	4.0	0.8	Insects, Plant Material
2600 1260	ND3	31-Mar-10	Mar-10	ALS	1230	500	1.0		1.6	4.0	0.8	Insects, Plant Material
2600 1268	ND3	28-Apr-10	Apr-10	ALS	1140	150	1.4		1.6	4.0	0.8	Insects, Plant Material
26001277	ND3	26-May-10	May-10	ALS	1155	300	1.0		1.6	4.0	0.5	Insects
2600-1288	ND3	23-Jun-10	Jun-10	ALS	0935	500	4.8		1.7	4.0	1.8	Insects, Bird Droppings, Plant Material
26001298	ND3	21-Jul-10	Jul-10	ALS	1215	750	3.0		1.7	4.0	1.4	Bird Droppings
26001309915	ND3	20-Aug-10	Aug-10	ALS	1510	2000	4.7		1.7	4.0	2.0	Insects, Plant material
26001319	ND3	20-Sep-10	Sep-10	ALS	1340	1300	2.8		1.8	4.0	1.5	Insects, Plant material
2600-1340-18	ND3	20-Oct-10	Oct-10	ALS	1340	800	1.0		1.8	4.0	0.5	
EN1002881-003	ND3	19-Nov-10	Nov-10	ALS	1300	1500	0.3		1.7	4.0	0.3	
EN1003078-003	ND3	21-Dec-10	Dec-10	ALS	1025	2000	3.2		1.8	4.0	2.0	
EN1100178-003	ND3	20-Jan-11	Jan-11	ALS	1100	1000	0.7		1.7	4.0	0.7	
EN1100432-003	ND3	21-Feb-11	Feb-11	ALS	1050	400	0.5		1.7	4.0	0.5	
EN1100689-003	ND3	23-Mar-11	Mar-11	ALS	1135	350	2.5		1.7	4.0	1.6	
EN1100923-003	ND3	20-Apr-11	Apr-11	ALS	11:00	800	3.6		1.8	4.0	1.6	Bird Droppings on funnel
EN1101164-003	ND3	19-May-11	May-11	ALS	11:00	50	1.8		1.8	4.0	0.6	Bird Droppings/Plant matter
EN1101450-003	ND3	17-Jun-11	Jun-11	ALS	12:00	1000	2.2		1.8	4.0	1.5	Bird droppings, plant material
EN1101813-003	ND3	18-Jul-11	Jul-11	ALS	12:00	80	2.6		1.8	4.0	1.0	Bird droppings
EN1102302-003	ND3	17-Aug-11	Aug-11	ALS	13:20	300	1.8		1.8	4.0	1.2	Insects, bird droppings, plant material
EN1102771-003	ND3	16-Sep-11	Sep-11	ALS	11:49	800	1.7		1.8	4.0	1.0	Insects, bird droppings, plant material
EN1103120-003	ND3	17-Oct-11	Oct-11	ALS	12:10	1100	2.1		1.8	4.0	1.3	Insects, plant material
EN1103469-003	ND3	15-Nov-11	Nov-11	ALS	10:50	900	3.8		1.8	4.0	1.4	Insects, bird droppings, plan material
EN1104231-003	ND3	15-Dec-11	Dec-11	ALS	11:10	2500	2.3		1.8	4.0	0.7	Insects, plant material
EN1200254-003	ND3	16-Jan-12	Jan-12	ALS	11:45	900	2.0		1.8	4.0	1.2	Insects, plant material
EN1200646-003	ND3	15-Feb-12	Feb-12	ALS	11:35	2500	0.5		1.8	4.0	0.3	Insects, plant material
EN1201072-003	ND3	16-Mar-12	Mar-12	ALS	12:05	800	0.7		1.8	4.0	0.5	Insects, plant material
EN1201470-003	ND3	17-Apr-12	Apr-12	ALS	12:15	200	2	2.0	1.8	4.0	1.1	Insects, plant material
EN1201863-003	ND3	17-May-12	May-12	ALS	10:35	600	1.5	1.8	1.8	4.0	0.8	Insects, plant material
EN1202257-003	ND3	18-Jun-12	Jun-12	ALS	12:30	900	2	1.8	1.8	4.0	1.3	Insects, plant material
EN1202680-003	ND3	18-Jul-12	Jul-12	ALS	14:10	1100	0.8	1.6	1.8	4.0	0.3	Insects, bird droppings, plan material
EN1203132-003	ND3	17-Aug-12	Aug-12	ALS	11:10	100	0.5	1.4	1.8	4.0	0.4	Insects, bird droppings, plan material
EN1203603-003	ND3	18-Sep-12	Sep-12	ALS	12:10	100	2.5	1.6	1.8	4.0	1.3	Insects, bird droppings, plan material
EN1203994-003	ND3	18-Oct-12	Oct-12	ALS	11:30	500	1.2	1.5	1.8	4.0	0.7	Insects, plant material
EN1204421-003	ND3	19-Nov-12	Nov-12	ALS	11:50	400	0.7	1.4	1.7	4.0	0.4	Insects, bird droppings blocked funnel, plant material
EN1204843-003	ND3	19-Dec-12	Dec-12	ALS	10:45	100	0.6	1.3	1.7	4.0	0.3	Insects, bird droppings, plant material
EN1300222-003	ND3	17-Jan-13	Jan-13	ALS	12:45	400	1.7	1.4	1.7	4.0	1.2	Insects, plant material
EN1300661-003	ND3	15-Feb-13	Feb-13	ALS	10:50	1950	1.9	1.4	1.7	4.0	0.9	Insects, plant material
EN1301080-003	ND3	15-Mar-13	Mar-13	ALS	12:40	900	1.5	1.4	1.7	4.0	0.6	Insects, plant material



Deposited Dust - ND4a "Matoppo"

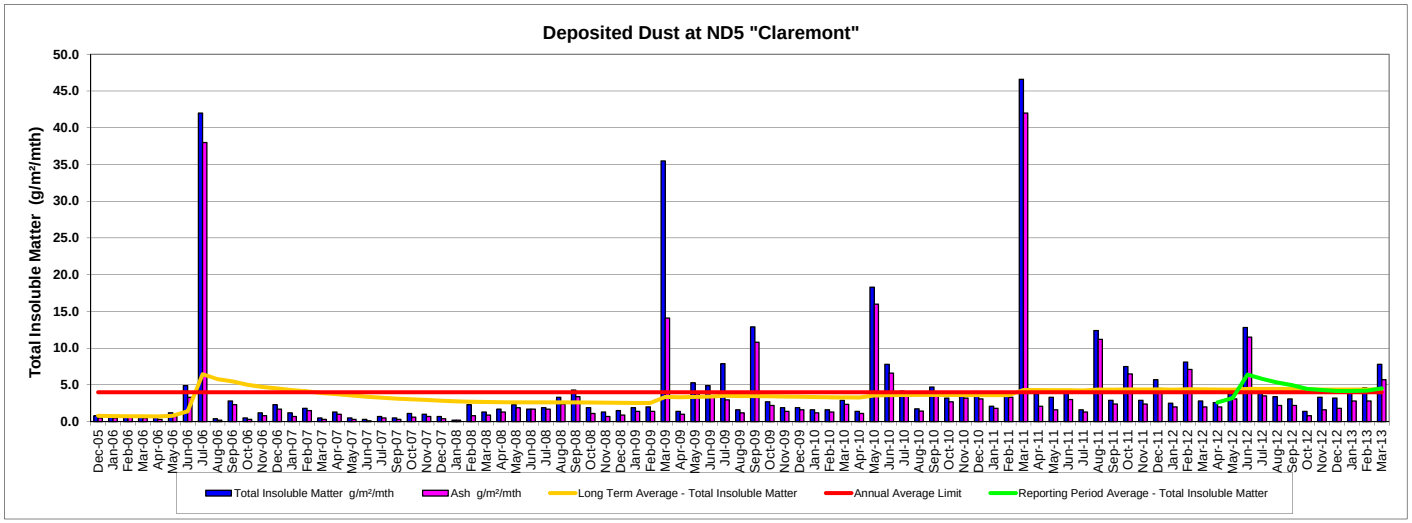
Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected (ml)	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
EN1100432-009	ND4a	21-Feb-11	Feb-11	ALS	10:30	600	3.6		3.6	4.0	2.1	
EN1100689-009	ND4a	23-Mar-11	Mar-11	ALS	11:00	200	3.2		3.4	4.0	2.4	
EN1100923-009	ND4a	20-Apr-11	Apr-11	ALS	10:50	200	1.8		2.9	4.0	1.5	
EN1101164-009	ND4a	19-May-11	May-11	ALS	10:40	0	1.1		2.4	4.0	0.5	Dry
EN1101450-009	ND4a	17-Jun-11	Jun-11	ALS	11:40	1000	4.3		2.8	4.0	3.6	Plant material
EN1101813-009	ND4a	18-Jul-11	Jul-11	ALS	11:50	50	1.5		2.6	4.0	0.5	Insects, bird droppings
EN1102302-009	ND4a	17-Aug-11	Aug-11	ALS	12:35	300	0.6		2.3	4.0	0.6	Insects, plant material
EN1102771-009	ND4a	16-Sep-11	Sep-11	ALS	11:35	800	0.5		2.1	4.0	0.5	Insects, plant material
EN1103120-009	ND4a	17-Oct-11	Oct-11	ALS	11:50	900	0.7		1.9	4.0	0.5	Insects, plant material
EN1103469-009	ND4a	15-Nov-11	Nov-11	ALS	10:40	900	2.1		1.9	4.0	1.3	Insects, plant material
EN1104231-009	ND4a	15-Dec-11	Dec-11	ALS	11:03	2500	0.6		1.8	4.0	0.6	Insects, bird droppings, plan material
EN1200254-009	ND4a	16-Jan-12	Jan-12	ALS	11:30	700	1.1		1.8	4.0	0.8	Insects, plant material
EN1200646-009	ND4a	15-Feb-12	Feb-12	ALS	11:25	2500	3.0		1.9	4.0	1.5	Insects, plant material
EN1201072-008	ND4a	16-Mar-12	Mar-12	ALS	12:00	600	21.6		3.3	4.0	14.4	Insects, plant material
EN1201470-008	ND4a	17-Apr-12	Apr-12	ALS	12:10	100	7.6	7.6	3.6	4.0	3	Insects, bird droppings, plant material, dead frog in bottle
EN1201863-008	ND4A	17-May-12	May-12	ALS	10:50	600	0.7	4.2	3.4	4.0	0.3	Insects, plant material
EN1202257-008	ND4A	18-Jun-12	Jun-12	ALS	12:15	800	0.7	3.0	3.2	4.0	0.7	Insects, plant material
EN1202680-007	ND4A	18-Jul-12	Jul-12	ALS	13:50	1100	0.3	2.3	3.1	4.0	0.3	Insects, plant material
EN1203132-008	ND4A	17-Aug-12	Aug-12	ALS	11:55	100	1.0	2.1	2.9	4.0	0.8	Insects, plant material, broken funnel in bottle
EN1203603-008	ND4A	18-Sep-12	Sep-12	ALS	12:20	100	1.1	1.9	2.9	4.0	0.8	Insects, plant material
EN1203994-008	ND4A	18-Oct-12	Oct-12	ALS	11:37	500	1.1	1.8	2.8	4.0	0.6	Insects, plant material
EN1204421-008	ND4A	19-Nov-12	Nov-12	ALS	12:10	350	0.6	1.6	2.7	4.0	0.5	Insects, plant material
EN1204843-004	ND4A	19-Dec-12	Dec-12	ALS	11:20	100	1.8	1.7	2.6	4.0	1.2	Insects, plant material
EN1300222-004	ND4A	17-Jan-13	Jan-13	ALS	13:00	400	1.2	1.6	2.6	4.0	0.8	Insects, plant material
EN1300661-004	ND4A	15-Feb-13	Feb-13	ALS	11:10	2000	0.8	1.5	2.5	4.0	0.6	Insects, plant material
EN1301080-004	ND4A	15-Mar-13	Mar-13	ALS	13:00	900	0.5	1.5	2.4	4.0	0.2	Insects, plant material



Deposited Dust - ND5 "Claremont"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected (ml)	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
21959.05	ND5	05-Jan-06	Dec-05	Client	1050	1360	0.8		0.8	4.0	0.5	
22569.05	ND5	03-Feb-06	Jan-06	Client	1405	125	0.7		0.8	4.0	0.5	
22720.05	ND5	09-Mar-06	Feb-06	Client	1310	950	0.7		0.7	4.0	0.6	
23204.05	ND5	03-Apr-06	Mar-06	Client	1045	125	0.7		0.7	4.0	0.5	
23295.05	ND5	02-May-06	Apr-06	Client	0910	500	0.6		0.7	4.0	0.3	
23630.05	ND5	02-Jun-06	May-06	Client	0830	<10	1.2		0.8	4.0	0.7	
23882.05	ND5	28-Jun-06	Jun-06	Client	1732	610	4.9		1.4	4.0	3.3	
24078.05	ND5	31-Jul-06	Jul-06	Client	0810	1430	42.0		6.5	4.0	38.0	
24412.05	ND5	30-Aug-06	Aug-06	Client	1446	30	0.4		5.8	4.0	0.2	
25689.05	ND5	03-Oct-06	Sep-06	Client	1120	700	2.8		5.5	4.0	2.3	
24973.05	ND5	02-Nov-06	Oct-06	Client	1313	345	0.5		5.0	4.0	0.3	
25439.05	ND5	04-Dec-06	Nov-06	Client	1235	620	1.2		4.7	4.0	0.8	
25536.05	ND5	02-Jan-07	Dec-06	Client	1340	620	2.3		4.5	4.0	1.7	
25839.05	ND5	02-Feb-07	Jan-07	Client	1155	260	1.2		4.3	4.0	0.7	
26114.05	ND5	05-Mar-07	Feb-07	Client	1320	880	1.8		4.1	4.0	1.5	
26423.05	ND5	03-Apr-07	Mar-07	Client	0925	170	0.5		3.9	4.0	0.3	
26626.05	ND5	02-May-07	Apr-07	Client	1030	380	1.3		3.7	4.0	1.0	
26955.05	ND5	05-Jun-07	May-07	Client	1120	1150	0.5		3.6	4.0	0.3	
27229.05	ND5	02-Jul-07	Jun-07	Client	1345	1310	0.3		3.4	4.0	0.1	
27526.05	ND5	03-Aug-07	Jul-07	Client	1015	185	0.7		3.3	4.0	0.5	
28113.05	ND5	04-Oct-07	Sep-07	Client	1310	45	0.5		3.1	4.0	0.3	
28392.05	ND5	05-Nov-07	Oct-07	Client	1610	625	1.1		3.0	4.0	0.6	
28656.05	ND5	04-Dec-07	Nov-07	Client	1235	1210	1.0		2.9	4.0	0.7	
28917.05	ND5	03-Jan-08	Dec-07	Client	1605	1335	0.7		2.9	4.0	0.4	
29219.05	ND5	04-Feb-08	Jan-08	Client	1425	1235	0.2		2.7	4.0	0.2	
29219.05	ND5	03-Mar-08	Feb-08	Client	1545	1985	2.3		2.7	4.0	0.8	
29767.05	ND5	02-Apr-08	Mar-08	Client	1245	100	1.3		2.7	4.0	0.9	
30049.05	ND5	09-May-08	Apr-08	Client	1050	425	1.7		2.6	4.0	1.3	
30380-05	ND5	02-Jun-08	May-08	Client	1440	190	2.3		2.6	4.0	1.9	
30654.05	ND5	01-Jul-08	Jun-08	Client	1425	870	1.7		2.6	4.0	1.7	
30896.05	ND5	04-Aug-08	Jul-08	Client	1115	510	1.9		2.6	4.0	1.7	
31204.05	ND5	01-Sep-08	Aug-08	Client	1210	840	3.3		2.6	4.0	2.4	
31522.05	ND5	02-Oct-08	Sep-08	Client	0935	1495	4.3		2.6	4.0	3.4	
31769.05	ND5	03-Nov-08	Oct-08	Client	1250	1220	1.9		2.6	4.0	1.1	
32017.05	ND5	03-Dec-08	Nov-08	Client	1250	1440	1.3		2.6	4.0	0.7	
32512.05	ND5	05-Jan-09	Dec-08	Client	1030	2760	1.5		2.6	4.0	0.9	
32240.05	ND5	02-Feb-09	Jan-09	Client	1115	450	1.9		2.5	4.0	1.4	
32857.05	ND5	02-Mar-09	Feb-09	Client	1000	2300	2.0		2.5	4.0	1.4	
2600 1003-00	ND5	01-Apr-09	Mar-09	ALS		100	35.5		3.4	4.0	14.1	Insects, Bird droppings
2600 1021-00	ND5	01-May-09	Apr-09	ALS		800	1.4		3.3	4.0	1.0	Bird droppings
2600 1031-01	ND5	01-Jun-09	May-09	ALS		750	5.3		3.4	4.0	3.8	Plant material
2604 1041-01	ND5	06-Jul-09	Jun-09	ALS		400	4.9		3.4	4.0	3.5	Insects, Plant Material
2604 1053-01	ND5	03-Aug-09	Jul-09	ALS	1035	450	7.9		3.5	4.0	3.0	Insects, Bird Droppings
2600 1065-00	ND5	31-Aug-09	Aug-09	ALS	1113	100	1.6		3.5	4.0	1.2	Insects, Plant Material
2600 1065-00	ND5	28-Sep-09	Sep-09	ALS	1428	700	12.9		3.5	4.0	10.8	Insects, Plant Material
2600 1125-00	ND5	03-Nov-09	Oct-09	ALS	1050	800	2.7		3.5	4.0	2.2	Insects, Bird Droppings
2600 1204-115	ND5	01-Dec-09	Nov-09	ALS	1116	100	1.9		3.4	4.0	1.4	Insects, Plant Material
2600 1222-00	ND5	31-Dec-09	Dec-09	ALS	1115	2400	1.9		3.4	4.0	1.6	
2600 1234-00	ND5	01-Feb-10	Jan-10	ALS	1205	1800	1.6		3.3	4.0	1.2	Insects, Plant Material
2600 1247-00	ND5	03-Mar-10	Feb-10	ALS	1210	1000	1.6		3.3	4.0	1.3	Insects
2600 1260	ND5	31-Mar-10	Mar-10	ALS	1150	600	2.9		3.3	4.0	2.3	Insects, Plant Material
2600 1268	ND5	28-Apr-10	Apr-10	ALS	1110	150	1.4		3.3	4.0	1.1	Insects, Plant Material
26001277	ND5	26-May-10	May-10	ALS	1110	300	18.3		3.6	4.0	16.0	Insects

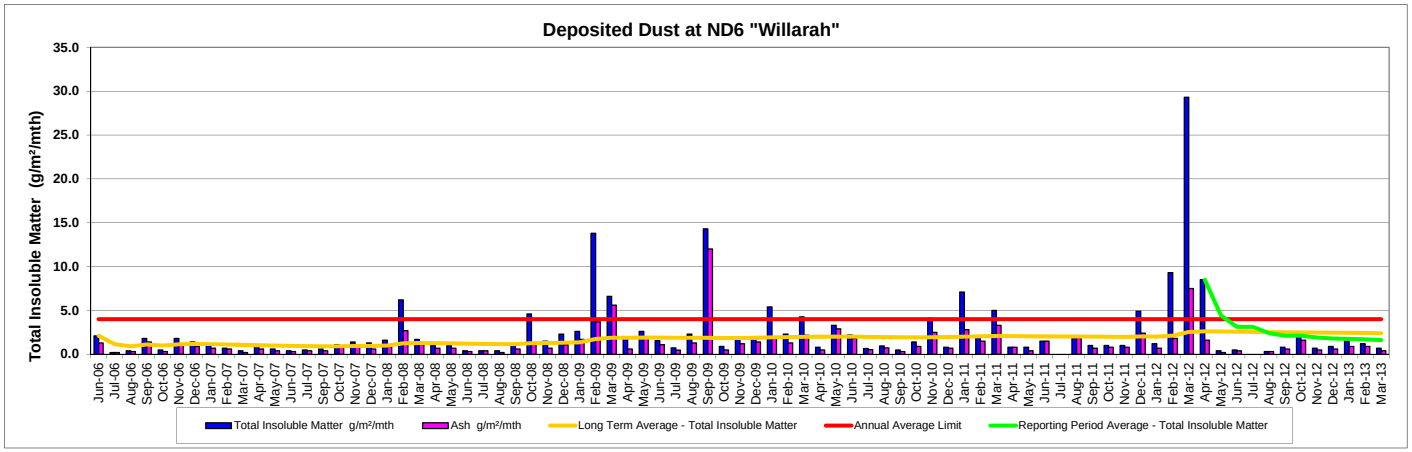
Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected (ml)	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
2600-1288	ND5	23-Jun-10	Jun-10	ALS	0955	400	7.8		3.6	4.0	6.6	Insects, Plant Material
26001298	ND5	21-Jul-10	Jul-10	ALS	1130	650	4.2		3.6	4.0	3.4	Insects, Plant Material
26001309915	ND5	20-Aug-10	Aug-10	ALS	1450	2300	1.7		3.6	4.0	1.4	Insects, Plant material
26001319	ND5	20-Sep-10	Sep-10	ALS	1300	1300	4.7		3.6	4.0	3.8	Insects, Plant material
2600-1340-18	ND5	20-Oct-10	Oct-10	ALS	1230	600	3.2		3.6	4.0	2.7	
EN1002881-005	ND5	19-Nov-10	Nov-10	ALS	1240	1500	3.6		3.6	4.0	3.2	
EN1003078-005	ND5	21-Dec-10	Dec-10	ALS	0940	2000	4.1		3.6	4.0	3.1	
EN1100178-005	ND5	20-Jan-11	Jan-11	ALS	1035	400	2.1		3.6	4.0	1.8	
EN1100432-005	ND5	21-Feb-11	Feb-11	ALS	1015	700	4.0		3.6	4.0	3.3	
EN1100689-005	ND5	23-Mar-11	Mar-11	ALS	1120	300	46.6		4.3	4.0	42.0	Amenity bund construction and frequent use of adjacent unsealed road
EN1100923-005	ND5	20-Apr-11	Apr-11	ALS	10:40	400	3.8		4.3	4.0	2.1	
EN1101164-005	ND5	19-May-11	May-11	ALS	10:30	0	3.3		4.3	4.0	1.6	Bird Droppings/Dry
EN1101450-005	ND5	17-Jun-11	Jun-11	ALS	11:15	1000	4.0		4.3	4.0	3.0	Insects, bird droppings, plant material
EN1101813-005	ND5	18-Jul-11	Jul-11	ALS	11:30	50	1.6		4.2	4.0	1.3	Plant material, road work adjacent
EN1102302-005	ND5	17-Aug-11	Aug-11	ALS	12:20	300	12.4		4.4	4.0	11.2	Insects, plant material
EN1102771-005	ND5	16-Sep-11	Sep-11	ALS	11:28	800	2.9		4.3	4.0	2.4	Insects, plant material
EN1103120-005	ND5	17-Oct-11	Oct-11	ALS	11:30	900	7.5		4.4	4.0	6.5	Insects, plant material, large strands of grass in bottle
EN1103469-005	ND5	15-Nov-11	Nov-11	ALS	10:25	900	2.9		4.4	4.0	2.4	Insects, plant material
EN1104231-005	ND5	15-Dec-11	Dec-11	ALS	10:50	2500	5.7		4.4	4.0	4.5	Insects, plant material
EN1200254-005	ND5	16-Jan-12	Jan-12	ALS	11:10	900	2.5		4.4	4.0	2.0	Insects, plant material
EN1200646-005	ND5	15-Feb-12	Feb-12	ALS	11:10	2500	8.1		4.4	4.0	7.1	Insects, plant material
EN1201072-004	ND5	16-Mar-12	Mar-12	ALS	11:40	800	2.8		4.4	4.0	2.0	Insects, plant material
EN1201470-004	ND5	17-Apr-12	Apr-12	ALS	12:00	200	2.6	2.6	4.4	4.0	2	Insects, plant material
EN1201863-004	ND5	17-May-12	May-12	ALS	11:00	600	3.8	3.2	4.4	4.0	3.1	Insects, plant material
EN1202257-004	ND5	18-Jun-12	Jun-12	ALS	12:00	800	12.8	6.4	4.5	4.0	11.5	Insects, plant material
EN1202680-004	ND5	18-Jul-12	Jul-12	ALS	13:40	1100	4.0	5.8	4.5	4.0	3.5	Insects, plant material
EN1203132-004	ND5	17-Aug-12	Aug-12	ALS	11:45	150	3.4	5.3	4.4	4.0	2.2	Insects, bird droppings, plant material
EN1203603-004	ND5	18-Sep-12	Sep-12	ALS	12:30	100	3.1	5.0	4.4	4.0	2.2	Insects, bird droppings, plant material
EN1203994-004	ND5	18-Oct-12	Oct-12	ALS	11:48	500	1.4	4.4	4.4	4.0	0.8	Insects, plant material
EN1204421-004	ND5	19-Nov-12	Nov-12	ALS	12:20	250	3.3	4.3	4.4	4.0	1.6	Insects, plant material, new road constructed 50 metres away
EN1204843-005	ND5	19-Dec-12	Dec-12	ALS	11:10	100	3.2	4.2	4.4	4.0	1.8	Insects, plant material, large amount of insects
EN1300222-005	ND5	17-Jan-13	Jan-13	ALS	13:10	400	4.2	4.2	4.4	4.0	2.8	Insects, plant material
EN1300661-005	ND5	15-Feb-13	Feb-13	ALS	11:20	2000	4.6	4.2	4.4	4.0	2.8	Insects, plant material
EN1301080-005	ND5	15-Mar-13	Mar-13	ALS	13:15	900	7.8	4.5	4.4	4.0	5.7	Insects, plant material



Deposited Dust - ND6 "Willarah"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected (ml)	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
23882.06	ND6	28-Jun-06	Jun-06	Client	1720	60	2.1		2.1	4.0	1.3	
24078.06	ND6	31-Jul-06	Jul-06	Client	0830	1280	0.2		1.2	4.0	0.2	
24412.06	ND6	30-Aug-06	Aug-06	Client	1438	30	0.4		0.9	4.0	0.3	
25689.06	ND6	03-Oct-06	Sep-06	Client	1131	400	1.8		1.1	4.0	1.4	
24973.06	ND6	02-Nov-06	Oct-06	Client	1318	255	0.5		1.0	4.0	0.3	
25439.06	ND6	04-Dec-06	Nov-06	Client	1245	560	1.8		1.1	4.0	1.1	
25536.06	ND6	02-Jan-07	Dec-06	Client	1350	280	1.4		1.2	4.0	0.9	
25839.06	ND6	02-Feb-07	Jan-07	Client	1145	60	1.2		1.2	4.0	0.7	
26114.06	ND6	05-Mar-07	Feb-07	Client	1330	890	0.7		1.1	4.0	0.6	
26423.06	ND6	03-Apr-07	Mar-07	Client	0930	<50	0.4		1.1	4.0	0.2	
26626.06	ND6	02-May-07	Apr-07	Client	1035	435	0.9		1.0	4.0	0.6	
26955.06	ND6	05-Jun-07	May-07	Client	1127	1105	0.6		1.0	4.0	0.4	
27229.06	ND6	02-Jul-07	Jun-07	Client	1350	1305	0.4		1.0	4.0	0.3	
27526.06	ND6	03-Aug-07	Jul-07	Client	1025	105	0.5		0.9	4.0	0.4	
28113.06	ND6	04-Oct-07	Sep-07	Client	1325	75	0.6		0.9	4.0	0.4	
28392.06	ND6	05-Nov-07	Oct-07	Client	1620	595	1.1		0.9	4.0	0.8	
28656.06	ND6	04-Dec-07	Nov-07	Client	1245	880	1.4		0.9	4.0	0.8	
28917.06	ND6	03-Jan-08	Dec-07	Client	1615	1445	1.3		1.0	4.0	0.6	
29219.06	ND6	04-Feb-08	Jan-08	Client	1440	925	1.6		1.0	4.0	0.9	
29219.06	ND6	03-Mar-08	Feb-08	Client	1600	1750	6.2		1.3	4.0	2.7	
29767.06	ND6	02-Apr-08	Mar-08	Client	1255	160	1.7		1.3	4.0	1.3	
30049.06	ND6	09-May-08	Apr-08	Client	1055	345	1.0		1.3	4.0	0.7	
30380-06	ND6	02-Jun-08	May-08	Client	1450	190	1.0		1.3	4.0	0.7	
30654.06	ND6	01-Jul-08	Jun-08	Client	1435	885	0.4		1.2	4.0	0.3	
30896.06	ND6	04-Aug-08	Jul-08	Client	1120	595	0.4		1.2	4.0	0.4	
31204.06	ND6	01-Sep-08	Aug-08	Client	1215	695	0.4		1.2	4.0	0.2	
31522.06	ND6	02-Oct-08	Sep-08	Client	0920	1465	1.0		1.1	4.0	0.6	
31769.06	ND6	03-Nov-08	Oct-08	Client	1300	1295	4.6		1.3	4.0	1.2	
32017.06	ND6	03-Dec-08	Nov-08	Client	1300	1505	1.5		1.3	4.0	0.7	
32512.06	ND6	05-Jan-09	Dec-08	Client	1022	2750	2.3		1.3	4.0	1.1	
32240.06	ND6	02-Feb-09	Jan-09	Client	1103	480	2.6		1.4	4.0	1.7	
32857.06	ND6	02-Mar-09	Feb-09	Client	0950	1900	13.8		1.7	4.0	3.7	
2600 1003-00	ND6	01-Apr-09	Mar-09	ALS		100	6.6		1.9	4.0	5.6	Insects, frogs
2600 1021-00	ND6	01-May-09	Apr-09	ALS		600	2.0		1.9	4.0	0.6	Insects, Bird droppings
2600 1031-01	ND6	01-Jun-09	May-09	ALS		750	2.6		1.9	4.0	2.0	
2605 1041-01	ND6	06-Jul-09	Jun-09	ALS		400	1.5		1.9	4.0	1.1	Insects
2605 1053-01	ND6	03-Aug-09	Jul-09	ALS	1030	500	0.7		1.9	4.0	0.5	Insects, Plant Material
2600 1065-00	ND6	31-Aug-09	Aug-09	ALS	1105	100	2.3		1.9	4.0	1.3	Insects, Plant Material
2600 1065-00	ND6	28-Sep-09	Sep-09	ALS	1420	700	14.3		1.9	4.0	12.0	Insects, Plant Material
2600 1125-00	ND6	03-Nov-09	Oct-09	ALS	1045	800	0.9		1.9	4.0	0.5	Bird Droppings, Plant Material
2600 1204-115	ND6	01-Dec-09	Nov-09	ALS	1110	50	1.9		1.9	4.0	1.2	Insects, Plant Material
2600 1222-00	ND6	31-Dec-09	Dec-09	ALS	1125	2400	1.9		1.9	4.0	1.4	Bird Droppings
2600 1234-00	ND6	01-Feb-10	Jan-10	ALS	1200	1800	5.4		1.9	4.0	1.8	Insects, Plant Material
2600 1247-00	ND6	03-Mar-10	Feb-10	ALS	1215	900	2.3		2.0	4.0	1.3	Insects, Bird Droppings
2600 1260	ND6	31-Mar-10	Mar-10	ALS	1200	500	4.3		2.0	4.0	2.2	Insects, Plant Material
2600 1268	ND6	28-Apr-10	Apr-10	ALS	1120	150	0.8		2.0	4.0	0.5	Insects, Plant Material

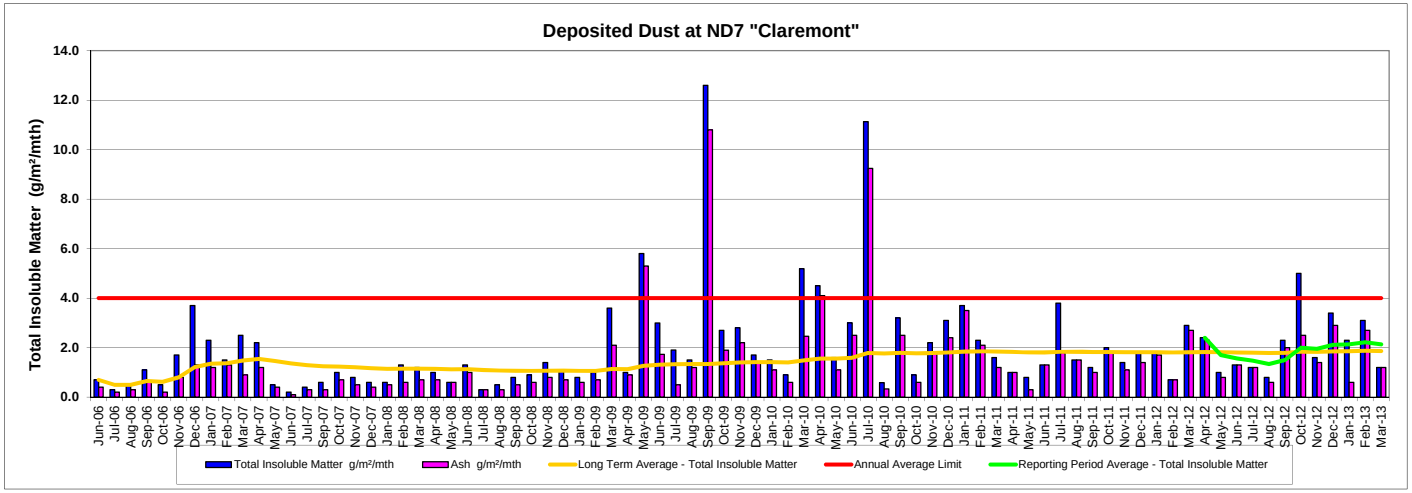
Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected (ml)	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
26001277	ND6	26-May-10	May-10	ALS	1120	300	3.3		2.0	4.0	2.9	Insects, Plant Material
2600-1288	ND6	23-Jun-10	Jun-10	ALS	1005	200	2.2		2.0	4.0	1.8	Insects, Plant Material
26001298	ND6	21-Jul-10	Jul-10	ALS	1140	600	0.6		2.0	4.0	0.5	Insects
26001309915	ND6	20-Aug-10	Aug-10	ALS	1445	2300	1.0		2.0	4.0	0.7	Insects, Plant material
26001319	ND6	20-Sep-10	Sep-10	ALS	1310	1100	0.5		1.9	4.0	0.3	Insects, Plant material
2600-1340-18	ND6	20-Oct-10	Oct-10	ALS	1240	600	1.4		1.9	4.0	0.9	
EN1002881-006	ND6	19-Nov-10	Nov-10	ALS	1245	1500	4.1		2.0	4.0	2.5	
EN1003078-006	ND6	21-Dec-10	Dec-10	ALS	0950	2000	0.8		1.9	4.0	0.7	
EN1100178-006	ND6	20-Jan-11	Jan-11	ALS	1025	300	7.1		2.0	4.0	2.8	Dead frog in bottle
EN1100432-006	ND6	21-Feb-11	Feb-11	ALS	1000	500	2.1		2.0	4.0	1.5	
EN1100689-006	ND6	23-Mar-11	Mar-11	ALS	1115	250	5.0		2.1	4.0	3.3	Dead praying mantis in bottle
EN1100923-006	ND6	20-Apr-11	Apr-11	ALS	10:35	450	0.8		2.1	4.0	0.8	
EN1101164-006	ND6	19-May-11	May-11	ALS	10:20	0	0.8		2.0	4.0	0.4	Plant Matter/Dry
EN1101450-006	ND6	17-Jun-11	Jun-11	ALS	11:00	1000	1.5		2.0	4.0	1.5	Plant material
	ND6	18-Jul-11	Jul-11	ALS	11:20	50			2.0	4.0		**Bottle broken in transit**
EN1102302-006	ND6	17-Aug-11	Aug-11	ALS	12:05	300	1.9		2.0	4.0	1.9	Insects, plant material
EN1102771-006	ND6	16-Sep-11	Sep-11	ALS	11:23	800	1.0		2.0	4.0	0.7	Insects, plant material
EN1103120-006	ND6	17-Oct-11	Oct-11	ALS	11:40	900	1.0		2.0	4.0	0.8	Insects, plant material
EN1103469-006	ND6	15-Nov-11	Nov-11	ALS	10:15	900	1.0		2.0	4.0	0.8	Insects, plant material
EN1104231-006	ND6	15-Dec-11	Dec-11	ALS	10:40	2500	4.9		2.0	4.0	2.4	Insects, bird droppings, plan material
EN1200254-006	ND6	16-Jan-12	Jan-12	ALS	11:00	900	1.2		2.0	4.0	0.7	Insects, plant material
EN1200646-006	ND6	15-Feb-12	Feb-12	ALS	11:00	2500	9.3		2.1	4.0	1.8	Insects, bird droppings, plan material, dead frog in bottle
EN1201072-005	ND6	16-Mar-12	Mar-12	ALS	11:30	800	29.3		2.5	4.0	7.5	Insects, bird droppings, plan material, dead frog in bottle
EN1201470-005	ND6	17-Apr-12	Apr-12	ALS	11:50	200	8.5	8.5	2.6	4.0	1.6	Insects, bird droppings, plant material
EN1201863-005	ND6	17-May-12	May-12	ALS	11:10	500	0.4	4.5	2.6	4.0	0.2	Insects, plant material
EN1202257-005	ND6	18-Jun-12	Jun-12	ALS	11:45	800	0.5	3.1	2.6	4.0	0.4	Insects, plant material
	ND6	18-Jul-12	Jul-12	ALS	13:30			3.1	2.6	4.0		**Bottle broken in transit**
EN1203132-005	ND6	17-Aug-12	Aug-12	ALS	11:30	150	0.3	2.4	2.5	4.0	0.3	Insects, plant material
EN1203603-005	ND6	18-Sep-12	Sep-12	ALS	12:40	100	0.8	2.1	2.5	4.0	0.6	Insects, plant material
EN1203994-005	ND6	18-Oct-12	Oct-12	ALS	11:45	500	2.2	2.1	2.5	4.0	1.6	Insects, plant material
EN1204421-005	ND6	19-Nov-12	Nov-12	ALS	12:30	250	0.7	1.9	2.5	4.0	0.5	Insects, plant material, lime green object in bottom of bottle
EN1204843-006	ND6	19-Dec-12	Dec-12	ALS	11:30	300	0.9	1.8	2.5	4.0	0.6	Insects, plant material
EN1300222-006	ND6	17-Jan-13	Jan-13	ALS	13:20	400	1.5	1.8	2.4	4.0	0.9	Insects, plant material
EN1300661-006	ND6	15-Feb-13	Feb-13	ALS	11:30	2000	1.2	1.7	2.4	4.0	0.9	Insects, plant material
EN1301080-006	ND6	15-Mar-13	Mar-13	ALS	13:30	1000	0.7	1.6	2.4	4.0	0.4	Insects, plant material



Deposited Dust - ND7 "Claremont"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected (ml)	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
23882.07	ND7	28-Jun-06	Jun-06	Client	1709	90	0.7		0.7	4.0	0.4	
24078.07	ND7	31-Jul-06	Jul-06	Client	0845	1375	0.3		0.5	4.0	0.2	
24412.07	ND7	30-Aug-06	Aug-06	Client	1426	35	0.5		0.5	4.0	0.3	
25689.07	ND7	03-Oct-06	Sep-06	Client	1440	600	1.1		0.7	4.0	0.6	
24973.07	ND7	02-Nov-06	Oct-06	Client	1328	340	0.5		0.6	4.0	0.2	
25439.07	ND7	04-Dec-06	Nov-06	Client	1255	780	1.7		0.8	4.0	0.8	
25536.07	ND7	02-Jan-07	Dec-06	Client	1205	700	3.7		1.2	4.0	1.3	
25839.07	ND7	02-Feb-07	Jan-07	Client	1230	140	2.3		1.4	4.0	1.2	
26114.07	ND7	05-Mar-07	Feb-07	Client	1355	925	1.5		1.4	4.0	1.3	
26423.07	ND7	03-Apr-07	Mar-07	Client	1000	205	2.5		1.5	4.0	0.9	
26626.07	ND7	02-May-07	Apr-07	Client	1120	290	2.2		1.5	4.0	1.2	
26955.07	ND7	05-Jun-07	May-07	Client	1150	1025	0.5		1.5	4.0	0.4	
27299.07	ND7	02-Jul-07	Jun-07	Client	1225	1270	0.2		1.4	4.0	0.1	
27526.07	ND7	03-Aug-07	Jul-07	Client	0845	205	0.4		1.3	4.0	0.3	
28113.07	ND7	04-Oct-07	Sep-07	Client	1150	60	0.6		1.2	4.0	0.3	
28392.07	ND7	05-Nov-07	Oct-07	Client	1505	630	1.0		1.2	4.0	0.7	
28656.07	ND7	04-Dec-07	Nov-07	Client	1140	1050	0.8		1.2	4.0	0.5	
28917.07	ND7	03-Jan-08	Dec-07	Client	1510	1610	0.6		1.2	4.0	0.4	
29219.07	ND7	04-Feb-08	Jan-08	Client	1335	1580	0.6		1.1	4.0	0.5	
29219.07	ND7	03-Mar-08	Feb-08	Client	1000	1565	1.3		1.2	4.0	0.6	
29767.07	ND7	02-Apr-08	Mar-08	Client	1130	105	1.2		1.2	4.0	0.7	
30049.07	ND7	09-May-08	Apr-08	Client	0920	355	1.0		1.1	4.0	0.7	
30380-07	ND7	02-Jun-08	May-08	Client	1255	170	0.6		1.1	4.0	0.6	
30654.07	ND7	01-Jul-08	Jun-08	Client	1250	985	1.3		1.1	4.0	1.0	
30896.07	ND7	04-Aug-08	Jul-08	Client	1040	475	0.3		1.1	4.0	0.3	
31204.07	ND7	01-Sep-08	Aug-08	Client	1115	695	0.5		1.1	4.0	0.3	
31522.07	ND7	02-Oct-08	Sep-08	Client	0910	1340	0.8		1.1	4.0	0.5	
31769.07	ND7	03-Nov-08	Oct-08	Client	1140	1290	0.9		1.1	4.0	0.6	
32017.07	ND7	03-Dec-08	Nov-08	Client	1220	1345	1.4		1.1	4.0	0.8	
32512.07	ND7	05-Jan-09	Dec-08	Client	1009	2495	1.1		1.1	4.0	0.7	
32240.07	ND7	02-Feb-09	Jan-09	Client	1027	695	0.8		1.1	4.0	0.6	
32857.07	ND7	02-Mar-09	Feb-09	Client	0926	1950	1.0		1.1	4.0	0.7	
2600 1003-00	ND7	01-Apr-09	Mar-09	ALS		100	3.6		1.1	4.0	2.1	Insects, Bird droppings
2600 1021-00	ND7	01-May-09	Apr-09	ALS		800	1.0		1.1	4.0	0.9	Insects
2600 1031-01	ND7	01-Jun-09	May-09	ALS		750	5.8		1.3	4.0	5.3	Plant material
2606 1041-01	ND7	06-Jul-09	Jun-09	ALS		450	3.0		1.3	4.0	1.7	Insects, Plant Material
2606 1053-01	ND7	03-Aug-09	Jul-09	ALS	1015	400	1.9		1.3	4.0	0.5	Insects, Bird Droppings, Plant Material
2600 1065-00	ND7	31-Aug-09	Aug-09	ALS	1050	75	1.5		1.3	4.0	1.2	Insects, Plant Material
2600 1065-00	ND7	28-Sep-09	Sep-09	ALS	1410	600	12.6		1.3	4.0	10.8	Insects
2600 1125-00	ND7	03-Nov-09	Oct-09	ALS	1034	850	2.7		1.4	4.0	1.9	Insects, Plant Material
2600 1204-115	ND7	01-Dec-09	Nov-09	ALS	1100	100	2.8		1.4	4.0	2.2	Insects, Plant Material
2600 1222-00	ND7	04-Jan-10	Dec-09	ALS	1230	2500	1.7		1.4	4.0	1.4	Insects, Plant Material
2600 1234-00	ND7	01-Feb-10	Jan-10	ALS	1140	400	1.5		1.4	4.0	1.1	Insects, Plant Material
2600 1247-00	ND7	03-Mar-10	Feb-10	ALS	1150	800	0.9		1.4	4.0	0.6	Insects
2600 1260	ND7	31-Mar-10	Mar-10	ALS	1130	600	5.2		1.5	4.0	2.5	Insects, Plant Material
2600 1268	ND7	28-Apr-10	Apr-10	ALS	1050	150	4.5		1.6	4.0	4.1	Insects, Plant Material

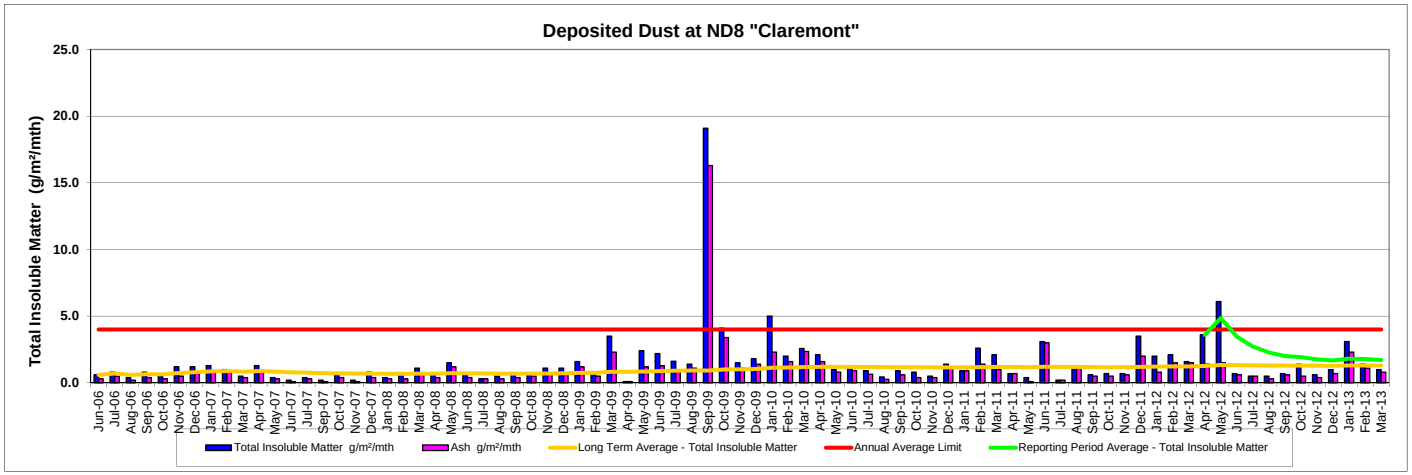
Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected (ml)	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
26001277	ND7	26-May-10	May-10	ALS	1050	250	1.6		1.6	4.0	1.1	Insects, Plant Material
2600-1288	ND7	23-Jun-10	Jun-10	ALS	1100	200	3.0		1.6	4.0	2.5	Insects, Plant Material
26001298	ND7	21-Jul-10	Jul-10	ALS	1120	700	11.1		1.8	4.0	9.2	Insects,Bird Droppings, Plant Material
26001309915	ND7	20-Aug-10	Aug-10	ALS	1430	2300	0.6		1.8	4.0	0.3	Insects, Plant material
26001319	ND7	20-Sep-10	Sep-10	ALS	1245	1200	3.2		1.8	4.0	2.5	Insects, Plant material
2600-1340-18	ND7	20-Oct-10	Oct-10	ALS	1215	600	0.9		1.8	4.0	0.6	
EN1002881-007	ND7	19-Nov-10	Nov-10	ALS	1230	1500	2.2		1.8	4.0	1.8	
EN1003078-007	ND7	21-Dec-10	Dec-10	ALS	0925	2000	3.1		1.8	4.0	2.4	
EN1100178-007	ND7	20-Jan-11	Jan-11	ALS	1015	300	3.7		1.8	4.0	3.5	
EN1100432-007	ND7	21-Feb-11	Feb-11	ALS	0945	400	2.3		1.8	4.0	2.1	
EN1100689-007	ND7	23-Mar-11	Mar-11	ALS	1035	200	1.6		1.8	4.0	1.2	
EN1100923-007	ND7	20-Apr-11	Apr-11	ALS	10:25	600	1.0		1.8	4.0	1.0	
EN1101164-007	ND7	19-May-11	May-11	ALS	10:10	0	0.8		1.8	4.0	0.3	Plant Matter/Dry
EN1101450-007	ND7	17-Jun-11	Jun-11	ALS	10:40	1000	1.3		1.8	4.0	1.3	Insects, plant material
EN1101813-007	ND7	18-Jul-11	Jul-11	ALS	11:00	80	3.8		1.8	4.0	1.8	Bird droppings
EN1102302-007	ND7	17-Aug-11	Aug-11	ALS	11:50	300	1.5		1.8	4.0	1.5	Insects, plant material
EN1102771-007	ND7	16-Sep-11	Sep-11	ALS	11:14	800	1.2		1.8	4.0	1.0	Insects, plant material
EN1103120-007	ND7	17-Oct-11	Oct-11	ALS	11:15	900	2.0		1.8	4.0	1.8	Insects, plant material
EN1103469-007	ND7	15-Nov-11	Nov-11	ALS	10:10	900	1.4		1.8	4.0	1.1	Insects, plant material
EN1104231-007	ND7	15-Dec-11	Dec-11	ALS	10:23	2500	1.8		1.8	4.0	1.4	Insects, plant material
EN1200254-007	ND7	16-Jan-12	Jan-12	ALS	10:45	1200	1.8		1.8	4.0	1.7	Insects, plant material
EN1200646-007	ND7	15-Feb-12	Feb-12	ALS	10:45	2500	0.7		1.8	4.0	0.7	Insects, plant material
EN1201072-006	ND7	16-Mar-12	Mar-12	ALS	11:25	800	2.9		1.8	4.0	2.7	Insects, plant material
EN1201470-006	ND7	17-Apr-12	Apr-12	ALS	11:40	200	2.4	2.4	1.8	4.0	2.3	Insects, plant material
EN1201863-006	ND7	17-May-12	May-12	ALS	11:20	600	1	1.7	1.8	4.0	0.8	Insects, plant material
EN1202257-006	ND7	18-Jun-12	Jun-12	ALS	11:30	800	1.3	1.6	1.8	4.0	1.3	Insects, plant material
EN1202680-005	ND7	18-Jul-12	Jul-12	ALS	13:15	1100	1.2	1.5	1.8	4.0	1.2	Insects, plant material
EN1203132-006	ND7	17-Aug-12	Aug-12	ALS	11:10	100	0.8	1.3	1.8	4.0	0.6	Insects, plant material
EN1203603-006	ND7	18-Sep-12	Sep-12	ALS	12:50	100	2.3	1.5	1.8	4.0	2.0	Insects, plant material
EN1203994-006	ND7	18-Oct-12	Oct-12	ALS	11:57	500	5.0	2.0	1.8	4.0	2.5	Insects, plant material
EN1204421-006	ND7	19-Nov-12	Nov-12	ALS	12:40	300	1.6	2.0	1.8	4.0	1.4	Insects, plant material
EN1204843-007	ND7	19-Dec-12	Dec-12	ALS	11:55	200	3.4	2.1	1.9	4.0	2.9	Insects, plant material
EN1300222-007	ND7	17-Jan-13	Jan-13	ALS	13:30	400	2.3	2.1	1.9	4.0	0.6	Insects, plant material
EN1300661-007	ND7	15-Feb-13	Feb-13	ALS	11:40	1900	3.1	2.2	1.9	4.0	2.7	Insects, plant material
EN1301080-007	ND7	15-Mar-13	Mar-13	ALS	13:40	1000	1.2	2.1	1.9	4.0	1.2	Insects, plant material



Deposited Dust - ND8 "Claremont"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected (ml)	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
23882.08	ND8	28-Jun-06	Jun-06	Client	1658	75	0.6		0.6	4.0	0.3	
24078.08	ND8	31-Jul-06	Jul-06	Client	0905	1300	0.8		0.7	4.0	0.5	
24412.08	ND8	30-Aug-06	Aug-06	Client	1414	10	0.4		0.6	4.0	0.2	
25689.08	ND8	03-Oct-06	Sep-06	Client	1429	400	0.8		0.7	4.0	0.4	
24973.08	ND8	02-Nov-06	Oct-06	Client	1334	200	0.6		0.6	4.0	0.3	
25439.08	ND8	04-Dec-06	Nov-06	Client	1305	370	1.2		0.7	4.0	0.5	
25536.08	ND8	02-Jan-07	Dec-06	Client	1220	500	1.2		0.8	4.0	0.8	
25839.08	ND8	02-Feb-07	Jan-07	Client	1235	170	1.3		0.9	4.0	0.9	
26114.08	ND8	05-Mar-07	Feb-07	Client	1410	750	1.0		0.9	4.0	0.8	
26423.08	ND8	03-Apr-07	Mar-07	Client	1015	<50	0.5		0.8	4.0	0.4	
26626.08	ND8	02-May-07	Apr-07	Client	1105	285	1.3		0.9	4.0	0.9	
26955.08	ND8	05-Jun-07	May-07	Client	1200	1040	0.4		0.8	4.0	0.3	
27299.08	ND8	02-Jul-07	Jun-07	Client	1235	1265	0.2		0.8	4.0	0.1	
27526.08	ND8	03-Aug-07	Jul-07	Client	0855	100	0.4		0.8	4.0	0.3	
28113.08	ND8	04-Oct-07	Sep-07	Client	1155	20	0.2		0.7	4.0	0.1	
28392.08	ND8	05-Nov-07	Oct-07	Client	1510	570	0.6		0.7	4.0	0.4	
28656.08	ND8	04-Dec-07	Nov-07	Client	1150	755	0.2		0.7	4.0	0.1	
28917.08	ND8	03-Jan-08	Dec-07	Client	1500	1595	0.8		0.7	4.0	0.4	
29219.08	ND8	04-Feb-08	Jan-08	Client	1345	1230	0.4		0.7	4.0	0.3	
29219.08	ND8	03-Mar-08	Feb-08	Client	1125	1585	0.6		0.7	4.0	0.3	
29767.08	ND8	02-Apr-08	Mar-08	Client	1120	70	1.1		0.7	4.0	0.7	
30049.08	ND8	09-May-08	Apr-08	Client	0910	410	0.6		0.7	4.0	0.4	
30380.08	ND8	02-Jun-08	May-08	Client	1245	50	1.5		0.7	4.0	1.2	
30654.08	ND8	01-Jul-08	Jun-08	Client	1235	795	0.6		0.7	4.0	0.4	
30896.08	ND8	04-Aug-08	Jul-08	Client	1030	465	0.3		0.7	4.0	0.3	
31204.08	ND8	01-Sep-08	Aug-08	Client	1050	835	0.5		0.7	4.0	0.3	
31522.08	ND8	02-Oct-08	Sep-08	Client	0850	1510	0.6		0.7	4.0	0.4	
31769.08	ND8	03-Nov-08	Oct-08	Client	1120	1455	0.6		0.7	4.0	0.5	
32017.08	ND8	03-Dec-08	Nov-08	Client	1210	1460	1.1		0.7	4.0	0.7	
32512.08	ND8	05-Jan-09	Dec-08	Client	0955	2740	1.1		0.7	4.0	0.7	
32240.08	ND8	02-Feb-09	Jan-09	Client	1007	725	1.6		0.7	4.0	1.2	
32857.08	ND8	02-Mar-09	Feb-09	Client	0906	2250	0.8		0.7	4.0	0.5	
2600 1003-00	ND8	01-Apr-09	Mar-09	ALS		100	3.5		0.8	4.0	2.3	Insects
2600 1021-00	ND8	01-May-09	Apr-09	ALS		800	0.1		0.8	4.0	0.1	Insects
2600 1031-01	ND8	01-Jun-09	May-09	ALS		750	2.4		0.9	4.0	1.2	
2607 1041-01	ND8	06-Jul-09	Jun-09	ALS		350	2.2		0.9	4.0	1.3	Insects
2607 1053-01	ND8	03-Aug-09	Jul-09	ALS	0925	450	1.6		0.9	4.0	0.9	Insects, Plant Material
2600 1065-00	ND8	31-Aug-09	Aug-09	ALS	0940	100	1.4		0.9	4.0	1.1	Insects, Plant Material
2600 1065-00	ND8	28-Sep-09	Sep-09	ALS	1310	800	19.1		0.9	4.0	16.3	Insects
2600 1125-00	ND8	03-Nov-09	Oct-09	ALS	1018	900	4.1		1.0	4.0	3.4	Insects
2600 1204-115	ND8	01-Dec-09	Nov-09	ALS	1000	100	1.5		1.0	4.0	1.1	Insects, Plant Material
2600 1222-00	ND8	31-Dec-09	Dec-09	ALS	1015	2500	1.8		1.0	4.0	1.4	Insects
2600 1234-00	ND8	01-Feb-10	Jan-10	ALS	1130	2200	5.0		1.1	4.0	2.3	Insects, Plant Material
2600 1247-00	ND8	03-Mar-10	Feb-10	ALS	1050	1000	2.0		1.2	4.0	1.6	Insects
2600 1260	ND8	31-Mar-10	Mar-10	ALS	1010	600	2.6		1.2	4.0	2.3	Insects, Plant Material
2600 1268	ND8	28-Apr-10	Apr-10	ALS	0935	150	2.1		1.2	4.0	1.6	Insects, Plant Material
26001277	ND8	26-May-10	May-10	ALS	0935	300	1.0		1.2	4.0	0.8	Insects

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected (ml)	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
2600-1288	ND8	23-Jun-10	Jun-10	ALS	1015	100	1.2		1.2	4.0	0.9	Insects, Plant Material
26001298	ND8	21-Jul-10	Jul-10	ALS	0955	800	0.9		1.2	4.0	0.6	Insects
26001309915	ND8	20-Aug-10	Aug-10	ALS	1410	2300	0.4		1.2	4.0	0.3	Insects, Plant material
26001319	ND8	20-Sep-10	Sep-10	ALS	1235	1200	0.9		1.2	4.0	0.6	Insects, Plant material
2600-1340-18	ND8	20-Oct-10	Oct-10	ALS	1200	800	0.8		1.2	4.0	0.4	
EN1002881-008	ND8	19-Nov-10	Nov-10	ALS	1220	1800	0.5		1.2	4.0	0.4	
EN1003078-008	ND8	21-Dec-10	Dec-10	ALS	0915	2000	1.4		1.2	4.0	1.1	
EN1100178-008	ND8	20-Jan-11	Jan-11	ALS	1000	500	0.9		1.2	4.0	0.9	
EN1100432-008	ND8	21-Feb-11	Feb-11	ALS	0930	400	2.6		1.2	4.0	1.4	
EN1100689-008	ND8	23-Mar-11	Mar-11	ALS	1010	500	2.1		1.2	4.0	1.0	
EN1100923-008	ND8	20-Apr-11	Apr-11	ALS	10:10	800	0.7		1.2	4.0	0.7	Near Plowed Paddock
EN1101164-008	ND8	19-May-11	May-11	ALS	10:00	0	0.4		1.2	4.0	0.1	Insects/Dry
EN1101450-008	ND8	17-Jun-11	Jun-11	ALS	10:20	1000	3.1		1.2	4.0	3.0	Plant material
EN1101813-008	ND8	18-Jul-11	Jul-11	ALS	10:50	50	0.2		1.2	4.0	0.2	Plant material
EN1102302-008	ND8	17-Aug-11	Aug-11	ALS	11:40	300	1.2		1.2	4.0	1.1	Insects, plant material
EN1102771-008	ND8	16-Sep-11	Sep-11	ALS	11:07	800	0.6		1.2	4.0	0.5	Insects, plant material
EN1103120-008	ND8	17-Oct-11	Oct-11	ALS	11:10	1100	0.7		1.2	4.0	0.5	Insects, plant material
EN1103469-008	ND8	15-Nov-11	Nov-11	ALS	10:00	900	0.7		1.2	4.0	0.6	Insects, plant material
EN1104231-008	ND8	15-Dec-11	Dec-11	ALS	10:20	2500	3.5		1.2	4.0	2.0	Insects, plant material
EN1200254-008	ND8	16-Jan-12	Jan-12	ALS	10:30	1200	2.0		1.2	4.0	0.8	Insects, bird droppings, plan material
EN1200646-008	ND8	15-Feb-12	Feb-12	ALS	10:30	2500	2.1		1.2	4.0	1.5	Insects, plant material
EN1201072-007	ND8	16-Mar-12	Mar-12	ALS	11:15	800	1.6		1.2	4.0	1.5	Insects, plant material
EN1201470-007	ND8	17-Apr-12	Apr-12	ALS	11:30	200	3.6	3.6	1.3	4.0	1.4	Insects, plant material
EN1201863-007	ND8	17-May-12	May-12	ALS	11:50	600	6.1	4.9	1.3	4.0	1.5	Insects, bird droppings, plant material
EN1202257-007	ND8	18-Jun-12	Jun-12	ALS	11:20	900	0.7	3.5	1.3	4.0	0.6	Insects, plant material
EN1202680-006	ND8	18-Jul-12	Jul-12	ALS	12:55	1100	0.5	2.7	1.3	4.0	0.5	Insects, plant material
EN1203132-007	ND8	17-Aug-12	Aug-12	ALS	11:10	100	0.5	2.3	1.3	4.0	0.3	Insects, plant material
EN1203603-007	ND8	18-Sep-12	Sep-12	ALS	13:10	100	0.7	2.0	1.3	4.0	0.6	Insects, plant material
EN1203994-007	ND8	18-Oct-12	Oct-12	ALS	12:10	500	1.4	1.9	1.3	4.0	0.5	Insects, plant material
EN1204421-007	ND8	19-Nov-12	Nov-12	ALS	13:00	250	0.6	1.8	1.3	4.0	0.4	Insects, plant material
EN1204843-008	ND8	19-Dec-12	Dec-12	ALS	11:00	100	1	1.7	1.3	4.0	0.7	Insects, plant material
EN1300222-008	ND8	17-Jan-13	Jan-13	ALS	14:00	400	3.1	1.8	1.3	4.0	2.3	Insects, plant material
EN1300661-008	ND8	15-Feb-13	Feb-13	ALS	12:00	2000	1.4	1.8	1.3	4.0	1.1	Insects, plant material
EN1301080-008	ND8	15-Mar-13	Mar-13	ALS	13:50	1800	1.0	1.7	1.3	4.0	0.8	Insects, plant material



Claremont PM_{10} High Volume Air Sampler

Site	Site Id	Datum	Zone	Easting	Northing
Claremont PM10	ND-9	MGA	55	777047	6619621
Date	**mg/paper**	**µg/m^3**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
1/12/2007	11.1	7	7.00	30	50
7/12/2007	20.5	14	10.50	30	50
13/12/2007	14.2	9	10.00	30	50
19/12/2007	16.1	11	10.25	30	50
25/12/2007	20.7	13	10.80	30	50
31/12/2007	14.1	9	10.50	30	50
6/01/2008	20.9	14	11.00	30	50
12/01/2008	37.4	24	12.63	30	50
18/01/2008	19.4	12	12.56	30	50
24/01/2008	33	21	13.40	30	50
30/01/2008	35.6	23	14.27	30	50
5/02/2008	26.6	17	14.50	30	50
11/02/2008	34	22	15.08	30	50
17/02/2008	20.2	13	14.93	30	50
23/02/2008	74.3	48	17.13	30	50
29/02/2008	13.1	8	16.56	30	50
6/03/2008		31	17.41	30	50
12/03/2008		22	17.67	30	50
18/03/2008		20	17.79	30	50
24/03/2008		26	18.20	30	50
30/03/2008		14	18.00	30	50
5/04/2008	24	15	17.86	30	50
11/04/2008	1.7	1	17.13	30	50
17/04/2008	11.4	7	16.71	30	50
23/04/2008	2	1	16.08	30	50
29/04/2008	1.8	1	15.50	30	50
5/05/2008	14	9	15.26	30	50
11/05/2008	5.3	3	14.82	30	50
17/05/2008	10.9	7	14.55	30	50
23/05/2008	5.7	3	14.17	30	50
29/05/2008	4.1	3	13.81	30	50
4/06/2008	2.5	2	13.44	30	50
10/06/2008	2.5	2	13.09	30	50
16/06/2008	2.4	2	12.76	30	50
22/06/2008	1.3	1	12.43	30	50
28/06/2008	6.7	4	12.19	30	50
4/07/2008	9.4	6	12.03	30	50
10/07/2008	4.3	3	11.79	30	50
16/07/2008	1.8	1	11.51	30	50
22/07/2008	9.2	6	11.38	30	50

Claremont PM_{10} High Volume Air Sampler

Site	Site Id	Datum	Zone	Easting	Northing
Claremont PM10	ND-9	MGA	55	777047	6619621
Date	**mg/paper**	**µg/m^3**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
28/07/2008	5.7	3	11.17	30	50
3/08/2008	6.5	4	11.00	30	50
9/08/2008	1.2	1	10.77	30	50
15/08/2008	5.5	3	10.59	30	50
21/08/2008	22.2	14	10.67	30	50
27/08/2008	12	7	10.59	30	50
2/09/2008	5.3	3	10.43	30	50
8/09/2008	2	1	10.23	30	50
14/09/2008	17	10	10.22	30	50
20/09/2008	36.7	23	10.48	30	50
26/09/2008	14.7	9	10.45	30	50
2/10/2008	41	26	10.75	30	50
8/10/2008	12.9	8	10.70	30	50
14/10/2008	14.7	9	10.67	30	50
20/10/2008	24.5	16	10.76	30	50
26/10/2008	19.5	12	10.79	30	50
1/11/2008	29.3	19	10.93	30	50
7/11/2008	13.4	9	10.90	30	50
13/11/2008	5	3	10.76	30	50
19/11/2008	3.9	3	10.63	30	50
25/11/2008	2.6	3	10.51	30	50
1/12/2008	14	9	10.54	30	50
7/12/2008	23.5	15	10.56	30	50
13/12/2008	21.2	14	10.64	30	50
19/12/2008	14.5	9	10.61	30	50
25/12/2008	21.6	14	10.62	30	50
31/12/2008	42.3	28	10.93	30	50
6/01/2009	29.2	21	11.05	30	50
12/01/2009	27.4	18	10.95	30	50
18/01/2009	27.2	17	11.03	30	50
24/01/2009	19	13	10.90	30	50
30/01/2009	21.9	14	10.75	30	50
5/02/2009	25.1	17	10.75	30	50
11/02/2009	31.2	20	10.72	30	50
17/02/2009	3.8	2	10.54	30	50
23/02/2009	16.8	11	9.93	30	50
1/03/2009	29.2	19	10.11	30	50
7/03/2009	23.3	15	9.85	30	50
13/03/2009	19.1	12	9.69	30	50
19/03/2009	36.8	24	9.75	30	50

Claremont PM_{10} High Volume Air Sampler

Site	Site Id	Datum	Zone	Easting	Northing
Claremont PM10	ND-9	MGA	55	777047	6619621
Date	**mg/paper**	**µg/m^3**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
25/03/2009	31	20	9.66	30	50
31/03/2009	11.7	7	9.54	30	50
6/04/2009	19.4	12	9.49	30	50
12/04/2009	12.3	8	9.61	30	50
18/04/2009	46.2	29	9.97	30	50
24/04/2009	9.3	6	10.05	30	50
30/04/2009	12.9	8	10.16	30	50
6/05/2009	20	13	10.23	30	50
12/05/2009	26	16	10.44	30	50
18/05/2009	34.3	21	10.67	30	50
24/05/2009	12.9	8	10.75	30	50
30/05/2009	8.7	5	10.79	30	50
5/06/2009	4.2	3	10.80	30	50
11/06/2009	5	3	10.82	30	50
17/06/2009	1.6	1	10.80	30	50
23/06/2009	2.3	1	10.80	30	50
29/06/2009	4.9	5	10.82	30	50
5/07/2009	5	3	10.77	30	50
11/07/2009	8.5	5	10.80	30	50
17/07/2009	1	1	10.80	30	50
23/07/2009	17	11	10.89	30	50
29/07/2009	5.3	3	10.89	30	50
4/08/2009	10.9	7	10.93	30	50
10/08/2009	35.4	22	11.28	30	50
16/08/2009	14.8	9	11.38	30	50
22/08/2009	25.9	16	11.41	30	50
28/08/2009	16.7	10	11.46	30	50
3/09/2009	25.9	16	11.67	30	50
9/09/2009	1.4	1	11.67	30	50
15/09/2009	29.3	19	11.82	30	50
21/09/2009	10.4	7	11.56	30	50
27/09/2009	61.5	39	12.05	30	50
3/10/2009	57.8	36	12.21	30	50
9/10/2009	17.4	11	12.26	30	50
15/10/2009	32.9	21	12.46	30	50
21/10/2009	44.2	28	12.66	30	50
27/10/2009	11.8	7	12.57	30	50
2/11/2009	24.6	16	12.52	30	50

Claremont PM_{10} High Volume Air Sampler

Site	Site Id	Datum	Zone	Easting	Northing
Claremont PM10	ND-9	MGA	55	777047	6619621
Date	**mg/paper**	**µg/m^3**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
8/11/2009	18.6	12	12.57	30	50
14/11/2009	28	18	12.82	30	50
20/11/2009	66.1	44	13.49	30	50
26/11/2009	53.7	35	14.02	30	50
2/12/2009	20.4	13	14.08	30	50
8/12/2009	170.1	114	15.70	30	50
14/12/2009	89.5	58	16.43	30	50
20/12/2009	39.9	26	16.70	30	50
26/12/2009	26.5	16	16.55	30	50
1/01/2010	10	7	16.39	30	50
7/01/2010	10.5	7	16.13	30	50
13/01/2010	40	27	16.31	30	50
19/01/2010	40.9	26	16.52	30	50
25/01/2010	44.7	29	16.72	30	50
31/01/2010	17	11	16.67	30	50
6/02/2010	13.9	9	16.48	30	50
12/02/2010	25.8	17	16.73	30	50
18/02/2010	14.1	9	16.70	30	50
24/02/2010	25.3	16	16.65	30	50
2/03/2010	11.3	7	16.52	30	50
8/03/2010	15.7	10	16.48	30	50
14/03/2010	3.5	2	16.12	30	50
20/03/2010	20.6	13	16.00	30	50
26/03/2010	39.3	25	16.30	30	50
1/04/2010	6	4	16.17	30	50
7/04/2010	11.2	7	16.15	30	50
13/04/2010	14.6	9	15.82	30	50
19/04/2010	20.7	13	15.93	30	50
25/04/2010	9.4	6	15.90	30	50
1/05/2010	24	15	15.93	30	50
7/05/2010	11.1	7	15.78	30	50
13/05/2010	23.5	14	15.67	30	50
19/05/2010	15.5	10	15.70	30	50
25/05/2010	52.9	34	16.18	30	50
31/05/2010	2.7	2	16.17	30	50
6/06/2010	1.6	1	16.13	30	50
12/06/2010	3.4	2	16.15	30	50
18/06/2010	4.3	3	16.18	30	50
24/06/2010	3.3	2	16.13	30	50

Claremont PM_{10} High Volume Air Sampler

Site	Site Id	Datum	Zone	Easting	Northing
Claremont PM10	ND-9	MGA	55	777047	6619621
Date	**mg/paper**	**µg/m^3**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
30/06/2010	3.6	2	16.12	30	50
6/07/2010	10	6	16.13	30	50
12/07/2010	9.6	6	16.22	30	50
18/07/2010	11.6	7	16.15	30	50
24/07/2010	2.3	1	16.12	30	50
30/07/2010	0	0	16.00	30	50
5/08/2010	7.8	5	15.72	30	50
11/08/2010	4.5	3	15.62	30	50
17/08/2010	5.9	4	15.42	30	50
23/08/2010	4.9	3	15.30	30	50
29/08/2010	5.9	4	15.10	30	50
4/09/2010	9.6	6	15.18	30	50
10/09/2010	2.9	2	14.90	30	50
16/09/2010	4	2	14.82	30	50
22/09/2010	24.8	16	14.43	30	50
28/09/2010	26.2	17	14.12	30	50
4/10/2010	12.8	8	14.07	30	50
10/10/2010	12.9	8	13.85	30	50
16/10/2010	2.6	2	13.42	30	50
22/10/2010	16.1	10	13.47	30	50
28/10/2010	16.3	11	13.38	30	50
3/11/2010	8.2	5	13.27	30	50
9/11/2010	9.6	6.8	13.08	30	50
15/11/2010	14	8.6	12.49	30	50
21/11/2010	14	8.6	12.05	30	50
27/11/2010	19.2	11.8	12.03	30	50
3/12/2010	13.5	8	10.26	30	50
9/12/2010	28.5	17	9.58	30	50
15/12/2010	32.5	19.3	9.47	30	50
21/12/2010	7.1	4.2	9.27	30	50
27/12/2010	1.5	0.9	9.17	30	50
2/01/2011	15.7	9.4	9.21	30	50
8/01/2011	17.4	10.4	8.93	30	50
14/01/2011	18	10.7	8.68	30	50
20/01/2011	8.8	5.2	8.28	30	50
26/01/2011	28.1	16.7	8.38	30	50
1/02/2011	38.7	23.7	8.62	30	50
7/02/2011	31.2	19.1	8.66	30	50
13/02/2011	25.5	15.6	8.77	30	50
19/02/2011	33.8	20.7	8.85	30	50

Claremont PM_{10} High Volume Air Sampler

Site	Site Id	Datum	Zone	Easting	Northing
Claremont PM10	ND-9	MGA	55	777047	6619621
Date	**mg/paper**	**µg/m^3**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
25/02/2011	45.6	28	9.20	30	50
3/03/2011	17.2	10.2	9.20	30	50
9/03/2011	18.7	11.1	9.35	30	50
15/03/2011	9.6	5.7	9.23	30	50
21/03/2011	5.7	3.4	8.87	30	50
27/03/2011	14.6	8.7	8.95	30	50
2/04/2011	16.1	9.6	8.99	30	50
8/04/2011	10	6	8.94	30	50
14/04/2011	18	10.7	8.90	30	50
20/04/2011	24.8	14.8	9.05	30	50
26/04/2011	7.7	4.6	8.88	30	50
2/05/2011	20.5	12.2	8.96	30	50
8/05/2011	21.4	12.7	8.94	30	50
14/05/2011	9.2	5.5	8.87	30	50
20/05/2011	21.2	12.6	8.51	30	50
26/05/2011	2.8	1.7	8.50	30	50
1/06/2011	5.4	3.2	8.54	30	50
7/06/2011	2.9	1.7	8.54	30	50
13/06/2011	5.1	3	8.54	30	50
19/06/2011	6.6	3.9	8.57	30	50
25/06/2011	9.4	5.6	8.63	30	50
1/07/2011	3.7	2.2	8.56	30	50
7/07/2011	15.1	9	8.61	30	50
13/07/2011	16.9	10.1	8.67	30	50
19/07/2011	3.2	1.9	8.68	30	50
25/07/2011	7.1	4.2	8.75	30	50
31/07/2011	10.2	6.1	8.77	30	50
6/08/2011	15	9.2	8.87	30	50
12/08/2011	2.8	1.7	8.83	30	50
18/08/2011	4	2.4	8.82	30	50
24/08/2011	4.2	2.6	8.80	30	50
30/08/2011	17.4	10.7	8.88	30	50
5/09/2011	14.2	8.4	8.99	30	50
11/09/2011	<0.1	<0.1	9.10	30	50
17/09/2011	8.7	5.2	8.92	30	50
23/09/2011	46	27.4	9.10	30	50
29/09/2011	7.4	6.6	9.07	30	50
5/10/2011	13.2	7.9	9.07	30	50
11/10/2011	9.8	5.8	9.14	30	50
17/10/2011	11.5	6.8	9.08	30	50

Claremont PM_{10} High Volume Air Sampler

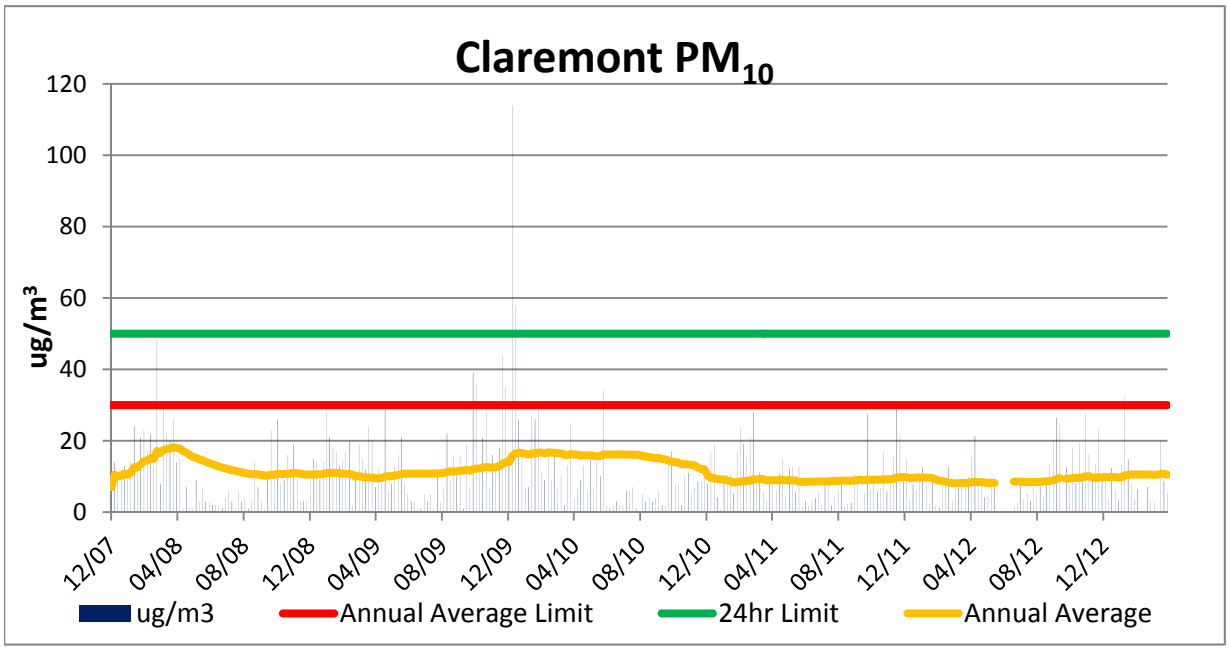
Site	Site Id	Datum	Zone	Easting	Northing
Claremont PM10	ND-9	MGA	55	777047	6619621
Date	**mg/paper**	**µg/m^3**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
23/10/2011	28.4	16.9	9.18	30	50
29/10/2011	9.8	5.8	9.19	30	50
4/11/2011	13.2	7.9	9.21	30	50
10/11/2011	26.1	15.5	9.33	30	50
16/11/2011	39.2	28.9	9.67	30	50
22/11/2011	35.8	21.3	9.84	30	50
28/11/2011	15.3	9.1	9.85	30	50
4/12/2011	24.7	14.7	9.82	30	50
10/12/2011	5.9	3.5	9.55	30	50
16/12/2011	12.9	7.7	9.61	30	50
22/12/2011	10.5	6.2	9.70	30	50
28/12/2011	16.8	10	9.71	30	50
3/01/2012	21	12.5	9.74	30	50
9/01/2012	12.8	7.6	9.69	30	50
15/01/2012	4	2.4	9.64	30	50
21/01/2012	15.5	9.2	9.52	30	50
27/01/2012	3.2	1.9	9.15	30	50
2/02/2012	2.3	1.4	8.85	30	50
8/02/2012	15.7	9.4	8.74	30	50
14/02/2012	15.8	9.4	8.55	30	50
20/02/2012	16.6	12.7	8.29	30	50
26/02/2012	5.4	3.2	8.17	30	50
3/03/2012	10.9	6.5	8.09	30	50
9/03/2012	11.5	6.8	8.11	30	50
15/03/2012	15.2	9	8.21	30	50
21/03/2012	12.2	7.3	8.18	30	50
27/03/2012	16.4	9.8	8.19	30	50

Claremont PM_{10} High Volume Air Sampler

Site	Site Id	Datum	Zone	Easting	Northing
Claremont PM10	ND-9	MGA	55	777047	6619621
Date	**mg/paper**	**µg/m^3**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
2/04/2012	26.1	15.5	8.35	30	50
8/04/2012	35.7	21.3	8.53	30	50
14/04/2012	12.1	7.2	8.40	30	50
20/04/2012	12.9	7.7	8.45	30	50
26/04/2012	7.1	4.2	8.32	30	50
2/05/2012	7.9	4.7	8.18	30	50
8/05/2012	12	7.1	8.21	30	50
14/05/2012	15.7	9.4	8.15	30	50
20/05/2012				30	50
26/05/2012				30	50
1/06/2012				30	50
7/06/2012				30	50
13/06/2012				30	50
19/06/2012	2.7	1.6	8.58	30	50
25/06/2012	4.2	2.5	8.59	30	50
1/07/2012	12.2	7.5	8.56	30	50
7/07/2012	5.8	3.6	8.44	30	50
13/07/2012	8.6	5.3	8.50	30	50
19/07/2012	5.1	3.1	8.48	30	50
25/07/2012	11.4	7	8.50	30	50
31/07/2012	8.1	5	8.42	30	50
6/08/2012	11.9	7.1	8.52	30	50
12/08/2012	7.3	4.3	8.56	30	50
18/08/2012	13.1	7.8	8.65	30	50
24/08/2012	22.5	13.4	8.70	30	50
30/08/2012	33.9	20.2	8.92	30	50
5/09/2012	44.1	26.4	9.24	30	50
11/09/2012	41.4	24.8	9.60	30	50
17/09/2012				30	50
23/09/2012	21	12.6	9.38	30	50
29/09/2012	12.7	7.6	9.37	30	50
5/10/2012	30	17.8	9.59	30	50
11/10/2012	13.6	8.1	9.62	30	50
17/10/2012	32.6	19.4	9.66	30	50
23/10/2012	13.9	8.3	9.71	30	50
29/10/2012	46.1	27.5	10.07	30	50
4/11/2012	27.4	16.4	10.09	30	50
10/11/2012	13.7	8.8	9.72	30	50
16/11/2012	22.5	13.4	9.57	30	50
22/11/2012	39	23.2	9.83	30	50

Claremont PM_{10} High Volume Air Sampler

Site	Site Id	Datum	Zone	Easting	Northing
Claremont PM10	ND-9	MGA	55	777047	6619621
Date	**mg/paper**	**µg/m³**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
28/11/2012	16.6	9.9	9.74	30	50
4/12/2012	16.4	10	9.86	30	50
10/12/2012	6.5	4	9.80	30	50
16/12/2012	20.3	12.4	9.91	30	50
22/12/2012	10.2	6.2	9.84	30	50
28/12/2012	5.7	3.5	9.67	30	50
3/01/2013	21.9	13.4	9.78	30	50
9/01/2013	53.4	32.3	10.34	30	50
15/01/2013	13.4	14.8	10.44	30	50
21/01/2013	13.5	8	10.55	30	50
27/01/2013	6.2	3.7	10.59	30	50
2/02/2013	10.9	6.5	10.54	30	50
8/02/2013			10.56	30	50
14/02/2013			10.52	30	50
20/02/2013	12	7.1	10.60	30	50
26/02/2013	5.3	3.2	10.53	30	50
4/03/2013	4.5	2.7	10.45	30	50
10/03/2013	<0.1	<0.1	10.48	30	50
16/03/2013	33.8	20.1	10.73	30	50
22/03/2013	14.8	8.8	10.71	30	50
28/03/2013	8.8	5.4	10.52	30	50



Turrabaa PM_{10} High Volume Air Sampler

Site	Site Id	Datum	Zone	Easting	Northing
Turrabaa PM10	ND-10	MGA	55	779775	6619367
Date	**mg/paper**	**µg/m^3**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
11/04/2008	20.9	14	14.00	30	50
17/04/2008	45.8	30	22.00	30	50
23/04/2008	0.9	1	15.00	30	50
29/04/2008	32.4	20	16.25	30	50
5/05/2008	51.4	33	19.60	30	50
11/05/2008	38.7	25	20.50	30	50
17/05/2008	106.6	70	27.57	30	50
23/05/2008	43.9	28	27.63	30	50
29/05/2008	19.4	12	25.89	30	50
4/06/2008	5	3	23.60	30	50
10/06/2008	38.1	24	23.64	30	50
16/06/2008	3.6	2	21.83	30	50
22/06/2008	1.7	1	20.23	30	50
28/06/2008	6.8	4	19.07	30	50
4/07/2008	11.6	7	18.27	30	50
10/07/2008	2.3	1	17.19	30	50
16/07/2008	8	5	16.47	30	50
22/07/2008	18.4	11	16.17	30	50
28/07/2008	3.6	2	15.42	30	50
3/08/2008	4.9	3	14.80	30	50
9/08/2008	9.8	6	14.38	30	50
15/08/2008	16	10	14.18	30	50
21/08/2008	28	18	14.35	30	50
27/08/2008	20.1	13	14.29	30	50
2/09/2008	5.6	4	13.88	30	50
8/09/2008	5.1	3	13.46	30	50
14/09/2008	18.9	12	13.41	30	50
20/09/2008	52.6	35	14.18	30	50
26/09/2008	17.4	11	14.07	30	50
2/10/2008	58.7	38	14.87	30	50
8/10/2008	16.1	10	14.71	30	50
14/10/2008	25.8	17	14.78	30	50
20/10/2008	55.8	37	15.45	30	50
26/10/2008	21.8	14	15.41	30	50
1/11/2008	55.9	37	16.03	30	50
7/11/2008	49.4	33	16.50	30	50
13/11/2008	16.6	11	16.35	30	50
19/11/2008	4.6	3	16.00	30	50
25/11/2008	15.3	10	15.85	30	50
1/12/2008	25	16	15.85	30	50

Turrabaa PM_{10} High Volume Air Sampler

Site	Site Id	Datum	Zone	Easting	Northing
Turrabaa PM10	ND-10	MGA	55	779775	6619367
Date	**mg/paper**	**µg/m^3**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
7/12/2008	14.7	10	15.71	30	50
13/12/2008	22.5	15	15.69	30	50
19/12/2008	19.3	12	15.60	30	50
25/12/2008	19.4	13	15.55	30	50
31/12/2008	47.6	31	15.89	30	50
6/01/2009	36.3	25	16.09	30	50
12/01/2009	30.1	20	16.17	30	50
18/01/2009	27.9	18	16.21	30	50
24/01/2009	21.5	15	16.18	30	50
30/01/2009	24.6	17	16.2	30	50
5/02/2009	33.5	23	16.33	30	50
11/02/2009	27.5	18	16.37	30	50
17/02/2009	7.4	5	16.15	30	50
23/02/2009	24.4	16	16.15	30	50
1/03/2009	31.4	21	16.24	30	50
7/03/2009	27.2	18	16.27	30	50
13/03/2009	44.8	30	16.51	30	50
19/03/2009	43.6	29	16.72	30	50
25/03/2009	34.9	23	16.83	30	50
31/03/2009	14.3	9	16.70	30	50
6/04/2009	12.2	8	16.56	30	50
12/04/2009	9.5	6	16.43	30	50
18/04/2009	38.1	25	16.34	30	50
24/04/2009	4.8	3	16.38	30	50
30/04/2009	10.1	6	16.15	30	50
6/05/2009	23.5	15	15.85	30	50
12/05/2009	35.5	23	15.82	30	50
18/05/2009	27.9	18	14.97	30	50
24/05/2009	18	12	14.70	30	50
30/05/2009	9.2	6	14.61	30	50
5/06/2009	4	3	14.61	30	50
11/06/2009	5.4	4	14.28	30	50
17/06/2009	4.3	3	14.30	30	50
23/06/2009	1.5	1	14.30	30	50
29/06/2009	5.9	6	14.33	30	50
5/07/2009	1.6	1	14.23	30	50
11/07/2009	9	6	14.31	30	50
17/07/2009	2.2	1	14.25	30	50
23/07/2009	18.8	12	14.26	30	50
29/07/2009	6.6	4	14.30	30	50

Turrabaa PM_{10} High Volume Air Sampler

Site	Site Id	Datum	Zone	Easting	Northing
Turrabaa PM10	ND-10	MGA	55	779775	6619367
Date	**mg/paper**	**µg/m^3**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
4/08/2009	10.7	7	14.36	30	50
10/08/2009	24	15	14.51	30	50
16/08/2009	16.5	11	14.52	30	50
22/08/2009	26.4	17	14.51	30	50
28/08/2009	14.5	9	14.44	30	50
3/09/2009	24.4	16	14.64	30	50
9/09/2009	2	1	14.61	30	50
15/09/2009	19.6	13	14.62	30	50
21/09/2009	14.3	9	14.20	30	50
27/09/2009	59.4	38	14.64	30	50
3/10/2009	63.3	41	14.69	30	50
9/10/2009	24.3	16	14.79	30	50
15/10/2009	42.9	28	14.97	30	50
21/10/2009	35.6	23	14.74	30	50
27/10/2009	26.5	16	14.77	30	50
2/11/2009	22.8	15	14.41	30	50
8/11/2009	13.7	9	14.02	30	50
14/11/2009	25.4	17	14.11	30	50
20/11/2009	72.2	49	14.87	30	50
26/11/2009	41.7	28	15.16	30	50
2/12/2009	15.4	10	15.07	30	50
8/12/2009	125.3	86	16.31	30	50
14/12/2009	78.9	53	16.93	30	50
20/12/2009	35.9	24	17.13	30	50
26/12/2009	22.3	15	16.93	30	50
1/01/2010	11.4	8	16.79	30	50
7/01/2010	19.2	13	16.59	30	50
13/01/2010	34.7	24	16.66	30	50
19/01/2010	31.5	21	16.70	30	50
25/01/2010	34	23	16.84	30	50
31/01/2010	25.8	17	16.84	30	50
6/02/2010	12.9	9	16.61	30	50
12/02/2010	19.8	13	16.52	30	50
18/02/2010	16.1	11	16.62	30	50
24/02/2010	21.5	14	16.59	30	50
2/03/2010	14	9	16.39	30	50
8/03/2010	6.4	4	16.16	30	50
14/03/2010	0	<1	15.93	30	50
20/03/2010	26.9	18	15.75	30	50
26/03/2010	39.8	22	15.85	30	50

Turrabaa PM_{10} High Volume Air Sampler

Site	Site Id	Datum	Zone	Easting	Northing
Turrabaa PM10	ND-10	MGA	55	779775	6619367
Date	**mg/paper**	**µg/m^3**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
1/04/2010	10.1	7	15.83	30	50
7/04/2010	7.3	5	15.81	30	50
13/04/2010	12.3	8	15.53	30	50
19/04/2010	2.5	2	15.51	30	50
25/04/2010	8.4	5	15.49	30	50
1/05/2010	16.9	11	15.42	30	50
7/05/2010	14	9	15.19	30	50
13/05/2010	20.4	13	15.10	30	50
19/05/2010	13.6	9	15.05	30	50
25/05/2010	8.8	6	15.05	30	50
31/05/2010	3.5	2	15.03	30	50
6/06/2010	2.2	1	14.98	30	50
12/06/2010	1.4	1	14.95	30	50
18/06/2010	2.9	2	14.97	30	50
24/06/2010	1.9	1	14.88	30	50
30/06/2010	2.1	1	14.88	30	50
6/07/2010	6.4	4	14.85	30	50
12/07/2010	7.4	5	14.92	30	50
18/07/2010	9.7	6	14.81	30	50
24/07/2010	3	2	14.78	30	50
30/07/2010	0	0	14.66	30	50
5/08/2010	5.3	3	14.46	30	50
11/08/2010	8	5	14.36	30	50
17/08/2010	8.6	5	14.15	30	50
23/08/2010	5.8	4	14.07	30	50
29/08/2010	3.2	2	13.83	30	50
4/09/2010	8.7	6	13.92	30	50
10/09/2010	4.1	3	13.75	30	50
16/09/2010	2.3	1	13.61	30	50
22/09/2010	22.5	15	13.22	30	50
28/09/2010	20	13	12.75	30	50
4/10/2010	9.4	6	12.58	30	50
10/10/2010	8	5	12.19	30	50
16/10/2010	0.1	0	11.80	30	50
22/10/2010	8.5	6	11.63	30	50
28/10/2010	15.5	10	11.54	30	50
3/11/2010	8.9	5.4	11.48	30	50
9/11/2010	9.6	5.9	11.29	30	50
15/11/2010	8.5	5.2	10.55	30	50
21/11/2010	10.4	6.4	10.18	30	50

Turrabaa PM_{10} High Volume Air Sampler

Site	Site Id	Datum	Zone	Easting	Northing
Turrabaa PM10	ND-10	MGA	55	779775	6619367
Date	**mg/paper**	**µg/m^3**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
27/11/2010	13.5	8.3	10.16	30	50
3/12/2010	10.3	6.3	8.81	30	50
9/12/2010	12.8	7.8	8.04	30	50
15/12/2010	11.6	7.1	7.75	30	50
21/12/2010	5.9	3.6	7.56	30	50
27/12/2010	2.7	1.6	7.45	30	50
2/01/2011	11.5	7	7.35	30	50
8/01/2011	5.4	3.3	7.00	30	50
14/01/2011	10.2	6.2	6.75	30	50
20/01/2011	11.5	7	6.48	30	50
26/01/2011	23.9	14.6	6.44	30	50
1/02/2011	20.3	12.4	6.49	30	50
7/02/2011	14	8.6	6.42	30	50
13/02/2011	20.8	12.7	6.45	30	50
19/02/2011	12.1	7.4	6.34	30	50
25/02/2011	15.5	9.5	6.34	30	50
3/03/2011	18.5	11.3	6.47	30	50
9/03/2011	9.4	5.8	6.46	30	50
15/03/2011	9.2	5.6	6.25	30	50
21/03/2011	2.8	1.7	5.91	30	50
27/03/2011	14.9	9.1	5.95	30	50
2/04/2011	17.2	10.6	6.01	30	50
8/04/2011	9.9	6.1	6.08	30	50
14/04/2011	13.4	8	6.13	30	50
20/04/2011	18.9	11.6	6.14	30	50
26/04/2011	7.6	4.6	6.06	30	50
2/05/2011	21.3	13	6.06	30	50
8/05/2011	18.7	11.4	6.10	30	50
14/05/2011	8.8	5.4	6.09	30	50
20/05/2011	19.7	12.1	6.26	30	50
26/05/2011	7.4	4.5	6.32	30	50
1/06/2011	8.5	5.2	6.39	30	50
7/06/2011	5.0	3.1	6.41	30	50
13/06/2011	6.0	3.7	6.51	30	50
19/06/2011	7.0	4.4	6.57	30	50
25/06/2011	6.8	4.2	6.57	30	50
1/07/2011	4.7	2.9	6.53	30	50
7/07/2011	9.1	5.6	6.53	30	50
13/07/2011	17.3	10.6	6.67	30	50
19/07/2011	3.5	2.1	6.71	30	50

Turrabaa PM_{10} High Volume Air Sampler

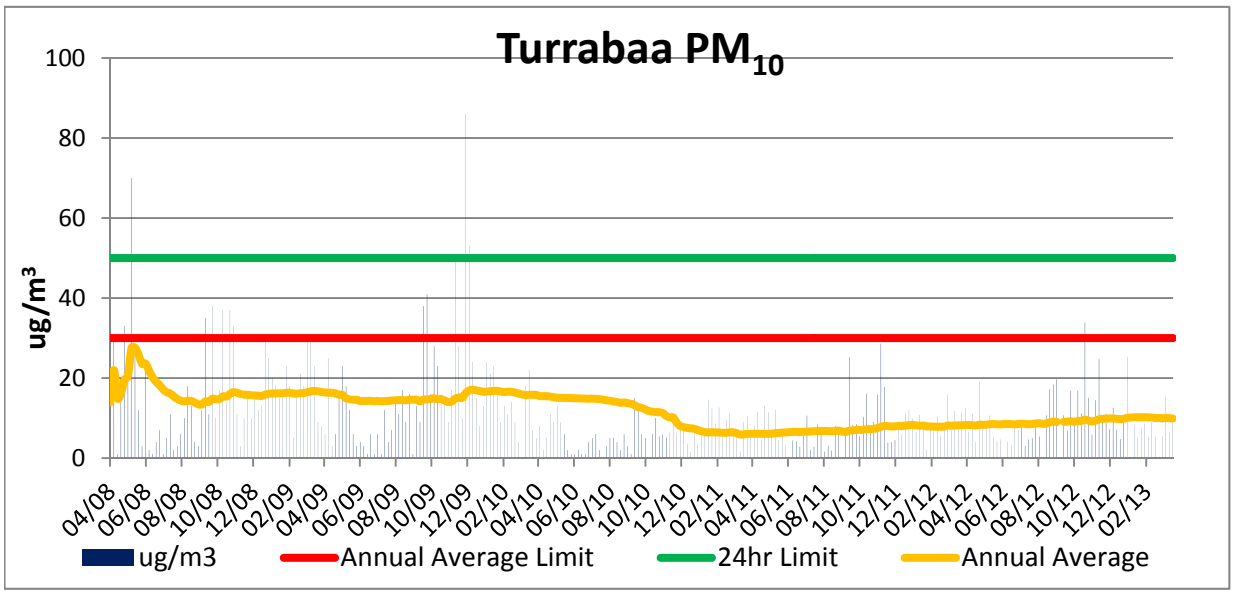
Site	Site Id	Datum	Zone	Easting	Northing
Turrabaa PM10	ND-10	MGA	55	779775	6619367
Date	**mg/paper**	**µg/m^3**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
25/07/2011	4.8	2.9	6.71	30	50
31/07/2011	13.8	8.4	6.77	30	50
6/08/2011	12.9	7.7	6.81	30	50
12/08/2011	2.7	1.6	6.77	30	50
18/08/2011	5.2	3.1	6.79	30	50
24/08/2011	3.2	1.9	6.72	30	50
30/08/2011	13.6	8.1	6.81	30	50
5/09/2011	10.2	6.2	6.90	30	50
11/09/2011	0.5	0.3	6.64	30	50
17/09/2011	11.5	7	6.54	30	50
23/09/2011	41.3	25.3	6.87	30	50
29/09/2011	13.6	8.3	6.93	30	50
5/10/2011	13.8	8.5	7.08	30	50
11/10/2011	9	5.5	7.07	30	50
17/10/2011	16.8	10.3	7.07	30	50
23/10/2011	26.2	16.1	7.26	30	50
29/10/2011	10.9	6.7	7.27	30	50
4/11/2011	14.8	9.1	7.34	30	50
10/11/2011	25.9	15.9	7.50	30	50
16/11/2011	46.7	28.6	7.85	30	50
22/11/2011	29	17.8	8.05	30	50
28/11/2011	6.3	3.9	7.98	30	50
4/12/2011	6.6	4	7.93	30	50
10/12/2011	7.4	4.5	7.95	30	50
16/12/2011	12.2	7.5	8.05	30	50
22/12/2011	9.6	5.9	8.03	30	50
28/12/2011	18.3	11.2	8.17	30	50
3/01/2012	19.7	12.1	8.27	30	50
9/01/2012	15.7	9.9	8.32	30	50
15/01/2012	10.8	6.6	8.18	30	50
21/01/2012	17.6	10.8	8.15	30	50
27/01/2012	11.7	7.2	8.13	30	50
2/02/2012	3.4	2.1	7.94	30	50
8/02/2012	11.2	6.9	7.94	30	50
14/02/2012	10.7	6.6	7.89	30	50
20/02/2012	16.9	10.4	7.87	30	50
26/02/2012	9.2	5.6	7.87	30	50
3/03/2012	12.2	7.5	7.90	30	50
9/03/2012	25.9	15.9	8.14	30	50
15/03/2012	13	8	8.13	30	50

Turrabaa PM_{10} High Volume Air Sampler

Site	Site Id	Datum	Zone	Easting	Northing
Turrabaa PM10	ND-10	MGA	55	779775	6619367
Date	**mg/paper**	**µg/m^3**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
21/03/2012	19.3	11.8	8.15	30	50
27/03/2012	15	9.2	8.20	30	50
2/04/2012	18.5	11.3	8.26	30	50
8/04/2012	20.6	12.6	8.27	30	50
14/04/2012	10.8	6.6	8.31	30	50
20/04/2012	17.9	11	8.27	30	50
26/04/2012	6.6	4	8.15	30	50
2/05/2012	31.2	19.1	8.38	30	50
8/05/2012	13.4	8.2	8.32	30	50
14/05/2012	14.3	8.8	8.39	30	50
20/05/2012	17.4	10.7	8.48	30	50
26/05/2012	8.4	5.2	8.52	30	50
1/06/2012	6.9	4.2	8.45	30	50
7/06/2012	7.7	4.7	8.45	30	50
13/06/2012			8.53	30	50
19/06/2012	6.5	4	8.54	30	50
25/06/2012	5.2	3.2	8.50	30	50
1/07/2012	13.1	8	8.46	30	50
7/07/2012	11.4	7	8.54	30	50
13/07/2012	13.2	8.1	8.63	30	50
19/07/2012	5.1	3.1	8.54	30	50
25/07/2012	7.6	4.7	8.49	30	50
31/07/2012	8.2	5	8.55	30	50
6/08/2012	15.4	9.4	8.66	30	50
12/08/2012	8.8	5.4	8.72	30	50
18/08/2012	0.1	0.1	8.58	30	50
24/08/2012	17.5	10.7	8.66	30	50
30/08/2012	28.1	17.2	8.95	30	50
5/09/2012	29.9	18.4	9.14	30	50
11/09/2012	32	19.7	9.05	30	50
17/09/2012				30	50
23/09/2012	17.4	10.7	9.10	30	50
29/09/2012	11.2	6.9	9.12	30	50
5/10/2012	27.4	16.8	9.24	30	50
11/10/2012	13.4	8.2	9.10	30	50
17/10/2012	27.6	16.9	9.28	30	50
23/10/2012	18.2	11.2	9.32	30	50
29/10/2012	55.4	33.9	9.63	30	50
4/11/2012	24.7	15.1	9.39	30	50
10/11/2012	9.7	5.9	9.19	30	50

Turrabaa PM_{10} High Volume Air Sampler

Site	Site Id	Datum	Zone	Easting	Northing
Turrabaa PM10	ND-10	MGA	55	779775	6619367
Date	**mg/paper**	**µg/m³**	**Annual Average**	**Annual Average Limit**	**24hr Limit**
16/11/2012	23.6	14.5	9.37	30	50
22/11/2012	40.5	24.8	9.74	30	50
28/11/2012	16.3	10	9.83	30	50
4/12/2012	17.9	11	9.89	30	50
10/12/2012	11.7	7.2	9.92	30	50
16/12/2012	20.6	12.6	9.94	30	50
22/12/2012	11.6	7.1	9.85	30	50
28/12/2012	7.8	4.8	9.76	30	50
3/01/2013	16.8	10.3	9.83	30	50
9/01/2013	41.3	25.3	10.08	30	50
15/01/2013			10.14	30	50
21/01/2013	13.3	8.2	10.24	30	50
27/01/2013	8.3	5.1	10.21	30	50
2/02/2013	12.2	7.5	10.23	30	50
8/02/2013	14.2	8.7	10.20	30	50
14/02/2013	8.5	5.2	10.19	30	50
20/02/2013	12.6	9	10.22	30	50
26/02/2013	8.9	5.4	10.03	30	50
4/03/2013			10.07	30	50
10/03/2013	8.9	5.4	9.95	30	50
16/03/2013	25	15.3	10.06	30	50
22/03/2013	10.7	6.6	9.98	30	50
28/03/2013	14.8	9.1	9.91	30	50



Appendix 5

WET WEATHER AND SURFACE WATER MONITORING DATA

Kurrajong Creek and Pine Creek Wet Weather Events

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
	31 July 2007	KCUS	7.9	255	22		<10	
	31 July 2007	KCDS	8	205	163		15	
	31 July 2007	KC2US	6.7	75	84		18	
	31 July 2007	KC2DS	6.7	85	21		12	
	31 July 2007	KC1US	8.2	1300	15		<10	
	31 July 2007	KC1DS	6.9	430	39		<10	
31489.01	23 September 2008	KC2US	6.5	65	35	<2	-	
31489.02	23 September 2008	KC1US	8.0	65	320	<2	-	
31489.03	23 September 2008	KCUS	7.7	315	168	<2	-	
31489.04	23 September 2008	KCDS	7.2	230	150	<2	-	
31489.05	23 September 2008	PC	7.2	90	294	<2	-	
31489.06	23 September 2008	PC1	7.0	90	62	<2	-	
31489.07	23 September 2008	KC1DS	7.1	220	1280	<2	-	
31489.08	23 September 2008	KC2DS	7.2	165	444	<2	-	
32276.01	15 December 2008	KCDS	7.1	355	21	<2	-	
32276.02	15 December 2008	KC2DS	6.9	95	8	<2	-	
32276.03	15 December 2008	KCUS	7.5	55	6	<2	-	
32276.04	15 December 2008	PC	7.2	125	12	<2	-	
32276.05	15 December 2008	PC1	6.9	255	23	<2	-	
32276.06	15 December 2008	KC1DS	8.2	315	42	<2	-	
32276.07	15 December 2008	KC2DS	7.4	185	289	<2	-	
32373.01	29 December 2008	KC1US	6.9	95	48	<2	-	
32373.02	29 December 2008	KC2US	6.8	90	17	<2	-	
32373.03	29 December 2008	KCDS	7.1	450	26	<2	-	
32815.01	17 February 2009	KCUS	7.2	280	123	<2	-	
32815.02	17 February 2009	KC2US	6.7	70	14	<2	-	
32815.03	17 February 2009	KCDS	6.9	180	132	<2	-	
32815.04	17 February 2009	PC	7.1	60	57	<2	-	
32815.05	17 February 2009	PC1	7.1	180	38	<2	-	
32815.06	17 February 2009	KC1DS	7.1	145	142	<2	-	
32815.07	17 February 2009	KC2DS	7.1	105	1130	<2	-	
ES0919730-001	29 December 2009	KC2DS	7.15	95	48	-	13	Oil & Grease not reported for any location due to incorrect sample bottle and insufficient sample. No site discharge - only adjacent creek samples
ES0919730-002	29 December 2009	KCDS	6.94	187	33	-	11	
ES0919730-003	29 December 2009	KC2US	6.67	86	4	-	16	
ES0919730-004	29 December 2009	KC1US	6.7	74	47	-	6	
ES0919730-005	29 December 2009	KCUS	7.05	305	52	-	9	
ES0919730-007	29 December 2009	PC	7.23	83	117	-	8	
ES0919730-008	29 December 2009	KC1DS	7.12	171	79	-	10	

Kurrajong Creek and Pine Creek Wet Weather Events

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1000146-001	5 January 2010	KCUS	7.24	804	2	<5	10	
ES1000146-002	5 January 2010	KC1US	7.42	126	8	<5	12	
ES1000146-003	5 January 2010	KCDS	7.41	456	2	<5	14	
ES1000146-004	5 January 2010	SD5	7.23	155	18	<5	8	Discharge
ES1000146-005	5 January 2010	PC1	7.3	174	7	<5	12	
ES1000146-006	5 January 2010	PC	7.38	121	8	<5	15	
ES1000146-007	5 January 2010	KC1DS	7.28	419	6	<5	10	
ES1000146-008	5 January 2010	KC2DS	7.47	178	22	<5	12	
ES1013938-001	14 July 2010	PC1	8.5	37	126	<5	13	
ES1013938-002	14 July 2010	PC	8.65	226	10	<5	9	
ES1013938-003	14 July 2010	KC1 DS	8.01	552	27	-	13	
ES1013938-004	14 July 2010	KC2 DS	7.92	211	142	<5	16	
ES1015034-001	28 July 2010	KCUS	8.18	72	130	<5	12	
ES1015034-002	28 July 2010	PC	7.95	170	151	<5	11	
ES1015034-003	28 July 2010	PCI	7.978	37	132	<5	9	
ES1015034-004	28 July 2010	KCIDS	7.77	36	90	<5	9	
ES1016053-001	10 August 2010	KCUS	7.45	33	296	<5	5	
ES1016053-002	10 August 2010	KC1US	7.65	169	2760	<5	10	
ES1016053-003	10 August 2010	KC2US	7.7	37	62	<5	12	
ES1016053-004	10 August 2010	PC1	7.54	43	1320	<5	6	
ES1016053-005	10 August 2010	PC	6.83	62	167	<5	7	
ES1016053-006	10 August 2010	KC1DS	6.8	64	380	<5	9	
ES1016053-007	10 August 2010	KC2DS	6.76	114	40	<5	17	
ES1016053-008	10 August 2010	KCDS	7.08	30	326	<5	4	
ES1016966-101	23 August 2010	KCUS	8.04	100	236	<5	9	
ES1016966-102	23 August 2010	KC1US	7.84	210	1600	<5	5	
ES1016966-103	23 August 2010	KC2US	8.05	58	48	<5	15	
ES1016966-104	23 August 2010	KCDS	7.97	50	122	<5	5	
ES1016966-105	23 August 2010	SD5	7.9	60	22	<5	11	No discharge. Sampled to determine sediment level.
ES1016966-106	23 August 2010	PC1	7.94	49	476	<5	7	
ES1016966-107	23 August 2010	KC1DS	7.37	193	146	<5	8	
ES1016966-108	23 August 2010	KC2DS	7.63	94	35	<5	15	
ES1016966-109	23 August 2010	PC	7.71	70	142	<5	10	
ES1018432-001	10 September 2010	KCUS	7.44	909	246	<5	8	
ES1018432-002	10 September 2010	KC1US	7.2	154	193	<5	10	
ES1018432-003	10 September 2010	KC2US	6.84	147	81	<5	11	
ES1018432-004	10 September 2010	KCDS	7.26	492	116	<5	10	
ES1018432-005	10 September 2010	PC1	7.18	65	176	<5	10	
ES1018432-006	10 September 2010	PC	7.21	159	26	<5	17	

Kurrajong Creek and Pine Creek Wet Weather Events

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1018432-007	10 September 2010	KC1DS	7.66	955	131	<5	12	
ES1018432-008	10 September 2010	KC2DS	7.25	133	84	<5	16	
ES1023281-001	16 November 2010	KCUS	7.83	866	162	10	12	
ES1023281-002	16 November 2010	PC1	7.27	98	260	9	9	
ES1023281-003	16 November 2010	PC	6.94	179	127	39	20	Elevated Oil and Grease
ES1024687-001	30 November 2010	KC2US	6.99	86	40	<5	14	
ES1024687-002	30 November 2010	KCUS	7.12	93	20	<5	15	
ES1024687-003	30 November 2010	KC1US	6.97	64	124	<5	10	
ES1024687-004	30 November 2010	PC	6.9	46	40	<10	14	
ES1024687-005	30 November 2010	PC1	7.42	101	136	<10	10	
ES1024687-006	30 November 2010	KCDS	7.11	191	191	<5	14	
ES1024687-007	30 November 2010	KC1DS	7.23	150	150	<5	15	
ES1024687-008	30 November 2010	KC2DS	7.2	101	101	<5	12	
ES1119821-001	9 September 2011	PC1	6.84	29	38	<5	10	
ES1119821-002	9 September 2011	PC	7.31	134	71	<5	13	
ES1119821-003	9 September 2011	KC1DS	7.58	209	66	<5	22	
ES1119821-004	9 September 2011	KC2DS	7.58	124	101	<5	15	
ES1121355-001	29 September 2011	KC2DS	6.69	76	38	<5	14	
ES1121355-002	29 September 2011	KCUS	6.88	73	160	<5	10	
ES1121355-003	29 September 2011	PC1	7.08	87	255	<5	9	
ES1121355-004	29 September 2011	PC	6.89	63	198	<5	9	
ES1121355-005	29 September 2011	KC1DS	7.17	92	167	<5	9	
ES1121355-006	29 September 2011	KCDS	6.93	434	530	<5	38	
ES1121355-007	29 September 2011	KC2DS	7.41	134	36	<5	12	
ES1124936-001	14 November 2011	KC2US	7.24	94	30	<5	26	
ES1124936-002	14 November 2011	PC1	7.36	158	220	<5	14	
ES1124936-003	14 November 2011	PC	7.93	167	73	<5	8	
ES1124936-004	14 November 2011	KC1DS	7.6	157	104	<5	13	
ES1126001-001	23 November 2011	KC2US	6.74	32	66	<5	12	
ES1126001-002	23 November 2011	KCUS	6.89	38	788	<5	13	
ES1126001-003	23 November 2011	KC1US	7.47	112	144	<5	12	
ES1126001-004	23 November 2011	PC1	7.22	60	202	<5	9	
ES1126001-005	23 November 2011	PC	6.75	72	322	<5	14	
ES1126001-006	23 November 2011	KC1DS	7.09	75	372	<5	16	
ES1126001-007	23 November 2011	KC2DS	7.09	90	59	<5	20	
ES1126001-008	23 November 2011	KCDS	6.87	88	536	<5	16	
ES1126200-001	25 November 2011	SD2	7.24	83	42	<5	7	
ES1126200-002	25 November 2011	SD5	7.48	125	83	<5	6	
ES1126200-003	25 November 2011	SB3	8.54	663	478	<5	4	Sampled overflowing dam

Kurrajong Creek and Pine Creek Wet Weather Events

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1126200-004	25 November 2011	KC2DS	7.45	99	49	<5	6	
ES1126200-005	25 November 2011	KC2US	7.04	37	18	<5	6	
ES1126200-006	25 November 2011	KC1US	7.05	62	191	<5	7	
ES1126200-007	25 November 2011	SD4	7.52	131	166	<5	7	
ES1126200-008	25 November 2011	KC1DS	7.19	86	384	<5	4	
ES1127632-001	13 December 2011	SD4	7.69	200	48	<5	5	
ES1127632-002	13 December 2011	SD2	7.2	106	82	<5	8	
ES1127632-003	13 December 2011	SD5	7.62	148	24	<5	6	
ES1127632-004	13 December 2011	KC2DS	7.5	134	16	<5	7	
ES1127632-005	13 December 2011	KCDS	7.41	200	64	<5	10	
ES1127632-006	13 December 2011	KC2US	7.13	58	9	<5	8	
ES1127632-007	13 December 2011	KCUS	7.49	277	120	<5	11	
ES1127632-008	13 December 2011	KC1US	7.35	180	26	<5	11	
ES1127632-009	13 December 2011	PCI	7.54	113	60	<5	8	
ES1127632-010	13 December 2011	PC	7.38	168	12	<5	11	
ES1127632-011	13 December 2011	KC1DS	7.77	741	43	<5	10	
ES1202508-001	1 February 2012	KC2DS	7.58	143	52	<5	11	
ES1202508-002	1 February 2012	KCDS	7.56	544	30	<5	7	
ES1202508-003	1 February 2012	KC2US	7.11	58	41	<5	9	
ES1202508-004	1 February 2012	KCUS	7.51	750	397	<5	6	
ES1202508-005	1 February 2012	KC1US	7.75	172	83	<5	8	
ES1202508-006	1 February 2012	PC1	7.36	63	73	<5	5	
ES1202508-007	1 February 2012	PC	7.29	59	81	<5	5	
ES1202508-008	1 February 2012	KC1DS	7.83	216	58	<5	8	
ES1202508-009	1 February 2012	SD2	7.91	178	20	<5	6	
ES1202508-010	1 February 2012	SD4	7.9	212	247	<5	5	
ES1202508-011	1 February 2012	SD5	7.84	148	36	<5	7	
ES1202509-001	2 February 2012	SB3	8.29	415	215	<5	2	Sampled overflowing dam
ES1202509-002	2 February 2012	PC1	7.43	48	80	<10	3	
ES1202509-003	2 February 2012	KC1US	7.42	70	36	<10	7	
ES1202509-004	2 February 2012	KCUS	7.53	113	300	<10	6	
ES1202509-005	2 February 2012	KC2US	7.28	42	16	<5	4	
ES1202509-006	2 February 2012	KCDS	7.35	54	15	<5	7	
ES1202509-007	2 February 2012	KC2DS	7.75	126	26	<10	5	
ES1202509-008	2 February 2012	KC1DS	7.63	114	84	<10	5	
ES1202509-009	2 February 2012	PC	7.3	67	70	<10	5	

Kurrajong Creek and Pine Creek Wet Weather Events

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1214027-001	4 June 2012	KC2US	7.27	82	20	<5	23	
ES1214027-002	4 June 2012	KCUS	7.82	218	52	<5	13	
ES1214027-003	4 June 2012	PC1	7.51	97	96	<5	16	
ES1214027-004	4 June 2012	PC	7.18	95	48	<5	13	
ES1214027-005	4 June 2012	KC1DS	7.9	1270	8	<5	10	
ES1214027-006	4 June 2012	KC2DS	6.72	136	108	<5	17	
ES1217576-001	12 July 2012	KC2US	6.86	50	32	<5	15	
ES1217576-002	12 July 2012	KCUS	7.11	62	229	<5	13	
ES1217576-003	12 July 2012	PC1	7.43	71	53	<5	10	
ES1217576-004	12 July 2012	PC	7	47	142	<5	8	
ES1217576-005	12 July 2012	KC1DS	7.65	230	88	<5	14	
ES1217576-006	12 July 2012	KC2DS	7.12	85	108	<5	20	
ES1217576-007	12 July 2012	SD5	7.33	98	122	<5	16	
ES1217572-001	13 July 2012	SD2	7.83	205	20	<5	14	
ES1217572-002	13 July 2012	KC1US	7.52	221	133	<5	21	
ES1302189-001	29 January 2013	KCDS	6.82	387	65	<5	16	
ES1302189-002	29 January 2013	KC2US	6.68	89	7	<5	31	
ES1302189-003	29 January 2013	KCUS	7.09	426	72	<5	15	
ES1302189-004	29 January 2013	PC1	6.89	92	90	<5	18	
ES1302189-005	29 January 2013	PC	7.01	162	55	<5	17	
ES1302189-006	29 January 2013	KC1DS	7.09	162	23	<5	20	
ES1305016-001	1 March 2013	KCUS	7.13	195	750	<5	6	
ES1305016-002	1 March 2013	KCDS	6.83	89	322	<5	16	Disturbance along rail line, just flowing @ rail line
ES1305016-003	1 March 2013	KC1US	6.96	88	238	<5	11	
ES1305016-004	1 March 2013	KC1DS	7.15	206	322	<5	10	
ES1305016-005	1 March 2013	KC2US	6.76	45	36	<5	9	
ES1305016-006	1 March 2013	KC2DS	7.33	204	27	<5	17	
ES1305016-007	1 March 2013	PCa	6.83	55	358	<5	10	
ES1305016-008	1 March 2013	PC1	6.78	54	234	<5	8	

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Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES0908566-001	11 June 2009	SD1	8.38	378	74	<5	8	
ES0908566-002	11 June 2009	SD2	8.15	254	89	<5	5	
ES0908566-003	11 June 2009	SD3	7.85	308	328	<5	11	
ES0908566-004	11 June 2009	SD4	8.27	421	262	<5	7	
ES0908566-005	11 June 2009	SD5	8.07	228	26	<5	16	
ES0908566-006	11 June 2009	SB1	8.23	1390	11	<5	3	
ES0912774-001	26 August 2009	SD1	9.54	363	8	<5	8	
ES0912774-002	26 August 2009	SD2	8.33	274	28	<5	4	
ES0912774-003	26 August 2009	SD3	7.97	326	141	<5	12	
ES0912774-004	26 August 2009	SD4	8.37	498	66	<5	6	
ES0912774-005	26 August 2009	SD5	8.25	256	24	<5	5	
ES0912774-006	26 August 2009	SB1	8.37	2020	21	<5	<1	
ES0918374-001	1 December 2009	SD1	8.66	722	68	<10	14	
ES0918374-002	1 December 2009	SD2	8.41	374	1870	<10	5	
ES0918374-003	1 December 2009	SD3	8.37	550	216	<10	7	
ES0918374-004	1 December 2009	SD4	9.3	1150	204	<10	10	
ES0918374-005	1 December 2009	SD5	8.68	417	52	<10	5	
ES0918374-006	1 December 2009	SB1	8.82	5250	26	<10	<1	
ES1004140-001	3 March 2010	SD1	8.29	326	44	<5	5	
ES1004140-002	3 March 2010	SD2	8.74	271	126	<5	6	
ES1004140-003	3 March 2010	SD3	8.14	286	326	<5	15	
ES1004140-004	3 March 2010	SD5	8.2	218	44	<5	6	
ES1004140-005	3 March 2010	SB1	8.2	947	480	<5	<2	
ES1009341-001	14 May 2010	SD1	8.78	381	16	<5	6	
ES1009341-002	12 May 2010	SD4	8.85	543	80	7	6	
ES1009341-003	12 May 2010	SD3	8.14	472	92	<5	10	
ES1009341-004	12 May 2010	SD5	8.62	261	36	8	8	
ES1009341-005	12 May 2010	SB1	9	607	100	<5	7	
ES1016572-001	17 August 2010	SD2	7.62	129	72	<5	8	
ES1016572-002	17 August 2010	SD3	7.84	247	299	<5	6	
ES1016572-003	17 August 2010	SD4	7.89	306	120	<5	6	
ES1016572-004	17 August 2010	A1	9.09	1390	36	<5	8	
ES1016572-005	17 August 2010	A2	8.73	541	82	<5	7	
ES1016572-006	17 August 2010	SB1	8.52	432	82	<5	3	
ES1025816-001	13 December 2010	SD2	7.5	157	107	<5	10	
ES1025816-002	13 December 2010	SD5	7.46	139	46	<5	10	
ES1025816-003	13 December 2010	SD4	7.88	290	146	<5	6	
ES1025816-004	13 December 2010	A1	9.25	1280	25	<5	9	
ES1025816-005	13 December 2010	A2	9.13	840	10	<5	7	
ES1025816-006	13 December 2010	SB1	9.02	583	75	<5	5	

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Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1026094-001	16 December 2010	BOX CUT SUMP	8.37	1360	76	-	4	O&G not analysed, Total TPH analysed instead
ES1026094-002	16 December 2010	A1	9.18	1480	56	-	7	O&G not analysed, Total TPH analysed instead
ES1026094-003	16 December 2010	D	8.05	331	228	-	9	O&G not analysed, Total TPH analysed instead
ES1102986-001	10 February 2011	A1	9.16	1260	14	<5	12	
ES1102986-002	10 February 2011	A2	9.17	874	<5	<5	10	
ES1102986-003	10 February 2011	A3	9.19	11300	16	<5	35	
ES1102986-004	10 February 2011	SB1	9.73	2150	52	<5	56	
ES1102986-005	10 February 2011	SD5	8.6	199	54	<5	16	
ES1106761-001	30 March 2011	BOX CUT SUMP	8.41	2100	98	-	31	O&G not analysed, Total TPH analysed instead
ES1106761-002	30 March 2011	A1	9.18	1540	14	-	8	O&G not analysed, Total TPH analysed instead
ES1106761-003	30 March 2011	SB1	9.5	3240	26	-	51	O&G not analysed, Total TPH analysed instead
ES1106761-004	30 March 2011	DAM G OR D	8.98	281	20	-	8	O&G not analysed, Total TPH analysed instead
ES1108782-001	27 April 2011	BOX CUT SUMP	8.4	2250	108	-	6	O&G not analysed, Total TPH analysed instead
ES1108782-002	27 April 2011	A1	9.34	14200	50	-	<1	O&G not analysed, Total TPH analysed instead
ES1108782-003	27 April 2011	SB1	9.57	4300	74	-	31	O&G not analysed, Total TPH analysed instead
ES1108782-004	27 April 2011	DAM G or D	8.63	251	48	-	6	O&G not analysed, Total TPH analysed instead
ES1109299-001	4 May 2011	SD1	8.15	452	44	<5	14	
ES1109299-002	4 May 2011	SD2	7.86	247	13	<5	6	
ES1109299-003	4 May 2011	SD3	8.02	416	20	<5	5	
ES1109299-004	4 May 2011	SD5	7.78	301	20	<5	9	
ES1109299-005	4 May 2011	SB1	9.2	4320	88	<5	49	
ES1109832-001	11 May 2011	BOX CUT SUMP	7.61	2390	148	-	22	O&G not analysed, Total TPH analysed instead
ES1109832-002	11 May 2011	A1	9.16	1890	16	-	12	O&G not analysed, Total TPH analysed instead
ES1109832-003	11 May 2011	SB1	9.05	4510	114	-	65	O&G not analysed, Total TPH analysed instead
ES1109832-004	11 May 2011	DAM G OR D	9.46	249	33	-	7	O&G not analysed, Total TPH analysed instead
ES1111058-001	25 May 2011	BOX CUT SUMP	8.39	2560	102	-	42	O&G not analysed, Total TPH analysed instead
ES1111058-002	25 May 2011	A1	9.02	1950	14	-	10	O&G not analysed, Total TPH analysed instead
ES1111058-003	25 May 2011	SB1	9.48	2870	296	-	19	O&G not analysed, Total TPH analysed instead
ES1111058-004	25 May 2011	D	8.41	355	7	-	5	O&G not analysed, Total TPH analysed instead
ES1112279-001	8 June 2011	BOX CUT SUMP	8.58	2520	190	-	11	O&G not analysed, Total TPH analysed instead
ES1112279-002	8 June 2011	A1	9	1930	11	-	10	O&G not analysed, Total TPH analysed instead
ES1112279-003	8 June 2011	SB1	9.55	2660	23	-	31	O&G not analysed, Total TPH analysed instead
ES1112279-004	8 June 2011	SD2	8.44	201	8	-	7	O&G not analysed, Total TPH analysed instead
ES1113370-001	21 June 2011	BOX CUT SUMP	8.64	2190	428	-	8	O&G not analysed, Total TPH analysed instead
ES1113370-002	21 June 2011	A1	8.89	2000	32	-	9	O&G not analysed, Total TPH analysed instead
ES1113370-003	21 June 2011	SB1	9.5	2620	27	-	32	O&G not analysed, Total TPH analysed instead
ES1113370-004	21 June 2011	D	8.53	350	16	-	5	O&G not analysed, Total TPH analysed instead
ES1114773-001	11 July 2011	BOX CUT SUMP	8.11	2880	336	-	5	O&G not analysed, Total TPH analysed instead
ES1114773-002	11 July 2011	A1	8.8	2080	21	-	10	O&G not analysed, Total TPH analysed instead
ES1114773-003	11 July 2011	SB1	9.42	2650	26	-	28	O&G not analysed, Total TPH analysed instead

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Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1114773-004	11 July 2011	SD2	8.34	270	11	-	6	O&G not analysed, Total TPH analysed instead
ES1116217-001	27 July 2011	BOX CUT SUMP	8.21	3340	123	-	9	O&G not analysed, Total TPH analysed instead
ES1116217-002	27 July 2011	A1	8.86	2170	11	-	10	O&G not analysed, Total TPH analysed instead
ES1116217-003	27 July 2011	SB1	9.49	2740	38	-	38	O&G not analysed, Total TPH analysed instead
ES1116217-004	27 July 2011	D	8.63	404	14	-	6	O&G not analysed, Total TPH analysed instead
ES1118568-001	25 August 2011	SD1	8.31	565	122	<5	17	
ES1118568-002	25 August 2011	SD2	8.28	294	<5	<5	6	
ES1118568-003	25 August 2011	SD3	8.45	488	10	<5	5	
ES1118568-004	25 August 2011	SD4	8.56	889	59	<5	7	
ES1118568-005	25 August 2011	SD5	8.12	247	16	<5	8	
ES1118568-006	25 August 2011	SB1	9.5	2470	45	<5	36	
ES1119508-001	7 September 2011	BOX CUT SUMP	8.58	2430	128	-	9	O&G not analysed, Total TPH analysed instead
ES1119508-002	7 September 2011	A1	8.91	2280	28	-	10	O&G not analysed, Total TPH analysed instead
ES1119508-003	7 September 2011	SB1	9.45	2500	80	-	33	O&G not analysed, Total TPH analysed instead
ES1119508-004	7 September 2011	D	8.55	324	36	-	6	O&G not analysed, Total TPH analysed instead
ES1120633-001	21 September 2011	BOX CUT SUMP	8.64	2590	127	-	24	O&G not analysed, Total TPH analysed instead
ES1120633-002	21 September 2011	A1	8.9	2270	64	-	11	O&G not analysed, Total TPH analysed instead
ES1120633-003	21 September 2011	SB1	9.3	1570	466	-	12	O&G not analysed, Total TPH analysed instead
ES1120633-004	21 September 2011	DAM G or D	8.48	398	40	-	2	O&G not analysed, Total TPH analysed instead
ES1122998-001	20 October 2011	BOX CUT SUMP	8.39	2770	156	-	4	O&G not analysed, Total TPH analysed instead
ES1122998-002	20 October 2011	A1	8.72	2510	14	-	6	O&G not analysed, Total TPH analysed instead
ES1122998-003	20 October 2011	SB1	9.33	1560	79	-	13	O&G not analysed, Total TPH analysed instead
ES1122998-004	20 October 2011	D	8.56	355	22	-	6	O&G not analysed, Total TPH analysed instead
ES1123998-001	2 November 2011	BOX CUT SUMP	8.41	4090	43	-	9	O&G not analysed, Total TPH analysed instead
ES1123998-002	2 November 2011	A1	8.8	2520	<5	-	6	O&G not analysed, Total TPH analysed instead
ES1123998-003	2 November 2011	SB1	9.48	2490	79	-	12	O&G not analysed, Total TPH analysed instead
ES1123998-004	2 November 2011	D	8.65	387	8	-	6	O&G not analysed, Total TPH analysed instead
ES1123998-005	2 November 2011	B1	8.91	619	<5	-	7	O&G not analysed, Total TPH analysed instead
ES1125416-001	17 November 2011	SD1	9.16	384	50	<5	12	
ES1125416-002	17 November 2011	SD2	8.21	278	31	<5	6	
ES1125416-003	17 November 2011	SD3	7.98	343	28	<5	10	
ES1125416-004	17 November 2011	SD4	8.09	446	132	<5	7	
ES1125416-005	17 November 2011	SD5	7.48	171	332	<5	9	
ES1125416-006	17 November 2011	SB1	9.26	1700	45	<5	6	
ES1126011-001	24 November 2011	BOX CUTSUMP	8.26	2740	336	-	34	O&G not analysed, Total TPH analysed instead
ES1126011-002	24 November 2011	A1	8.83	2390	34	-	6	O&G not analysed, Total TPH analysed instead
ES1126011-003	24 November 2011	D	8.55	392	10	-	6	O&G not analysed, Total TPH analysed instead
ES1127641-001	13 December 2011	BOX CUT SUMP	8.57	2020	94	-	8	O&G not analysed, Total TPH analysed instead
ES1127641-002	13 December 2011	A1	9	1930	30	-	5	O&G not analysed, Total TPH analysed instead

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Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1127641-003	13 December 2011	SB1	8.7	605	154	-	<1	O&G not analysed, Total TPH analysed instead
ES1127641-004	13 December 2011	D	8.63	354	11	-	6	O&G not analysed, Total TPH analysed instead
ES1201147-001	18 January 2012	A1	9.06	2200	12	<5	6	
ES1201147-002	18 January 2012	A2	9.29	1900	30	<5	13	
ES1201147-003	18 January 2012	A3	9.77	4960	44	<5	26	
ES1201147-004	18 January 2012	B1	8.72	545	10	<5	<1	
ES1201147-005	18 January 2012	B2	9.06	13400	47	<5	16	
ES1201147-006	18 January 2012	C	9.3	610	90	<5	3	
ES1201147-007	18 January 2012	D	8.58	380	18	<5	2	
ES1201539-001	23 January 2012	SB1	9.15	2390	27	<5	3	
ES1201539-002	23 January 2012	SB2	8.16	364	8	-	7	
ES1201539-003	23 January 2012	SB3	8.77	995	28	<5	<1	
ES1201539-004	23 January 2012	SD1	8.09	295	30	<5	7	
ES1201539-005	23 January 2012	SD2	8.01	188	18	<5	5	
ES1201539-006	23 January 2012	SD3	8	235	42	<5	4	
ES1201539-007	23 January 2012	SD4	8.25	269	137	<5	4	
ES1201539-008	23 January 2012	SD5	7.75	168	16	<5	8	
ES1201539-009	23 January 2012	SD6	8.73	1470	2280	<5	8	
ES1204194-001	22 February 2012	A1	9.1	1900	21	<5	2	
ES1204194-002	22 February 2012	A2	9.2	1740	411	<5	7	
ES1204194-003	22 February 2012	A3	9.78	3450	538	<5	15	
ES1204194-004	22 February 2012	B1	8.7	496	300	<5	6	
ES1204194-005	22 February 2012	B2	9.16	12200	59	<5	13	
ES1204194-006	22 February 2012	C	9.29	389	35	<5	11	
ES1204194-007	22 February 2012	D	8.51	358	20	<5	4	
ES1204195-001	22 February 2012	SB1	8.7	718	185	<5	4	
ES1204195-002	22 February 2012	SB2	8.33	462	74	<5	5	
ES1204195-003	22 February 2012	SB3	8.61	596	269	<5	3	
ES1204195-004	22 February 2012	SD1	7.92	371	37	<5	7	
ES1204195-005	22 February 2012	SD2	8.03	195	52	<5	6	
ES1204195-006	22 February 2012	SD3	7.71	251	132	<5	6	
ES1204195-007	22 February 2012	SD4	7.81	272	32	<5	7	
ES1204195-008	22 February 2012	SD5	7.74	142	48	<5	10	
ES1204195-009	22 February 2012	SD6	8.66	911	392	<5	7	
ES1207056-001	22 March 2012	A1	9.01	1950	20	<5	5	
ES1207056-002	22 March 2012	A2	9.23	1880	14	<5	14	
ES1207056-003	22 March 2012	A3	9.74	3810	33	<5	27	
ES1207056-004	22 March 2012	B1	8.76	512	8	<5	6	
ES1207056-005	22 March 2012	B2	9.15	12600	173	<5	90	
ES1207056-006	22 March 2012	C	9.43	553	20	<5	20	

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Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1207056-007	22 March 2012	D	8.62	367	16	<5	5	
ES1207061-003	22 March 2012	SB3	9.41	2330	272	<5	41	SB1 and SB2 not sampled as dams being upgraded
ES1207061-004	22 March 2012	SD1	8.84	415	11	<5	8	
ES1207061-005	22 March 2012	SD2	7.65	202	10	<5	8	
ES1207061-006	22 March 2012	SD3	7.95	275	16	<5	5	
ES1207061-007	22 March 2012	SD4	8.21	269	21	<5	4	
ES1207061-008	22 March 2012	SD5	7.98	154	10	<5	9	
ES1207061-009	22 March 2012	SD6	8.67	1090	332	<5	9	
ES1211544-001	9 May 2012	A1	9.11	2240	20	<5	2	
ES1211544-002	9 May 2012	A2	9.22	2210	10	<5	6	
ES1211544-003	9 May 2012	A3	9.73	4050	65	<5	8	
ES1211544-004	9 May 2012	B1	8.61	486	<5	<5	<1	
ES1211544-005	9 May 2012	B2	9.08	13100	71	<5	71	
ES1211544-006	9 May 2012	C	9.27	820	42	<5	15	
ES1211544-007	9 May 2012	D	8.55	408	20	<5	2	
ES1211544-008	9 May 2012	SB1	9.1	1870	56	<5	<1	SB2 not sampled as dam being upgraded
ES1211545-001	9 May 2012	SB3	9.42	4220	100	<5	42	
ES1211545-002	9 May 2012	SD1	8.64	448	16	<5	3	
ES1211545-003	9 May 2012	SD2	8.29	233	11	<5	4	
ES1211545-004	9 May 2012	SD3	8.39	336	21	<5	3	
ES1211545-005	9 May 2012	SD4	8.45	323	18	<5	3	
ES1211545-006	9 May 2012	SD5	8.09	206	8	<5	7	
ES1211545-007	9 May 2012	SD6	8.71	1280	932	<5	5	

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Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1215409-001	20 June 2012	SB1	9.15	2390	67	<5	7	
ES1215409-002	20 June 2012	SB2	8.3	802	18	<5	23	
ES1215409-003	20 June 2012	SB3	9.14	2960	53	<5	44	
ES1215409-004	20 June 2012	SD1	8	348	8	<5	15	
ES1215409-005	20 June 2012	SD2	8.12	223	<5	<5	9	
ES1215409-006	20 June 2012	SD3	8	339	6	<5	10	
ES1215409-007	20 June 2012	SD4	8.49	331	5	<5	6	
ES1215409-008	20 June 2012	SD5	8.03	182	<5	<5	9	
ES1215409-009	20 June 2012	SD6	8.64	1100	44	<5	17	
ES1215547-001	21 June 2012	A1	9.04	2290	17	<5	11	
ES1215547-002	21 June 2012	A2	9.19	2450	10	<5	14	
ES1215547-003	21 June 2012	A3	9.71	3770	46	<5	43	
ES1215547-004	21 June 2012	B1	8.23	418	<5	<5	5	
ES1215547-005	21 June 2012	B2	9	12800	32	<5	<1	
ES1215547-006	21 June 2012	C	8.97	768	42	<5	16	
ES1215547-007	21 June 2012	D	8.57	385	8	<5	6	
ES1218051-001	23 July 2012	SB1	8.99	2020	58	<5	12	
ES1218051-002	23 July 2012	SB2	8.47	800	19	<5	12	
ES1218051-003	23 July 2012	SB3	9.1	1940	88	<5	34	
ES1218051-004	23 July 2012	SD1	8.15	279	5	<5	13	
ES1218051-005	23 July 2012	SD2	8.09	221	5	<5	9	
ES1218051-006	23 July 2012	SD3	7.59	388	<5	<5	6	
ES1218051-007	23 July 2012	SD4	8.25	363	<5	<5	6	
ES1218051-008	23 July 2012	SD5	8.21	176	<5	<5	9	
ES1218051-009	23 July 2012	SD6	8.6	955	39	<5	8	
ES1218050-001	23 July 2012	A1	8.97	2150	16	<5	12	
ES1218050-002	23 July 2012	A2	9.15	2900	10	<5	11	
ES1218050-003	23 July 2012	A3	9.68	3520	41	<5	32	
ES1218050-004	23 July 2012	B1	8.81	370	<5	<5	3	
ES1218050-005	23 July 2012	B2	8.96	12500	26	<5	14	
ES1218050-006	23 July 2012	C	8.87	640	<5	<5	14	
ES1218050-007	23 July 2012	D	8.55	386	<5	<5	4	
ES1218050-008	23 July 2012	B2 POINT 1	8.96	12300	34	<5	15	
ES1218050-009	23 July 2012	B2 POINT 2	8.96	12600	40	<5	14	
ES1220401-001	21 August 2012	A1	8.84	2280	15	<5	8	
ES1220401-002	21 August 2012	A2	9.08	3430	35	<5	2	
ES1220401-003	21 August 2012	A3	9.47	3760	63	<5	<1	
ES1220401-004	21 August 2012	B1	8.5	361	<5	<5	<1	
ES1220401-005	21 August 2012	B2 POINT 1	9.17	12200	28	<5	17	
ES1220401-006	21 August 2012	B2 POINT 2	8.92	12900	31	<5	17	

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Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1220401-007	21 August 2012	C	9.23	942	42	<5	2	
ES1220401-008	21 August 2012	D	8.72	407	6	<5	3	
ES1220586-001	23 August 2012	SB1	9.01	3120	72	<5	<1	
ES1220586-002	23 August 2012	SB2	8.54	850	58	<5	<1	
ES1220586-003	23 August 2012	SB3	8.96	3350	50	<5	33	
ES1220586-004	23 August 2012	SD1	8.13	299	48	<5	3	
ES1220586-005	23 August 2012	SD2	8.15	228	12	<5	4	
ES1220586-006	23 August 2012	SD3	8.1	378	10	<5	3	
ES1220586-007	23 August 2012	SD4	8.54	396	31	<5	2	
ES1220586-008	23 August 2012	SD5	8.24	192	11	<5	6	
ES1220586-009	23 August 2012	SD6	8.69	1070	376	<5	4	
ES1222949-001	24 September 2012	A1	8.81	2940	9	<5	10	
ES1222949-002	24 September 2012	A2	9.03	4460	20	7	21	
ES1222949-003	24 September 2012	A3	8.73	7720	25	<5	24	
ES1222949-004	24 September 2012	B1	8.6	334	8	<5	2	
ES1222949-005	24 September 2012	B2 POINT 1	8.99	13200	<5	<5	14	
ES1222949-006	24 September 2012	B2 POINT 2	8.99	13400	16	<5	15	
ES1222949-007	24 September 2012	C	8.93	1560	252	<5	41	
ES1222949-008	24 September 2012	D	8.87	422	<5	<5	4	
ES1223081-001	25 September 2012	SB1	8.97	3400	13	<5	6	
ES1223081-002	25 September 2012	SB2	9.09	989	30	<5	12	
ES1223081-003	25 September 2012	SB3	9.1	6350	200	<5	63	
ES1223081-004	25 September 2012	SD1	8.83	343	16	<5	13	
ES1223081-005	25 September 2012	SD2	8.6	264	10	<5	8	
ES1223081-006	25 September 2012	SD3	7.94	488	10	<5	7	
ES1223081-007	25 September 2012	SD4	8.93	505	46	<5	7	
ES1223081-008	25 September 2012	SD5	7.97	226	66	<5	10	
ES1223081-009	25 September 2012	SD6	8.58	1170	160	<5	16	

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Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1224704-001	16 October 2012	A1	8.86	3280	18	<5	<1	
ES1224704-002	16 October 2012	A2	9.04	4780	26	<5	25	
ES1224704-003	16 October 2012	A3	8.55	10300	24	<5	27	
ES1224704-004	16 October 2012	B1	8.72	322	<5	<5	<1	
ES1224704-005	16 October 2012	B2-POINT 1	9.09	12600	42	<5	27	
ES1224704-006	16 October 2012	B2-POINT 2	9.07	13600	35	<5	18	
ES1224704-007	16 October 2012	C	8.83	2760	406	<5	91	
ES1224704-008	16 October 2012	D	8.76	424	26	<5	<1	
ES1224703-001	16 October 2012	SB1	9.03	3760	59	<5	25	
ES1224703-002	16 October 2012	SB2	8.8	1070	32	<5	7	
ES1224703-003	16 October 2012	SB3	9.28	9020	220	<5	106	
ES1224703-004	16 October 2012	SD1	9.54	330	11	<5	13	
ES1224703-005	16 October 2012	SD2	8.01	263	72	<5	5	
ES1224703-006	16 October 2012	SD3	8.33	455	20	<5	7	
ES1224703-007	16 October 2012	SD4	9.22	721	167	<5	6	
ES1224703-008	16 October 2012	SD5	8.48	243	50	<5	6	
ES1224703-009	16 October 2012	SD6	8.81	1300	50	<5	<1	
ES1227721-001	21 November 2012	B1	8.73	322	<5	<5	3	
ES1227721-002	21 November 2012	B2 POINT 1	9.21	14500	20	<5	3	
ES1227721-003	21 November 2012	B2 POINT 2	9.2	14500	22	<5	7	
ES1228045-001	26 November 2012	A1	8.91	4190	35	<5	4	
ES1228045-002	26 November 2012	A2	9.06	6770	42	<5	30	
ES1228045-003	26 November 2012	A3	8.61	12300	20	<5	15	
ES1228136-001	27 November 2012	D	8.48	397	29	<5	5	
ES1228137-001	27 November 2012	SB1	9.18	4850	101	<5	14	
ES1228137-002	27 November 2012	SB2	9.48	1430	10	<5	13	
ES1228137-003	27 November 2012	SD1	8.51	435	26	<5	12	
ES1228137-004	27 November 2012	SD2	8.39	335	40	<5	8	
ES1228137-005	27 November 2012	SD3	8.67	546	14	<5	6	
ES1228137-006	27 November 2012	SD5	8.23	296	40	<5	10	
ES1228137-007	27 November 2012	SD6	8.89	1500	126	<5	11	

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Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1229976-001	18 December 2012	A1	9.13	4940	38	<5	25	
ES1229976-002	18 December 2012	A2	9.05	9840	80	<5	49	
ES1229976-003	18 December 2012	A3	8.76	12100	43	<5	459	
ES1229976-004	18 December 2012	B1	8.58	345	5	<5	5	
ES1229976-005	18 December 2012	B2-POINT 1	9.24	13700	67	<5	17	
ES1229976-006	18 December 2012	B2-POINT 2	9.25	14500	64	<5	18	
ES1229976-008	18 December 2012	D	8.65	452	32	<5	27	
ES1229977-001	18 December 2012	SB1	9.29	3930	72	<5	27	
ES1229977-002	18 December 2012	SB2	9.46	1870	14	<5	23	
ES1229977-003	18 December 2012	SD1	9.15	462	29	<5	19	
ES1229977-004	18 December 2012	SD2	8.56	382	84	<5	10	
ES1229977-005	18 December 2012	SD3	8.52	573	65	<5	11	
ES1229977-006	18 December 2012	SD5	8.38	314	41	<5	14	
ES1229977-007	18 December 2012	SD6	8.91	1600	52	<5	26	
ES1301112-001	16 January 2013	A1	9.31	5330	50	56	15	
ES1301112-002	16 January 2013	A2	9.33	13800	44	<5	50	
ES1301112-003	16 January 2013	A3	8.89	13900	28	<5	18	
ES1301112-004	16 January 2013	B1	9.04	382	<5	<5	4	
ES1301112-005	16 January 2013	B2 - POINT 1	9.51	16000	71	<5	21	
ES1301112-006	16 January 2013	B2 - POINT 2	9.54	16200	63	<5	20	
ES1301112-007	16 January 2013	D	9.11	515	84	<5	9	
ES1303170-001	8 February 2013	SB1	9.03	2110	1210	<5	4	
ES1303170-002	8 February 2013	SB2	9.57	1250	736	<5	13	
ES1303170-003	8 February 2013	SB3	8.43	827	460	<5	3	
ES1303170-004	8 February 2013	SD1	7.59	175	146	<5	13	
ES1303170-005	8 February 2013	SD2	8.04	154	182	<5	9	
ES1303170-006	8 February 2013	SD3	7.86	338	28	<5	14	
ES1303170-007	8 February 2013	SD4	8.07	281	258	<5	8	
ES1303170-008	8 February 2013	SD5	7.58	125	20	<5	11	
ES1303170-009	8 February 2013	SD6	8.89	1220	768	<5	6	
ES1304586-001	27 February 2013	A1	9.09	4340	31	<5	12	
ES1304586-002	27 February 2013	A2	9.19	14600	49	<5	63	
ES1304586-003	27 February 2013	A3	8.99	13600	25	<5	18	
ES1304586-004	27 February 2013	B1	8.62	359	<5	<5	7	
ES1304586-005	27 February 2013	B2 - POINT 1	9.48	12400	101	<5	32	
ES1304586-006	27 February 2013	B2 - POINT 2	9.48	15400	117	<5	31	
ES1304586-007	27 February 2013	C	9.15	672	344	<5	13	
ES1304586-008	27 February 2013	D	8.67	434	24	<5	8	

Narrabri - Surface Water Monitoring

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1304712-001	28 February 2013	SB1	9.09	4870	24	<5	7	
ES1304712-002	28 February 2013	SB2	9.58	1400	8	<5	8	
ES1304712-003	28 February 2013	SB3	8.89	1720	1060	<5	3	
ES1304712-004	28 February 2013	SD1	7.83	258	14	<5	16	
ES1304712-005	28 February 2013	SD2	8.04	171	16	<5	10	
ES1304712-006	28 February 2013	SD3	8.01	288	26	<5	11	
ES1304712-007	28 February 2013	SD4	9.11	399	66	<5	8	
ES1304712-008	28 February 2013	SD5	7.96	161	103	<5	10	
ES1304712-009	28 February 2013	SD6	8.89	1240	500	<5	12	

Appendix 6

GROUNDWATER MONITORING DATA

Site ID	Piezometer / Water Bore	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals															Mercury (Hg) - mg/L	pH Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N - mg/L	Nitrate as N - mg/L	NOX as N - mg/L	Total Dissolved Solids
						pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L							
ANZECC Guideline - stock drinking water									*5*	*0.5*			*0.01*	*1*	*1*	*1*		*0.1*			*20*	*0.002*			*1000*					*1000*									*1500*	*400*		*4000*
P1	**NG1**	**1-Nov-07**	1450	52.02	53.00																																					
		17-Dec-07		50.02	51.00																																					
		23-Jan-08	1145	47.43	48.42																																					
		3-Mar-08	1230	46.53	47.51																																					
		2-Apr-08	1040	45.51	46.50																																					
		9-May-08	0826	44.25	45.23																																					
		2-Jun-08	1200	43.25	44.24																																					
		1-Jul-08	1150	42.00	42.98																																					
		11-Aug-08	1350	40.24	41.22																																					
		14-Aug-08	1047	40.15	41.13																																					
		19-Aug-08	0925	39.96	40.94																																					
		9-Sep-08	0830	42.82	43.80	7.6	470	20.8		0.008	0.684	0.003	0.0008	0.094	0.041	0.128	56.7	**0.516**	2.33	0.154	0.11	0.250	0.0001		3710	26	25	933	24	44.6	641	43	<1	<1	1190	1190	42.7	2.06	1.62				2380
		14-Nov-08	0956	45.86	46.84																																					
		3-Dec-08	1505	45.18	46.16																																					
		16-Feb-09	1255	42.24	43.22																																					
		11-Jun-09	1500							<0.001	0.237	<0.001	<0.0001	0.001	0.002	0.096	0.71	**0.198**	0.266	0.025	<0.1	0.235	<0.0001		3840	25	26	846	23	40.7	693	<10	<1	<1	1000	1000	39.6	1.33	0.24				2300
		17-Aug-09	0930	35.79	36.77	7.3	3920	23.5		0.009	0.954	0.002	0.0005	0.094	0.051	0.236	56.5	**0.24**	1.38	0.206	0.14	0.347	0.0002		4130	20	27	892	22	42.6	614	48.2	<1	<1	1120	1120	40.6	2.24	0.48				2520
		17-Nov-09	0920	42.30	43.28	7.21	2940	34.4		0.003	0.31	<0.001	0.0002	0.032	0.007	0.121	7.74	**0.236**	0.403	0.041	0.02	0.091	<0.0001		2370	7	20	471	13	22.8	346	40.4	<1	<1	624	624	23	0.57	0.35				1420
		24-Feb-10	1255	42.13	43.11																																					
		24-Jun-10	1515	37.00	37.98	7.44	4060	21	<0.01	<0.001				<0.005		0.006	<0.05	0.002	0.009	0.003		0.036	<0.0001	7.5	3810	23	29	928	28	44.6	662	44.2	<1	<1	1080	1080	41.2	3.9		<0.01	1.8	1.8	
		3-Sep-10	1100	34.86	35.84	7.53	3830	22.1																																			
		9-Feb-11	1340	30.08	31.06	7.31	2960	28.4	<0.01	<0.001				<0.005		0.019	<0.05	0.012	0.06	0.004		0.088	<0.0001	7.47	3770	19	22	792	22	37.8	680	39	<1	<1	957	957	39.1	1.78		<0.01	0.69	0.69	
		9-Jun-11	1340	27.49	28.47	7.35	3180	20.4																																			
		27-Sep-11	930	25.63	26.61	7.41	3520	20.8	0.03	<0.001	0.301	<0.001	<0.0001	<0.001	<0.001	0.024	0.24	0.036	0.207	0.008	<0.01	0.045	<0.0001	8.31	3970	20	26	916	25	43.6	716	38	<1	5	994	999	41	3.12	0.24	<0.01	0.02	0.02	2260
		4-Jan-12	1350	24.98	25.96	7.44	3255	24.1																																			
		28-Mar-12	1350	24.20	25.18	7.5	3130	22.7	0.07	<0.001	0.316	<0.001	<0.0001	<0.001	<0.001	0.013	0.12	0.026	0.002	0.01	<0.01	0.054	<0.0001	7.96	3870	25	30	913	25	44.1	716	46	<1	<1	1050	1050	42.1	2.2	0.01	<0.01	0.49	0.49	2230
		25-Jun-12	1340			No access to property																																					
		11-Sep-12	1415	20.55	21.53	7.64	3800	23.5	0.09	<0.001	0.328	<0.001	<0.0001	<0.001	<0.001	0.012	0.15	0.03	0.116	0.003	<0.01	0.029	<0.0001	8.05	3980	8	26	884	24	41.6	685	41	<1	<1	1090	1090	42	0.46	0.02	<0.01	0.46	0.46	2140
		06-Dec-12	1340	22.56	23.54	7.73	3670	22.7																																			
		03-Apr-13	1350			7.77	3920	23.4	0.07	<0.001	0.331	<0.001	0.0001	<0.001	<0.001	0.057	0.18	0.017	0.022	0.002	<0.01	0.115	<0.0001	7.79	4040	23	31	925	29	44.7	687	37	<1	<1	1030	1030	40.7	4.58	<0.01	<0.01	0.6	0.6	2230
P2	**NG2**	**1-Nov-07**	1420	30.58	31.50																																					
		17-Dec-07		29.58	30.50																																					
		23-Jan-08	1120	28.97	29.90																																					
		3-Mar-08	1655	29.48	30.40																																					
		2-Apr-08	1100	29.46	30.38																																					
		9-May-08	0846	29.45	30.38																																					
		2-Jun-08	1224	29.46	30.39																																					
		1-Jul-08	1215	29.43	30.35																																					
		11-Aug-08	1435	29.44	30.36																																					
		14-Aug-08	1105	29.45	30.37																																					
		19-Aug-08	1055	29.45	30.37																																					
		9-Sep-08	1030	29.88	30.80	7.2	15700	20.8		0.010	1.40	0.004	0.0006	0.024	0.029	0.057	33.4	0.091	2.96	0.048	0.06	0.093	<0.0001		17100	189	453	4060	126	227	5650	366	<1	<1	2550	2550	218	1.97	4.52				**12900**
		14-Nov-08	1012	29.64	30.56																																					
		3-Dec-08	1445	29.51	30.43																																					
		16-Feb-09	1329	29.32	30.23																																					
		11-Jun-09	1500							0.004	0.613	<0.001	<0.0001	0.016	0.021	0.025	8.81	**0.124**	2.44	0.039	0.02	0.108	<0.0001		19300	184	397	3770	90	208	5790	181	<1	<1	2890	2890	225	3.83	3.31				**13400**
		17-Aug-09	1125	29.33	30.24	6.5	33100	25.3		0.004	0.896	<0.001	0.0001	0.026	0.024	0.057	7.47	0.032	2.37	0.057	0.02	0.064	0.0002		20300	250	585	3650	83	222	5720	247	<1	<1	3000	3000	226	1.12	2.47				**12800**
		17-Nov-09	1020	29.31	30.22	6.58	20400	32.4		0.041	8.41	0.008	0.0009	0.215	0.103	0.463	167	**0.152**	4.64	0.284	0.25	0.493	0.0002		18900	6	434	3630	78	196	5300	276	<1	393	2360	2750	210	3.51	2.88				**12800**
		24-Feb-10	1220	29.29	30.20																																					
		24-Jun-10	1415	29.19	30.10	6.62	19740	21	<0.01	0.003				<0.005		0.002	<0.05	0.012	1.53	0.035		0.098	<0.0001	6.92	17200	115	465	3320	108	191	5960	362	<1	<1	<1	<1	176	4.22		<0.01	0.2	0.2	
		3-Sep-10	0930	29.06	29.97	6.8	19650	21.5																																			
		8-Feb-11	1030	29.07	29.98	6.27	17090	25	0.01	0.005				<0.005		0.01	<0.05	0.002	1.64	0.017		0.013	<0.0001	6.45	20600	170	440	4520	91	244	6080	408	<1	<1	3380	3380	248	0.82		<0.01	<0.01	<0.01	
		08-Jun-11	1230	28.95	29.86	6.55	15990	20.7																																			
		26-Sep-11	1340	28.94	29.85	6.55	17150	22.7	0.6	0.014	0.474	0.001	0.0001	0.004	0.016	0.024	1.38	**0.135**	2.07	0.042	0.01	0.121	<0.0001	6.91	20500	157	432	4760	91	253	5880	344	<1	<1	2860	2860	230	4.65	3.1	<0.01	0.5	0.5	**12500**
		4-Jan-12	1310	28.79	29.70	6.43	17090	23.7																																			
		28-Mar-12	1320	28.29	29.2	6.85	15250	22.8	0.12	<0.001	0.437	<0.001	<0.0001	0.008	<0.001	0.016	0.66	**1.96**	0.019	0.018	<0.01	0.087	<0.0001	7.44	20000	170	452	4660	87	251	6190	393	<1	<1	3020	3020	243	1.49	2.54	<0.01	0.16	0.16	**13200**
		25-Jun-12	1320	28.73	29.64	6.71	17300	22.2																																			
		11-Sep-12	1350	28.21	29.12	6.53	17840	23.3	0.03	0.003	0.417	<0.001	<0.0001	0.001	0.007	0.014	0.66	0.004	1.84	0.016	<0.01	0.047	<0.0001	7.4	20400	160	426	4600	98	246	5820	385	<1	<1	3030	3030	233	2.67	0.19	<0.01	0.12	0.12	**12600**
		06-Dec-12	1300	28.71	29.62	6.51	18410	23.1																																			
		03-Apr-13	1320	28.59	29.5	6.94	18500	24.2	0.12	<0.001	0.374	<0.001	0.0001	0.006	0.008	0.027	0.64	0.024	1.8	0.025	<0.01	0.112	<0.0001	7.15	20400	184	475	4330	134	240	5580	331	<1	<1	2750	2750	219	4.5	2.9	<0.01	0.47	0.47	**12000**
P3	**NG3**	**1-Nov-07**	1530	9.92	10.85																																					
		17-Dec-07		10.07	11.00																																					
		23-Jan-08	1400	9.32	10.25																																					
		3-Mar-08	1640	9.87	10.80																																					
		2-Apr-08	1200	9.89	10.83																																					
		9-May-08	1002	9.90	10.83																																					
		2-Jun-08	1353	9.90	10.84																																					
		1-Jul-08	1345	9.91	10.84																																					
		11-Aug-08	1610	9.92	10.85																																					
		9-Sep-08	1300	9.77	10.70	7.07	1340	20.2		0.005	0.092	0.002	0.0002	0.004	0.006	0.002	0.76	0.030	0.496	0.014	<0.01	0.014	<0.0001		15800	331	504	3190	60	198	5250	**1230**	<1	<1	1310	1310	200	0.44	0.94				**11700**
		14-Nov-08	0930	9.89	10.83																																					
		1-Dec-08	1120	9.86	10.80																																					
		12-Jan-09	1223	9.86	10.80																																					
		9-Dec-09	0945	9.90	10.83	6.64	18620	25.8	0.02	<0.001				<0.005		0.004	<0.05	<0.001	0.348	0.025		0.016	<0.0001	6.82	14500	257	467	3440	51	202	5230	**1160**	<1	<1	1270	1270	197	1.24		0.02	<0.01	<0.01	
		24-Feb-10	0920	9.90	10.83																																					
		23-Jun-10	1205	9.92	10.85	6.3	18570	21	<0.01	0.003				<0.001		0.012	<0.05	0.003	0.358	0.014		0.069	<0.0001	6.68	13900	266	450	3490	53	203	5860	**1310**	<1	<1	1340	1340	219	3.79		<0.01	0.03	0.03	
		3-Sep-10	0915	9.89	10.82	6.57	17620	21.1																																			
		8-Feb-11	1200	9.90	10.83	6.48	14780	25.9	<0.01	0.003				<0.005		0.004	<0.05	<0.001	0.27	0.013		0.014	<0.0001	6.47	18800	300	0.27	3040	50	190	5100	**1120**	<1	<1	1240	1240	192	0.59		0.02	0.02	0.02	
		08-Jun-11	1240	9.89	10.82	6.55	14430	20.4																																			
		27-Sep-11	1020	9.88	10.81	6.51	16030	21.3	0.02	<0.001	0.125	<0.001	<0.0001	0.001	0.005	0.015	0.2	0.004	0.355	0.02	<0.01	0.071	<0.0001	7.7	19000	275	526	3760	44	222	5670	**1310**	<1	<1	1230	1230	212	2.26	0.35	<0.01	<0.01	<0.01	**12100**
		3-Jan-12	1050	8.85	9.78	6.56	15820	22.5																																			
		28-Mar-12	915	9.84	10.77	7.15	13220	22.4	0.11	0.001	0.116	<0.001	0.0001	0.001	<0.001	0.034	0.18	**0.242**	0.015	0.032	<0.01	0.167	<0.0001	7.42	18200	303	532	3900	48	230	5810	**1450**	<1	<1	1220	1220	218	2.5	<0.10	<0.01	0.38	0.38	**11300**
		25-Jun-12	915	9.87	10.8	6.82	18250	19.5																																			
		11-Sep-12	1010	9.84	10.77	6.7	15880	21.6	0.06	0.003	0.098	<0.001	0.0001	<0.001	0.003	0.041	0.17	0.004	0.304	0.015	<0.01	0.132	<0.0001	7.47	18400	290	540	3960	59	233	5910	**1250**	<1	<1	1440	1440	222	2.44	<0.10	<0.01	<0.01	<0.01	**12300**
		04-Dec-12	1115	9.85	10.78	6.82	15790	22																																			
		03-Apr-13	910	9.87	10.8	6.95	15800	20.2	0.88	<0.001	0.108	<0.001	0.0003	0.002	0.001	0.096	0.94	0.005	0.044	0.013	<0.01	0.308	<0.0001	7.22	18800	343	555	3620	70	222	5240	**1350**	<1	<1	1280	1280	202	4.83	0.04	<0.01	0.31	0.31	**11700**

Site ID	Piezometer / Water Bore	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																Major Cations					Major Anions														
						pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) mg/L	Zinc (Zn) - mg/L	Mercury (Hg) - mg/L	pH Lab	EC - Lab - µs/cm	Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L	Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N - mg/L	Nitrate as N - mg/L	NOX as N - mg/L	Total Dissolved Solids
ANZECC Guideline - stock drinking water									*5*	*0.5*			*0.01*	*1*	*1*	*1*		*0.1*		*1*	*20*	*0.002*			*1000*						*1000*									*1500*	*400*		*4000*
P4	**NG4**	**1-Nov-07**	1610	18.49	19.40																																					
		11-Dec-07		18.09	19.00																																					
		17-Dec-07		18.09	19.00																																					
		23-Jan-08	1225	17.82	18.73																																					
		3-Mar-08	1505	18.3	19.21																																					
		2-Apr-08	1305	18.29	19.20																																					
		9-May-08	1110	18.26	19.17																																					
		2-Jun-08	1505	18.275	19.19																																					
		1-Jul-08	1448	18.24	19.15																																					
		11-Aug-08	1703	18.19	19.10																																					
		9-Sep-08	1400	17.99	18.9	6.7	1560	21.2		0.008	0.265	0.003	<0.0001	0.005	0.033	0.006	3.93	0.027	6.20	0.024	<0.01	0.013	<0.0001		17700	355	699	4550	124	276	7650	**1700**	<1	<1	1840	1840	288	2.10	1.70				**16800**
		14-Nov-08	0920	18.16	19.06																																					
		1-Dec-08	1315	18.12	19.02																																					
		12-Jan-09	1239	18.10	19.00																																					
		23-Feb-09	1045	18.06	18.96																																					
		9-Jun-09	1100	18.55	19.40	6.9	25600	20.8		0.003	0.165	<0.001	<0.0001	0.056	0.026	0.006	14.4	0.047	4.99	0.066	0.02	0.044	<0.0001		25200	288	640	5670	86	316	7850	**1470**	<1	<1	2220	2220	297	3.1	0.48				**16200**
		24-Aug-09	1310	18.11	18.99																																					
		18-Nov-09	1455	18.12	19.00	6.51	25700	25.1	0.04	0.004				<0.005		0.013	<0.05	0.009	3.61	0.043		0.053	<0.0001	6.73	23700	351	706	6200	115	348	8700	**1560**	<1	<1	1850	1820	314	5.04		<0.01	0.1	0.1	
		18-Feb-10	1100	17.88	18.76																																					
		22-Jun-10	1420	18.09	18.97	8.2	25700	22	<0.01	0.001				<0.005		0.006	0.09	0.001	3.19	0.024		0.032	<0.0001	6.71	23700	249	591	5070	98	284	8020	**1430**	<1	<1	2340	2340	303	3.22		<0.01	0.04	0.04	
		3-Sep-10	1130	17.98	18.86	6.69	24290	22.1																																			
		7-Feb-11	1430	17.97	18.85	6.94	19920	28.6	0.01	0.004				<0.001		0.015	<0.05	<0.001	3.19	0.009		0.029	<0.0001	6.42	25600	232	599	5580	103	306	8050	**1490**	<1	<1	2070	2070	299	1.1		<0.01	0.05	0.05	
		08-Jun-11	1350	17.93	18.81	6.80	19820	20.8																																			
		27-Sep-11	1050	17.91	18.79	6.70	22130	22.5	0.03	0.008	0.104	<0.001	<0.0001	0.001	0.02	0.01	0.17	0.01	2.61	0.027	<0.01	0.076	<0.0001	7.83	26600	179	661	5690	89	313	7730	**1690**	<1	<1	1970	1970	293	3.36	0.8	<0.01	0.1	0.1	**17200**
		3-Jan-12	1000	17.82	18.70	6.45	22910	23.4																																			
		22-Mar-12	1050	17.77	18.65	6.75	19830	23.6	0.48	<0.001	0.112	<0.001	<0.0001	0.003	0.02	0.048	0.58	0.012	2.97	0.028	<0.01	0.143	<0.0001	7.42	24800	240	592	5260	99	292	7590	**1780**	<1	<1	1990	1990	291	0.17	1.37	0.15	0.01	0.16	**17500**
		01-Jun-12	1100	17.87	18.75	6.69	17650	21.3																																			
		10-Sep-12	1150	17.88	18.76	6.4	24900	21.9	0.05	0.002	0.101	<0.001	<0.0001	0.002	0.018	0.019	1.24	0.004	2.47	0.017	<0.01	0.064	<0.0001	7.21	26400	219	593	5660	110	309	7510	**1670**	<1	<1	2380	2380	294	2.39	0.96	<0.01	0.3	0.3	**17100**
		04-Dec-12	1025	17.86	18.74	6.53	25500	23.1																																			
		07-Mar-13	1240	17.82	18.7	6.52	25400	24.8	**5.75**	0.006	1.39	<0.001	0.0002	0.018	0.023	0.072	23.3	0.05	4.49	0.026	0.03	0.133	<0.0001	6.79	26400	280	716	5420	131	312	7300	**1650**	<1	<1	2340	2340	287	4.15	3.78	0.02	0.67	0.69	**15500**
P5	**NG5**	**1-Nov-07**	1620	29.06	30.00																																					
		11-Dec-07		29.06	30.00																																					
		17-Dec-07		29.06	30.00																																					
		23-Jan-08	1240	28.36	29.30																																					
		3-Mar-08	1455	27.97	28.91																																					
		2-Apr-08	1315	27.475	28.42																																					
		9-May-08	1120	26.92	27.86																																					
		2-Jun-08	1516	26.605	27.55																																					
		1-Jul-08	1500	26.26	27.20																																					
		14-Aug-08	1515	25.78	26.72																																					
		12-Sep-08	1015	26.56	27.5	7	1050	20.8		0.007	0.368	0.003	0.0002	0.004	0.019	0.007	2.01	0.081	1.92	0.051	<0.01	0.031	<0.0001		24600	456	494	3960	71	238	7300	719	<1	<1	1860	1860	258	4.16	2.03				**12700**
		14-Nov-08	0908	27.06	28																																					
		1-Dec-08	1109	26.81	27.75																																					
		12-Jan-09	1249	26.41	27.35																																					
		16-Feb-09	1356	25.79	26.72																																					
		9-Jun-09	1215	25.06	25.99	6.6	25800	20.4		0.014	0.985	0.001	0.0003	0.032	0.022	0.597	19.7	**0.336**	1.16	0.091	0.04	1.14	0.0002		25100	361	536	5700	63	312	8230	765	<1	<1	1920	1920	286	4.19	0.91				**15900**
		1-Dec-09	1245	24.68	25.62	6.74	25600	25.8	<0.01	0.001				0.009		0.095	<0.05	0.008	0.659	0.053		0.167	<0.0001	6.76	20800	381	577	5830	73	322	8480	739	<1	<1	1940	1940	294	4.54		0.26	6.42	6.68	
		18-Feb-10	1115	24.99	25.93																																					
		23-Jun-10	1305	23.58	24.52	6.74	26100	22	<0.01	<0.001				<0.001		0.007	<0.05	<0.001	0.402	0.029		0.055	<0.0001	6.77	18300	314	503	5550	74	300	9320	996	<1	<1	1900	1900	322	3.43		<0.01	8.45	8.45	
		3-Sep-10	1150	23.53	24.47	6.75	16840	22.5																																			
		9-Feb-11	1230	23.05	23.99	6.69	19520	26.3	0.03	0.006				0.006		0.16	<0.05	0.003	0.435	0.028		0.949	<0.0001	6.76	27200	359	570	3040	83	332	8610	**1070**	<1	<1	1970	1970	304	4.33		<0.01	5.32	5.32	
		31-May-11	1130	22.90	23.84	6.70	20750	21.7																																			
		27-Sep-11	1130	22.05	22.99	6.72	22880	23.4	0.07	0.006	0.214	0.001	0.0003	0.001	0.009	0.032	0.22	0.014	0.791	0.042	<0.01	0.095	<0.0001	7.71	27000	208	578	5980	72	320	8460	918	<1	<1	1830	1830	294	4.14	0.62	<0.01	1.33	1.33	**17400**
		3-Jan-12	1120	22.72	23.66	6.61	22600	24.1																																			
		22-Mar-12	1120	22.65	23.59	6.81	21700	24.3	0.46	<0.001	0.2	<0.001	0.0002	0.002	0.009	0.185	0.87	0.026	0.525	0.032	<0.01	0.375	<0.0001	7.54	26500	202	592	6210	91	331	8990	993	<1	<1	1930	1930	313	2.84	0.95	<0.01	0.11	0.11	**18700**
		01-Jun-12	1130	22.60	23.54	6.77	20600	22.1																																			
		10-Sep-12	1130	22.48	23.42	6.4	15630	22.8	0.14	0.001	0.159	<0.001	<0.0001	0.001	0.008	0.033	0.41	0.008	0.712	0.028	<0.01	0.064	<0.0001	7.35	27200	179	524	6030	92	317	8140	926	<1	<1	2160	2160	292	4.02	1.06	0.01	0.45	0.46	**17100**
		04-Dec-12	1000	22.57	23.51	6.47	26010	22.8																																			
		07-Mar-13	1300	22.66	23.6	6.58	26100	23.8	3.18	0.005	0.509	<0.001	0.0004	0.009	0.014	0.048	15.6	0.03	1.62	0.037	0.02	0.095	<0.0001	6.94	27500	283	593	5530	101	306	7900	896	<1	<1	2150	2150	284	3.64	1.86	0.03	0.06	0.09	**16700**
P6	**NG6**	**1-Nov-07**	1640	90.21	91.10																																					
		11-Dec-07		90.11	91.00																																					
		17-Dec-07		90.11	91.00																																					
		23-Jan-08	1315	89.37	90.26																																					
		3-Mar-08	1440	89.91	90.80																																					
		2-Apr-08	1330	89.93	90.82																																					
		9-May-08	1145	89.91	90.80																																					
		2-Jun-08	1533	89.92	90.81																																					
		1-Jul-08	1519	89.92	90.81																																					
		12-Aug-08	1055	89.86	90.75																																					
		10-Sep-08		89.11	90.00																																					
		14-Nov-08	1204	89.04	90.02																																					
		3-Dec-08	1336	89.05	90.03																																					
		23-Feb-09	1214	89.17	90.05																																					
		24-Aug-09	1400			Dry																																					
		17-Nov-09	1140			Dry																																					
		24-Feb-10	1035	89.82	90.71																																					
		24-Jun-10	1000			Dry																																					
		2-Sep-10	1400			Dry																																					
		9-Feb-11	1400			Dry																																					
		08-Jun-11	930	89.81	90.70	7.60	2320	18.5																																			
		26-Sep-11	930	89.97	90.86	Insufficient to sample																																					
		4-Jan-12	930	89.85	90.74	Insufficient to sample																																					
		28-Mar-12	1000	89.91	90.80	Insufficient to sample																																					
		25-Jun-12	1020			Insufficient to sample																																					
		11-Sep-12	1055			Dry																																					
		6-Dec-12	1040			Dry																																					
		3-Apr-13	1110			Dry																																					

Site ID	Piezometer / Water Bore	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals														Major Cations					Major Anions														
						pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) mg/L	Zinc (Zn) - mg/L	Mercury (Hg) - mg/L	pH Lab	EC - Lab - µs/cm	Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L	Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N - mg/L	Nitrate as N - mg/L	NOX as N - mg/L	Total Dissolved Solids
ANZECC Guideline - stock drinking water									*5*	*0.5*			*0.01*	*1*	*1*	*1*		*0.1*		*1*		*20*	*0.002*			*1000*						*1000*								*1500*	*400*		*4000*
P7	**NG7**	**1-Nov-07**	1700	62.87	63.80																																				
		11-Dec-07		62.07	63.00																																				
		17-Dec-07		62.07	63.00																																				
		23-Jan-08	1335	90.47	91.40																																				
		3-Mar-08	1425	90.00	90.93																																				
		2-Apr-08	1400	91.07	92.00																																				
		9-May-08	1202	89.52	90.45																																				
		2-Jun-08	1553	92.07	93.00																																				
		1-Jul-08	1544	92.07	93.00																																				
		12-Aug-08	1135	91.07	92.00																																				
		10-Sep-08	1115	62.87	63.80	7.95	1170	20.5		<0.001	0.031	<0.001	<0.0001	0.005	0.003	0.006	0.79	**0.117**	0.095	0.005	<0.01	0.033	<0.0001		149	1	1	25	3	1.33	26	4	<1	<1	19	19	1.20		0.55				101
		14-Nov-08	1213	91.08	92.00																																				
		3-Dec-08	1350	91.08	92.00																																				
		23-Feb-09	1240	89.17	90.10																																				
		9-Jun-09	1425			Dry																																				
		24-Aug-09	1415	86.26	87.20	8.9	170	22.4		<0.001	0.064	<0.001	0.0002	0.007	0.004	0.016	2.72	0.022	0.074	0.012	<0.01	0.066	<0.0001		147	3	1	18	3	1.27	26.2	3.47	<1	<1	24	24	1.27		<0.01				107
		17-Nov-09	1230	62.84	63.78	5.52	212	25		<0.001	0.029	<0.001	0.0001	0.004	0.002	0.053	0.49	0.047	0.023	0.013	<0.01	0.173	<0.0001		160	2	1	19	3	1.11	27	3.09	<1	<1	22	22	1.27	-	<0.01				95
		24-Feb-10	1105	63.04	63.98																																				
		24-Jun-10	1110	62.99	63.93	7.96	222	20	0.02	<0.001				0.001		0.011	<0.05	0.021	0.016	0.008		0.114	<0.0001	6.6	169	3	3	36	4	2.07	33.5	4.28	<1	<1	45	45	1.93			<0.01	0.19	0.19	
		2-Sep-10	1350	62.86	63.80	6.81	202	23.9																																		
		9-Feb-11	1010	63.50	64.44	6.88	356	24.3	<0.01	<0.001				<0.005		0.03	<0.05	0.001	0.022	0.002		0.322	<0.0001	6.12	477	28	3	66	4	4.63	92	12	<1	<1	90	90	39.1			<0.01	0.26	0.26	
		08-Jun-11	1010	63.90	64.84	6.55	263	21.3																																		
		26-Sep-11	1015	62.90	63.84	6.65	245	22.3	0.82	0.005	0.052	<0.001	0.0002	0.004	0.003	0.036	0.89	0.07	0.028	0.028	<0.01	0.07	<0.0001	5.89	170	4	2	22	4	1.42	26	4	<1	<1	27	27	1.36		0.35	<0.01	0.24	0.24	104
		4-Jan-12	1010	88.59	89.53	6.38	148	22.3																																		
		28-Mar-12	1030	63.02	63.96	6.8	129	22.7	0.16	<0.001	0.032	<0.001	<0.0001	0.002	0.003	0.026	0.36	0.019	0.003	0.024	<0.01	0.087	<0.0001	6.23	152	1	2	24	4	1.36	25	4	<1	<1	35	35	1.49		0.14	<0.01	0.08	0.08	105
		25-Jun-12	1050	63.04	63.98	6.4	478	21.2																																		
		11-Sep-12	1115	62.96	63.9	6.36	225	23.5	0.64	<0.001	0.037	<0.001	<0.0001	0.003	0.002	0.006	0.89	0.005	0.031	0.003	<0.01	0.05	<0.0001	6.56	172	2	2	25	4	1.7	33	6	<1	<1	42	42	1.89	<0.01	<0.10	<0.01	0.09	0.09	118
		06-Dec-12	1110	62.96	63.9	6.48	467	24.8																																		
		03-Apr-13	1130	62.96	63.9	6.28	160	21.6	0.73	<0.001	0.046	<0.001	0.0002	0.004	0.003	0.028	1.43	0.026	0.047	0.003	<0.01	0.125	<0.0001	5.75	139	1	2	24	4	1.36	31	4	<1	<1	16	16	1.28		<0.01	<0.01	0.19	0.19	84
P8	**NC110S**	**3-Mar-08**	1345	62.23	63.00																																				
		2-Apr-08	1415	50.52	51.29																																				
		9-May-08	1220	50.59	51.36																																				
		2-Jun-08	1608	62.23	63.00																																				
		1-Jul-08	1558	50.57	51.34																																				
		12-Aug-08	1230	50.62	51.39																																				
		19-Aug-08	1515	50.63	51.40																																				
		12-Sep-08	0830	50.53	51.30	7.85	1120	21.2		<0.001	0.057	<0.001	<0.0001	<0.001	<0.001	0.001	0.09	0.004	0.037	<0.001	<0.01	0.007	<0.0001		805	33	10	121	9	7.96	64	20	<1	<1	276	276	7.74	1.35	0.14				455
		14-Nov-08	1247	50.55	51.33																																				
		3-Dec-08	1414	50.44	51.22																																				
		23-Feb-09	1326	50.48	51.30																																				
		09-Jun-09	1445			SWL >50				0.003	0.192	<0.001	0.0002	0.004	0.004	0.382	3.62	**0.374**	0.364	0.016	<0.01	0.967	<0.0001		490	29	8	59	7	4.85	44	<10	<1	<1	171	171	4.66	1.99	<0.01				360
		24-Aug-09	1500	50.20	51.24	SWL only																																				
		17-Nov-09	1330	50.32	51.36	7.45	414	25.2		<0.001	0.121	<0.001	0.0001	<0.001	<0.001	0.014	0.52	0.019	0.117	0.005	<0.01	0.07	<0.0001		423	12	4	57	6	3.59	27.2	10.3	<1	<1	137	137	3.72	1.81	0.06				240
		24-Feb-10	1130	50.36	51.40																																				
		24-Jun-10	1200	50.29	51.33	7.85	390	19	<0.01	<0.001				<0.001		0.002	<0.05	<0.001	0.006	0.003		0.04	<0.0001	7.05	358	14	4	55	7	3.56	27.7	8.75	<1	<1	131	131	3.58	0.33		<0.01	0.03	0.03	
		2-Sep-10	1425	50.19	51.23	6.93	360	24																																		
		9-Feb-11	1120	50.44	51.48	7.1	355	23.6	<0.01	<0.001				<0.001		0.012	<0.05	0.001	0.029	0.001		0.096	<0.0001	6.65	387	22	5	55	6	4.06	28	12	<1	<1	151	151	4.06	0.08		<0.01	0.63	0.63	
		08-Jun-11	1110	50.17	51.21	7.05	327	19.5																																		
		26-Sep-11	1200	50.21	51.25	6.98	321	19.8	0.98	0.006	0.143	<0.001	<0.0001	0.001	0.002	0.026	1.56	0.067	0.51	0.005	<0.01	0.1	<0.0001	6.72	346	12	4	55	6	3.47	24	7	<1	<1	128	128	3.38	1.33	0.15	<0.01	0.06	0.06	213
		4-Jan-12	1130	50.20	51.24	6.76	298	22.5																																		
		28-Mar-12	1130	50.22	51.26	7.15	293	22.5	0.29	<0.001	0.118	<0.001	<0.0001	<0.001	<0.001	0.018	0.42	**0.23**	0.002	0.016	<0.01	0.067	<0.0001	7	341	15	5	48	7	3.43	26	6	<1	<1	122	122	3.3	1.92	0.17	<0.01	0.19	0.19	196
		25-Jun-12	1200	50.26	51.3	6.93	357	19.9																																		
		11-Sep-12	1230	50.21	51.25	6.87	308	22.8	0.15	<0.001	0.158	<0.001	<0.0001	<0.001	0.003	0.031	0.38	0.017	1.44	0.003	<0.01	0.134	<0.0001	7.23	335	12	5	50	8	3.39	28	6	<1	<1	122	122	3.35	0.53	0.2	<0.01	0.1	0.1	160
		06-Dec-12	1210	50.76	51.8	6.72	310	21.1																																		
		03-Apr-13	1220	50.16	51.2	6.89	362	21.2	0.2	<0.001	0.134	<0.001	<0.0001	0.001	0.001	0.036	0.59	0.021	0.346	0.003	<0.01	0.308	<0.0001	6.8	344	17	4	46	9	3.41	32	7	<1	<1	119	119	3.43	0.27	1.02	<0.01	0.06	0.06	184
P9	**GWB5S**	**3-Mar-08**	1105	19.88	20.52																																				
		2-Apr-08	1135	19.88	20.52																																				
		9-May-08	929	19.87	20.51																																				
		2-Jun-08	1300	19.89	20.53																																				
		1-Jul-08	1255	19.86	20.50																																				
		14-Aug-08	1217	19.90	20.54																																				
		12-Sep-08	1230	19.66	20.30	6.8	1210	22.1		0.002	0.059	<0.001	0.0001	0.004	0.003	0.014	1.32	0.036	0.037	0.012	<0.01	0.042	<0.0001		451	30	12	43	5	4.51	42	24	<1	<1	139	139	4.46	0.52	0.13				295
		14-Nov-08	1103	19.80	20.44																																				
		01-Dec-08	1219	19.77	20.41																																				
		12-Jan-09	0930	19.79	20.43																																				
		23-Feb-09	0938	19.80	20.45																																				
		17-Aug-09	1430	19.70	20.51	6.7	22500	24		<0.001	0.077	<0.001	<0.0001	0.003	0.002	0.01	6.94	0.001	0.122	<0.005	<0.01	0.009	<0.0001		23000	402	635	3560	62	229	7150	**1830**	<1	<1	641	641	253	4.96	1.6				**16000**
		18-Nov-09	1120	19.64	20.45	6.61	22870	28.1	0.04	<0.001				<0.005		0.005	0.38	<0.001	0.127	0.004		<0.005	<0.0001	6.63	21200	249	535	3830	74	225	7260	**1720**	<1	<1	392	392	248	5.02		<0.01	<0.01	<0.01	
		17-Feb-10	1120	19.72	20.53																																				
		22-Jun-10	1150	19.80	20.61	6.58	23010	23	<0.01	<0.001				<0.005		0.004	4.86	<0.001	0.098	0.002		0.008	<0.0001	6.69	22000	329	493	4020	59	233	7240	**1570**	<1	<1	599	599	249	3.22		<0.01	<0.01	<0.01	
		2-Sep-10	1050	19.72	20.53	7.07	17050	23.7																																		
		7-Feb-11	1215	19.98	20.79	6.5	17180	25.7	0.02	0.003				<0.001		0.004	2.96	<0.001	0.102	0.002		0.006	<0.0001	6.4	22500	348	547	3830	61	230	7410	**1590**	<1	<1	604	604	254	4.86		<0.01	0.02	0.02	
		09-Jun-11	1115	20.11	20.92	6.55	17080	20.5																																		
		11-Oct-11	1220	18.66	19.47	6.40	15360	23.5	0.12	0.011	0.046	<0.001	<0.0001	0.01	0.001	0.012	6.14	0.021	0.182	0.003	<0.01	0.058	<0.0001	7.12	21000	354	534	4680	58	267	7310	**1550**	<1	<1	553	553	250	3.3	2.72	<0.01	0.52	0.52	**15400**
		8-Dec-11	1100	19.36	20.17	6.60	15670	23.1																																		
		04-Apr-12	1040	19.85	20.66	7.2	1133	24.7	0.61	0.003	0.046	<0.001	0.0001	0.002	0.006	0.03	1.22	**0.411**	0.008	0.041	<0.01	0.195	<0.0001	7.51	3350	74	60	585	22	34.6	828	212	<1	<1	257	257	32.9	2.55	27.2	0.7	2.48	3.18	1930
		31-May-12	1030	19.67	20.48	6.8	12970	21.7																																		
		29-Aug-12	1150	19.76	20.57	6.73	14420	22.6	0.32	<0.001	0.076	<0.001	0.0002	0.006	0.001	0.028	2.27	0.029	0.338	0.004	<0.01	0.218	<0.0001	7.42	19100	336	516	4460	71	255	6670	**1590**	<1	<1	681	681	235	4.1	10.4	0.04	4.28	4.32	**12400**
		04-Dec-12	1335	19.97	20.78	6.74	16220	23.4																																		
		07-Mar-13	1130	19.89	20.7	6.63	18400	23.3	0.06	<0.001	0.031	<0.001	0.0002	<0.001	<0.001	0.034	7.28	0.006	0.167	0.001	<0.01	0.072	<0.0001	6.92	21900	372	536	4260	68	250	6320	**1820**	<1	<1	649	649	229	4.28	1.67	0.04	0.71	0.75	**12900**

Site ID	Piezometer / Water Bore	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals															Major Cations					Major Anions														
						pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) mg/L	Zinc (Zn) - mg/L	Mercury (Hg) - mg/L	pH Lab	EC - Lab - µs/cm	Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L	Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N - mg/L	Nitrate as N - mg/L	NOX as N - mg/L	Total Dissolved Solids
ANZECC Guideline - stock drinking water									*5*	*0.5*			*0.01*	*1*	*1*	*1*		*0.1*		*1*		*20*	*0.002*			*1000*						*1000*								*1500*	*400*		*4000*
P10	NC-030D	3-Mar-08	1315	15.56	16.53																																					
		2-Apr-08	1425	15.64	16.61																																					
		9-May-08	1230	15.88	16.85																																					
		2-Jun-08	1623	16.03	17.00																																					
		1-Jul-08	1610	15.13	16.10																																					
		14-Aug-08	1635	16.31	17.28																																					
		9-Sep-08	1700	20.03	21.00	7.92	1130	20.8		0.002	1.59	0.001	<0.0001	0.006	0.002	0.004	0.92	0.024	2.13	0.005	<0.01	0.023	<0.0001		6800	155	80	1490	30	79.9	2410	188	<1	<1	546	546	82.9	1.88	1.73				4170
		14-Nov-08	1301	53.36	54.33																																					
		3-Dec-08	1432	51.73	52.70																																					
		12-Jan-09	1130	47.89	48.86																																					
		23-Feb-09	1355	43.72	44.68																																					
		11-Jun-09	1540	31.95	32.93					<0.001	1.4	<0.001	<0.0001	0.002	0.003	0.034	0.15	0.027	1.57	0.015	<0.01	0.249	<0.0001		7610	134	74	1490	31	78.6	2160	40	<1	<1	774	774	77.1	0.9	<0.01				4370
		24-Aug-09	1530	44.98	45.96	SWL only																																				
		17-Nov-09	1400	41.83	42.81	7.4	8350	25.2		0.001	1.34	<0.001	<0.0001	0.002	<0.001	0.014	0.31	0.035	1.35	0.018	<0.01	0.12	<0.0001		3200	41	78	1550	30	76.8	2250	64.8	<1	<1	760	760	30.9	2.11	1.27				4610
		24-Feb-10	1150	39.10	40.08																																					
		24-Jun-10	1250	35.79	36.77	7.28	8160	23	<0.01	0.002				<0.005		<0.001	<0.05	0.013	1.46	0.005		0.021	<0.0001	7.39	7010	83	83	1560	32	79.7	2140	76.5	<1	<1	757	757	77.1	1.64		<0.01	0.02	0.02	
		3-Sep-10	0955	38.65	39.63	7.61	7750	21.2																																		
		9-Feb-11	1215	22.88	23.86	7.25	7020	27.2	<0.01	0.004				<0.005		0.002	<0.05	<0.001	3.29	0.004		0.01	<0.0001	6.91	9430	143	124	1790	29	95.9	2920	308	<1	<1	793	793	105	4.35		<0.01	0.26	0.26	
		08-Jun-11	1140	22.93	23.91	7.45	6240	19.8																																		
		26-Sep-11	1240	22.92	23.90	7.32	6390	22.3	0.62	0.01	1.03	<0.001	<0.0001	0.004	0.002	0.02	1.15	**0.106**	1.77	0.012	<0.01	0.183	<0.0001	7.53	7990	127	92	1420	29	76.4	2000	142	<1	<1	631	631	72	2.97	1.06	<0.01	0.28	0.28	**4250**
		4-Jan-12	1210	22.92	23.90	7.21	7154	23.5																																		
		28-Mar-12	1215	22.89	23.87	7.3	4060	22.6	0.17	<0.001	0.928	<0.001	<0.0001	<0.001	0.001	0.011	0.54	**1.52**	0.004	0.02	<0.01	0.101	<0.0001	7.87	5750	122	73	1160	24	63.2	1580	123	<1	<1	534	534	57.8	4.42	1.31	0.03	0.34	0.37	3290
		25-Jun-12	1230	22.96	23.94	7.45	6190	20.6																																		
		11-Sep-12	1300	22.81	23.79	7.34	6180	22.2	0.12	0.001	0.713	<0.001	<0.0001	<0.001	<0.001	0.016	0.3	0.004	1.29	0.003	<0.01	0.07	<0.0001	7.86	7280	111	87	1300	25	69.9	1700	159	<1	<1	684	684	64.9	3.65	1.24	0.01	0.1	0.11	3920
		06-Dec-12	1225	22.86	23.84	7.3	8360	22.3																																		
		03-Apr-13	1250	22.82	23.8	8.51	6680	24.2	0.52	<0.001	0.959	<0.001	0.0002	0.003	0.002	0.057	1.32	**0.11**	1.91	0.011	<0.01	0.344	<0.0001	7.67	7330	142	90	1420	32	77.1	1890	189	<1	<1	629	629	69.8	4.92	1.45	0.01	0.19	0.2	3970
P11	NC-030S	3-Mar-08	1320	22.18	23.17																																					
		2-Apr-08	1430	22.14	23.13																																					
		9-May-08	1232	22.26	23.25																																					
		2-Jun-08	1620	22.30	23.29																																					
		1-Jul-08	1612	22.33	23.32																																					
		12-Aug-08	1248	22.39	23.38																																					
		12-Sep-08	0730	22.91	23.90	8.23	980	17.6		0.004	0.162	<0.001	<0.0001	<0.001	0.089	0.004	0.81	0.006	2.98	0.159	<0.01	0.016	<0.0001		2490	89	40	341	4	22.7	581	16	<1	<1	248	248	21.7	2.24	0.04				1330
		14-Nov-08	1258	23.02	24.01																																					
		3-Dec-08	1430	23.01	24.00																																					
		12-Jan-09	1125	23.01	24.00																																					
		23-Feb-09	1400	22.98	23.95																																					
		11-Jun-09	1525	22.88	23.98					0.007	0.303	<0.001	0.0014	0.003	0.082	0.069	3.6	0.092	3.22	0.194	0.02	0.46	<0.0001		3230	122	54	495	6	32.2	878	<1	<1	<1	335	335	31.5	1.15	<0.01				1890
		24-Aug-09	1530	24.19	25.18	SWL only																																				
		17-Nov-09	1420	24.79	25.78	7.34	34900	25		0.005	0.303	<0.001	0.0004	0.001	0.09	0.048	0.57	0.056	2.43	0.215	<0.01	0.294	<0.0001		3200	64	48	493	6	28.7	863	10.2	<1	<1	320	320	30.9	3.68	<0.1				1870
		24-Feb-10	1150	24.30	25.29																																					
		24-Jun-10	1330	23.82	24.81	7.4	4360	20	<0.01	0.001				<0.005		0.001	0.14	0.011	3.16	0.256		0.033	<0.0001	7.34	3590	152	69	621	8	40.4	1130	7.32	<1	<1	382	382	39.6	1		<0.01	0.02	0.02	
		3-Sep-10	1005	28.06	29.05	7.61	3650	21.1																																		
		9-Feb-11	1240	27.40	28.39	7.05	3280	28.1	<0.01	0.002				<0.005		<0.001	0.33	0.006	5.17	0.3		0.025	<0.0001	6.82	4360	132	77	652	6	41.4	1250	7	<1	<1	329	329	41.9	0.54		<0.01	0.37	0.37	
		08-Jun-11	1200	30.85	31.84	7.10	3630	18.7																																		
		26-Sep-11	1310	30.56	31.55	7.04	3790	22.4	0.2	0.004	0.35	<0.001	0.0002	0.004	0.064	0.01	0.9	0.018	5.34	0.269	<0.01	0.058	<0.0001	7.22	4840	148	74	728	8	45.4	1210	19	<1	<1	327	327	41.1	4.95	0.27	<0.01	0.05	0.05	2710
		4-Jan-12	1240	30.21	31.20	6.93	4205	23.1																																		
		28-Mar-12	1245	28.96	29.95	7.25	3410	22.5	0.2	0.002	0.374	<0.001	<0.0001	0.044	<0.001	0.013	1.4	**4.85**	0.203	0.012	<0.01	0.066	<0.0001	7.57	4310	168	75	671	8	44	1210	14	<1	<1	290	290	40.2	4.43	0.24	<0.01	0.27	0.27	2590
		25-Jun-12	1250	26.12	27.11	7.27	4140	20.4																																		
		11-Sep-12	1320	22.90	23.89	7.22	4110	22.4	0.15	0.001	0.372	<0.001	<0.0001	<0.001	0.056	0.041	0.76	0.07	4.66	0.23	<0.01	0.208	<0.0001	7.54	4640	150	82	717	8	45.6	1250	11	<1	<1	320	320	41.9	4.27	<0.10	<0.01	0.28	0.28	2760
		06-Dec-12	1235	20.64	21.63	7.12	4730	22																																		
		03-Apr-13	1300	18.61	19.6	7.43	4410	23.4	0.36	0.002	0.489	<0.001	0.0001	0.002	0.067	0.061	2.02	0.098	6.38	0.295	<0.01	0.335	<0.0001	7.46	4880	194	85	750	10	49.6	1410	11	<1	<1	271	271	45.4	4.36	0.15	<0.01	0.17	0.17	2940
P12	NC-098D	3-Mar-08	1135	36.70	37.51																																					
		2-Apr-08	1145	37.72	38.53																																					
		9-May-08	0937	36.75	37.56																																					
		2-Jun-08	1312	36.78	37.59																																					
		1-Jul-08	1300	36.79	37.60																																					
		11-Aug-08		36.54	37.35																																					
		12-Sep-08	1130	36.49	37.30	6.8	1020	21.5		0.007	0.022	<0.001	<0.0001	0.002	0.008	0.002	0.67	0.132	0.053	0.002	<0.01	0.189	<0.0001		367	30	10	28	5	3.62	24	16	<1	<1	131	131	3.63	0.14	0.08				226
		14-Nov-08	1047	36.72	37.61																																					
		01-Dec-08	1200	36.67	37.56																																					
		12-Jan-09	0915	36.66	37.57																																					
		18-Feb-09	1233	36.72	37.52																																					
		17-Aug-09	1245	37.18	37.99	7.3	2540	23.8		0.006	0.163	<0.001	0.0004	0.005	0.211	0.008	3	0.009	3.37	0.218	<0.01	0.04	<0.0001		2530	82	49	453	6	28	370	8.67	<1	<1	864	864	27.9	0.1	0.09				1540
		11-Nov-09	1035	37.13	37.94	7.5	2790	33.8		0.013	0.12	<0.001	<0.0001	0.009	0.051	0.004	1.42	0.014	1.41	0.078	<0.01	0.044	<0.0001		2470	51	28	555	7	29.2	394	4.15	<1	<1	931	931	29.8	0.98	0.3				1660
		17-Feb-10	0945	37.13	37.94																																					
		22-Jun-10	1030	36.30	37.11	7.38	2150	23.6	<0.01	0.009				<0.005		<0.001	0.25	<0.001	1.02	0.027		<0.005	<0.0001	7.5	2970	47	25	774	8	38.3	426	1.72	<1	<1	1180	1180	35.6	3.55		<0.01	0.04	0.04	
		2-Sep-10	1035	36.33	37.14	7.56	2700	21.9																																		
		7-Feb-11	1030	36.43	37.24	7.32	2560	25.8	0.03	0.011				<0.001			<0.001	0.002	0.943	0.024		0.009	<0.0001	7.46	2880	48	29	703	10	35.6	431	1	<1	<1	1040	1040	33.1	3.66		<0.01	0.01	0.02	
		09-Jun-11	1000	36.67	37.48	7.45	2610	19.8																																		
		11-Oct-11	1045	36.74	37.55	7.50	2390	22.9	0.98	0.011	0.137	<0.001	<0.0001	0.003	0.005	0.038	2.17	0.02	1.13	0.028	<0.01	0.144	<0.0001	7.76	3170	40	24	732	8	36	442	9	<1	<1	1030	1030	33.2	3.97	0.51	<0.01	0.04	0.04	1870
		8-Dec-11	1010	36.71	37.52	7.50	2480	22.4																																		
		04-Apr-12	910	37.27	38.08	7.8	2550	23.2	0.64	0.011	0.129	<0.001	<0.0001	0.005	<0.001	0.023	1.56	**0.921**	0.016	0.009	<0.01	0.104	<0.0001	7.94	3080	36	28	790	9	38.7	479	11	<1	<1	1070	1070	35.1	4.8	0.58	0.02	0.22	0.24	1960
		31-May-12	915	37.38	38.19	7.51	2450	20.3																																		
		29-Aug-12	1040	37.43	38.24	7.68	2790	21.6	0.11	0.009	0.106	<0.001	<0.0001	<0.001	0.005	0.04	1.08	0.004	0.879	0.015	<0.01	0.202	<0.0001	7.98	3160	42	24	711	9	35.2	458	11	<1	<1	1170	1170	36.5	1.85	0.49	<0.01	0.07	0.07	1880
		04-Dec-12	1230	37.59	38.4	7.67	2870	24.1																																		
		07-Mar-13	1145	37.79	38.6	7.78	3020	24.1	0.06	0.01	0.105	<0.001	<0.0001	<0.001	0.006	0.009	0.92	0.005	0.839	0.013	<0.01	0.038	<0.0001	7.81	3230	32	23	751	9	36.4	416	11	<1	<1	1120	1120	34.3	2.84	0.37	0.02	0.11	0.13	1890

Site ID	Piezometer / Water Bore	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals															Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N - mg/L	Nitrate as N - mg/L	NOX as N - mg/L	Total Dissolved Solids
						pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) mg/L	Zinc (Zn) - mg/L	Mercury (Hg) - mg/L	pH Lab	EC - Lab - µs/cm	Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L						
ANZECC Guideline - stock drinking water									*5*	*0.5*			*0.01*	*1*	*1*	*1*		*0.1*		*1*		*20*	*0.002*			*1000*						*1000*							*4000*
P13	NC-098S	3-Mar-08	1140	8.51	9.38																																		
		2-Apr-08	1147	8.62	9.49																																		
		9-May-08	0939	8.88	9.75																																		
		2-Jun-08	1308	9.00	9.88																																		
		1-Jul-08	1303	9.18	10.05																																		
		11-Aug-08		9.34	10.21																																		
		12-Sep-08	1045	9.43	10.30	7.1	1180	20.1		<0.001	0.153	<0.001	<0.0001	0.001	<0.001	0.001	0.11	0.007	0.134	0.002	<0.01	0.023	<0.0001		2040	50	89	253	7	21.0	279	30	<1	<1	556	556	19.6	3.47	0.24				1040
		14-Nov-08	1045	8.35	9.21																																		
		01-Dec-08	1202	8.48	9.34																																		
		12-Jan-09	0920	7.53	8.39																																		
		18-Feb-09	1241	7.35	8.23																																		
		17-Aug-09	1330	8.03	8.90	7.6	1540	24.3		<0.001	0.103	<0.001	<0.0001	0.003	0.002	0.002	1.51	0.002	0.064	0.004	<0.01	0.009	<0.0001		1760	50	100	204	3	19.6	272	50.7	<1	<1	551	551	19.7	0.34	<0.01				978
		11-Nov-09	1120	8.92	9.79	7.2	1310	27.5		0.001	0.125	<0.001	<0.0001	0.003	0.005	0.006	2.57	0.005	0.625	0.016	<0.01	0.015	<0.0001		1820	54	105	218	3	20.9	362	45.8	<1	<1	520	520	21.6	1.66	14.9				1110
		17-Feb-10	0950	8.06	8.93																																		
		22-Jun-10	0930	8.80	9.67	7.69	1923	21	<0.01	<0.001				<0.005		<0.001	<0.05	<0.001	<0.001	0.003		<0.005	<0.0001	7.47	1820	56	106	222	3	21.2	301	41.4	<1	<1	544	544	20.2	2.37		<0.01	2.77	2.77	
		2-Sep-10	1025	8.30	9.17	7.38	1668	22.4																																	
		7-Feb-11	1100	6.28	7.15	7.21	1615	24.5	0.03	<0.001				<0.001		<0.001	<0.05	<0.001	<0.001	0.001		<0.005	<0.0001	7.24	1480	70	86	191	2	19	283	54	<1	<1	512	512	19.3	0.97		0.02	1.95	1.97	
		09-Jun-11	1030	7.03	7.90	7.40	1492	18.7																																	
		11-Oct-11	1120	7.78	8.65	7.30	1336	21.4	0.31	0.004	0.072	<0.001	<0.0001	0.001	<0.001	0.02	0.41	0.004	0.033	0.004	0.01	0.051	<0.0001	7.7	1730	56	88	191	<1	18.4	250	38	<1	<1	455	455	16.9	3.98	0.13	<0.01	2.75	2.75	942
		8-Dec-11	1025	7.49	8.36	7.40	1202	21.2																																	
		04-Apr-12	930	5.19	6.06	7.7	1103	22.5	0.32	<0.001	0.067	<0.001	<0.0001	<0.001	<0.001	0.014	0.1	0.021	0.004	0.003	<0.01	0.063	<0.0001	7.82	1360	113	69	117	3	16.5	128	258	<1	<1	306	306	15.1	4.39	0.05	<0.01	1.48	1.48	922
		31-May-12	935	5.36	6.23	7.55	1195	20.1																																	
		29-Aug-12	1100	4.90	5.77	7.66	1268	21.6	0.12	<0.001	0.066	<0.001	0.0001	0.002	<0.001	0.035	0.35	0.004	0.027	0.006	<0.01	0.101	<0.0001	7.88	1330	106	63	97	2	14.7	121	276	<1	<1	310	310	15.4	2.02	0.05	<0.01	2.48	2.48	846
		04-Dec-12	1250	5.47	6.34	7.68	1258	21																																	
		07-Mar-13	1200	5.27	6.14	7.74	1290	22.4	0.02	<0.001	0.064	<0.001	<0.0001	<0.001	<0.001	0.008	<0.05	0.002	0.003	0.005	<0.01	0.022	<0.0001	7.76	1360	91	64	113	2	14.8	111	268	<1	<1	288	288	14.5	1.05	<0.01	<0.01	2.91	2.91	910
P14	NC-100D	3-Mar-08																																							
		2-Apr-08																																							
		9-May-08																																							
		2-Jun-08																																							
		1-Jul-08																																							
		11-Aug-08																																							
		12-Sep-08																																							
		14-Nov-08																																							
		3-Dec-08																																							
		12-Jan-09	0945	58.41	58.77																																				
		24-Aug-09	1240	57.32	57.68	12.6	9300	23.3		0.002	2.04	<0.001	<0.0001	0.04	0.003	0.06	2.04	0.018	0.051	0.027	<0.01	0.158	<0.0001		5430	656	<1	205	112	44.5	5.71	2.58	<1	<1	<1	<1	0.21	99	3.03				2480
		18-Nov-09	1200	59.48	59.84	12.35	9320	28.5	0.02	0.002				0.018		0.016	<0.5	<0.001	<0.001	0.011		<0.005	<0.0001	9.98	2520	574	<1	202	118	40.5	7.84	31.8	2140	50	<1	2190	44.6	4.88		0.06	0.06	0.13	
		24-Feb-10	0955	60.31	60.67																																		
		22-Jun-10	1325	60.18	60.54	11.95	8980	21	0.01	0.002				0.018		0.027	<0.05	<0.001	<0.001	0.018		<0.005	<0.0001	12.5	9070	562	<1	341	126	46.1	129	12.7	1960	78	<1	2040	44.6	1.64		0.06	0.06	0.12	
		2-Sep-10	1210	60.73	61.09	Insufficient to sample																																			
		7-Feb-11	1300	60.37	60.73	Insufficient to sample																																			
		08-Jun-11	1330	60.9	61.26	10.50	7480	21.1																																	
		11-Oct-11	1430	61.06	61.42	Insufficient to sample																																			
		8-Dec-11	1130	60.86	61.22	Insufficient to sample																																			
		4-Apr-12	1115	59.8	60.16	Insufficient to sample																																			
		31-May-12	1120			Insufficient to sample																																			
		29-Aug-12	1230			Insufficient to sample																																			
		10-Dec-12	1410			Insufficient to sample																																			
		3-Apr-13	1020			Dry																																			
P15	NC-100S	3-Mar-08																																							
		2-Apr-08																																							
		9-May-08																																							
		2-Jun-08																																							
		1-Jul-08																																							
		11-Aug-08																																							
		12-Sep-08																																							
		14-Nov-08																																							
		3-Dec-08																																							
		12-Jan-09	0950	16.21	16.56																																				
		24-Aug-09	1215	16.16	16.47	6.8	16000	26.8		0.004	0.522	<0.001	0.0005	0.036	0.024	0.091	12.9	0.011	3.54	0.058	0.04	0.108	<0.0001		15300	193	286	2830	60	158	4340	928	<1	<1	1220	1220	166	2.56	3.34				**10400**
		18-Nov-09	1230	16.18	16.49	6.68	16320	29.3	<0.01	<0.001				<0.005		0.008	<0.05	<0.001	3.12	0.019		0.02	<0.0001	7.25	15200	87	284	3090	70	164	4490	971	<1	<1	788	788	162	0.39		<0.01	<0.01	<0.01	
		24-Feb-10	0955	16.23	16.54																																				
		22-Jun-10	1250	16.18	16.49	6.73	13990	22	<0.01	<0.001				<0.005		0.005	<0.05	<0.001	1.9	0.016		0.02	<0.0001	7.36	11500	182	234	2690	47	146	4110	**1020**	<1	<1	1080	1080	159	3.99		<0.01	0.04	0.04	
		2-Sep-10	1215	16.16	16.47	6.98	13550	23.8																																	
		7-Feb-11	1350	16.13	16.44	6.47	12520	27.1	0.01	0.002				<0.001		0.006	<0.05	<0.001	3.3	0.013		0.019	<0.0001	6.69	15800	214	300	2900	59	163	4860	910	<1	<1	1050	1050	177	4.13		<0.01	0.02	0.02	
		08-Jun-11	1310	16.13	16.44	6.65	10860	20.5																																	
		11-Oct-11	1440	16.00	16.31	6.70	9850	23.1	0.55	0.006	0.127	<0.001	<0.0001	0.003	0.007	0.009	0.8	0.006	1.93	0.015	<0.01	0.052	<0.0001	7.43	12400	185	220	2510	46	138	3840	874	<1	<1	950	950	146	2.78	3.62	<0.01	0.03	0.03	**8440**
		8-Dec-11	1140	16.10	16.41	6.90	9380	23.5																																	
		04-Apr-12	1130	15.95	16.26	7.2	1701	25.5	0.43	0.001	0.151	<0.001	<0.0001	0.002	0.002	0.03	1.04	0.094	0.007	0.019	<0.01	0.123	<0.0001	7.58	1730	36	28	331	11	18.8	240	28	<1	<1	541	541	18.2	1.64	0.74	<0.01	0.48	0.48	1040
		31-May-12	1110	16.00	16.31	7.08	1986	21.9																																	
		29-Aug-12	1220	15.89	16.2	7.26	1781	22.4	0.24	<0.001	0.127	<0.001	<0.0001	0.002	<0.001	0.109	0.44	0.015	0.024	0.005	<0.01	0.342	<0.0001	7.74	1780	38	28	342	13	19.4	258	36	<1	<1	600	600	20	1.57	0.06	<0.01	0.79	0.79	1010
		10-Dec-12	1420	15.99	16.3	7.32	1775	22.5																																	
		03-Apr-13	1040	15.99	16.3	7.92	1760	21	0.51	0.001	0.148	<0.001	0.0004	0.003	0.001	0.133	1.1	0.04	0.104	0.007	<0.01	0.381	<0.0001	7.85	1870	41	30	384	16	21.6	257	41	<1	<1	576	576	19.6	4.85	0.68	<0.01	0.79	0.79	1050

Site ID	Piezometer / Water Bore	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals															Major Cations					Major Anions												
						pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L	Mercury (Hg) - mg/L	pH Lab	EC - Lab - µs/cm	Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L	Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N - mg/L	Nitrate as N - mg/L	NOX as N - mg/L	Total Dissolved Solids
ANZECC Guideline - stock drinking water									*5*	*0.5*			*0.01*	*1*	*1*	*1*		*0.1*		*1*		*20*	*0.002*			*1000*						*1000*								*1500*	*400*		*4000*
P16	NC-119D	3-Mar-08	1410	51.25	52.03																																				
		2-Apr-08	1345	51.24	52.02																																				
		9-May-08	1152	51.21	51.99																																				
		2-Jun-08	1542	51.20	51.98																																				
		1-Jul-08	1525	51.12	51.90																																				
		12-Aug-08	1145	51.08	51.86																																				
		12-Sep-08	0930	50.52	51.30	7.45	1085	20.5		0.001	0.029	<0.001	<0.0001	0.002	<0.001	0.002	4.43	**0.394**	0.070	0.036	<0.01	0.204	<0.0001		132	5	1	14	3	1.05	22	<1	<1	<1	25	25	1.12		2.00				109
		14-Nov-08	1227	56.22	57.00																																				
		3-Dec-08	1400	55.22	56.00																																				
		12-Jan-09	1055	48.67	49.45																																				
		23-Feb-09	1250	48.45	49.24																																				
		9-Jun-09	1330	48.45	49.30	Bore pumped dry																																				
		24-Aug-09	1445	47.53	48.37	SWL only																																				
		17-Nov-09	1300	48.16	49.00	6.84	1605	24.1		<0.001	0.135	<0.001	<0.0001	0.001	<0.001	0.023	4.79	0.119	0.299	0.043	<0.01	1.21	<0.0001		1530	23	13	208	14	13.3	324	1.36	<1	<1	235	235	13.9	2.11	23.4				682
		24-Feb-10	1045	47.00	47.84																																				
		24-Jun-10	1015	47.46	48.30	7.53	1947	18	<0.01	<0.001				<0.005		0.003	0.33	0.002	0.389	0.016		0.085	<0.0001	7.01	1740	32	16	265	23	15	371	2.78	<1	<1	298	298	16.5	4.61		0.02	0.33	0.35	
		2-Sep-10	1345	46.77	47.61	6.78	2370	24.5																																		
		9-Feb-11	1040	47.50	48.34	6.73	2169	24	0.16	0.002				<0.005		0.01	0.5	0.031	0.515	0.006		0.063	<0.0001	6.67	2460	38	14	297	32	16.8	478	6	<1	<1	497	497	23.5	16.6		0.23	0.38	0.61	
		08-Jun-11	1030	46.96	47.80	6.85	2480	20.4																																		
		26-Sep-11	1100	47.03	47.87	6.85	2950	21.8	**6.22**	0.011	0.461	<0.001	0.0006	0.013	0.006	0.237	16	**2.11**	0.831	0.096	0.03	7.37	0.0004	7	3150	28	15	424	43	33.3	587	3	<1	<1	752	752	31.6	2.63	156	<0.01	0.46	0.46	1280
		4-Jan-12	1040	46.33	47.17	6.81	2825	24.1																																		
		28-Mar-12	1050	46.26	47.1				2.02	0.002	0.39	<0.001	0.0002	0.001	0.003	0.065	3.6	**0.407**	0.009	0.238	<0.01	1.34	<0.0001	7.33	4230	9	15	632	45	39.8	825	2	<1	<1	841	841	40.1	0.38	133	<0.01	0.06	0.06	1830
		25-Jun-12	1120	46.26	47.1	7.15	2500	20.3																																		
		11-Sep-12	1140	46.16	47	6.87	3620	23.7	1.8	0.002	0.417	<0.001	0.0002	0.005	<0.001	0.188	4.25	**0.382**	0.297	0.017	<0.01	3.03	0.0001	7.58	3790	27	14	609	37	38.4	719	13	<1	<1	769	769	35.9	3.36	119	<0.01	0.1	0.1	1480
		06-Dec-12	1125	46.25	47.09	7.2	2950	24.3																																		
		03-Apr-13	1150	46.06	46.9	7.1	3740	21.4	0.29	<0.001	0.346	<0.001	0.0001	0.002	0.001	0.078	2.42	0.072	0.269	0.009	<0.01	3.13	<0.0001	7.11	4010	27	13	688	46	33.5	761	4	<1	<1	772	772	37	4.93	125	<0.01	0.05	0.05	1650
P17	NC-119S	3-Mar-08	1405	55.98	56.56																																				
		2-Apr-08	1350	59.42	60.00																																				
		9-May-08	1157	59.07	59.65																																				
		2-Jun-08	1539	59.42	60.00																																				
		1-Jul-08	1527	43.42	44.00																																				
		12-Aug-08	1150	58.42	59.00																																				
		12-Sep-08		57.32	57.90																																				
		14-Nov-08	1233	57.42	58.00																																				
		3-Dec-08	1404	57.42	58.00																																				
		12-Jan-09	1100	58.42	59.00																																				
		23-Feb-09	1258	48.92	49.50																																				
		09-Jun-09	1345			Dry																																				
		24-Aug-09	1450			Dry																																				
		17-Nov-09	1320			Dry																																				
		24-Feb-10	1115			Dry																																				
		24-Jun-10	1025			Dry																																				
		2-Sep-10	1325			Dry																																				
		9-Feb-11	1050			Dry																																				
		08-Jun-11	1050			Dry																																				
		26-Sep-11	1120			Dry																																				
		4-Jan-12	1100			Dry																																				
		28-Mar-12	1100			7.2	2440	22.8																																		
		25-Jun-12	1140			Dry																																				
		11-Sep-12	1200			Dry																																				
		6-Dec-12	1140			Dry																																				
		3-Apr-13	1200			Dry																																				
P18	NC-122	3-Mar-08	1530	13.40	14.24																																				
		2-Apr-08	1225	13.40	14.24																																				
		9-May-08	1027	13.45	14.29																																				
		2-Jun-08	1425	13.53	14.37																																				
		1-Jul-08	1414	13.56	14.40																																				
		11-Aug-08	1650	13.66	14.50																																				
		11-Sep-08	1030	13.16	14.00	6.75	1410	22.9		0.003	0.817	<0.001	<0.0001	0.008	0.032	0.007	3.75	0.046	0.137	0.059	0.03	0.022	<0.0001		3650	30	27	824	38	40.6	80	38	<1	<1	1870	1870	40.5	0.04	2.61				2370
		14-Nov-08	1123	12.70	13.49																																				
		01-Dec-08	1251	12.79	13.58																																				
		12-Jan-09	1015	12.88	13.67																																				
		23-Feb-09	1003	13.00	13.80																																				
		09-Jun-09	0900	13.60	14.35	6.1	8750	20.7		0.002	1.98	<0.001	<0.0001	0.009	0.019	0.007	4.6	0.04	0.14	0.038	0.03	0.03	<0.0001		8250	66	70	1960	79	96.4	134	<1	<1	<1	5100	5100	106	4.62	4.74				**6720**
		24-Aug-09	1320	17.87	18.68	SWL only																																				
		18-Nov-09	1400	23.90	24.71	6.66	6180	27.5	0.2	0.009				0.009		0.03	3.44	0.042	0.306	0.091		0.694	<0.0001	7.03	6100	58	48	1450	63	71.7	110	18	<1	<1	3710	3710	77.6	3.99		0.02	0.06	0.08	
		17-Feb-10	1200	31.91	32.72																																				
		16-Mar-10	1610	33.34	34.15	SWL only																																				
		7-May-10	1500	33.89	34.70																																				
		23-Jun-10	0950	40.03	40.84	6.54	7490	18	0.04	0.003				0.004		0.002	0.08	0.002	0.784	0.06		0.13	<0.0001	6.75	6210	80	137	1370	37	75.8	861	91.2	<1	<1	2880	2880	83.7	4.99		<0.01	0.1	0.1	
		2-Sep-10	1130	41.38	42.19	6.65	4070	23.2																																		
		10-Feb-11	1200			Dry																																				
		08-Jun-11	1200			Dry																																				
		11-Oct-11	1240			Dry																																				
		8-Dec-11	1200			Dry																																				
		4-Apr-12	1150			Dry																																				
		31-May-12	1210			Dry																																				
		29-Aug-12	1300			Dry																																				
		10-Dec-12	1345			Dry																																				
		3-Apr-13	940			Dry																																				

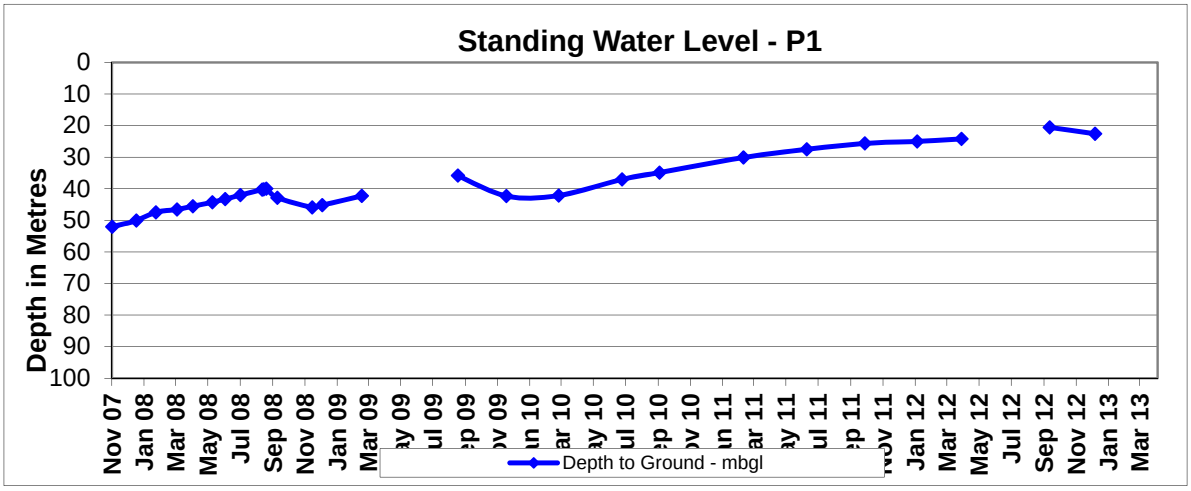
Site ID	Piezometer / Water Bore	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals														Mercury (Hg) - mg/L	pH Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N - mg/L	Nitrate as N - mg/L	NOX as N - mg/L	Total Dissolved Solids
						pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L							
ANZECC Guideline - stock drinking water									*5*	*0.5*			*0.01*	*1*	*1*	*1*		*0.1*		*1*		*20*	*0.002*			*1000*						*1000*							*1500*	*400*		*4000*
P19	NC-123R	3-Mar-08	1535	16.11	17.05																																				
		2-Apr-08	1230	16.10	17.05																																				
		9-May-08	1033	16.11	17.05																																				
		2-Jun-08	1432	16.30	17.24																																				
		1-Jul-08	1421	16.38	17.32																																				
		14-Aug-08	1335	16.34	17.29																																				
		17-Sep-08	1445	16.16	17.10	6.7	1340	23.2		0.001	1.26	<0.001	0.0001	0.018	0.043	0.005	3.19	0.015	0.728	0.320	<0.01	0.066	<0.0001		11000	99	141	1040	1400	97.6	1880	28	<1	<1	1880	1880	91.2	3.40	6.15				**6220**
		14-Nov-08	1130	19.19	20.18																																				
		01-Dec-08	1244	17.26	18.21																																				
		12-Jan-09	1025	16.87	17.82																																				
		23-Feb-09	1008	24.20	24.60																																				
		09-Jun-09	0930	23.50	23.90	7	5600	21.2		<0.001	0.275	<0.001	<0.0001	0.029	0.003	0.002	3.14	0.003	1.24	0.014	<0.01	0.039	<0.0001		5230	40	82	1030	18	54	1170	<20	<1	<1	1060	1060	54.2	0.16	3.83				2910
		24-Aug-09	1322	24.82	25.30	SWL only																																				
		18-Nov-09	1410	24.11	24.59	7.34	3690	23.8	<0.01	0.003				<0.005		0.002	0.12	<0.001	0.93	0.005		0.011	<0.0001	7.71	3050	28	45	551	19	29.6	624	22.1	<1	<1	663	663	31.3	2.9		<0.01	0.04	0.04	
		17-Feb-10	1210	23.75	24.23																																				
		23-Jun-10	1100	22.95	23.43	7.3	3970	20	0.01	0.003				0.002		<0.001	0.13	<0.001	1.09	0.007		0.008	<0.0001	7.28	3330	32	57	672	24	36.1	708	29.4	<1	<1	838	838	37.3	1.67		<0.01	<0.01	<0.01	
		2-Sep-10	1140	22.86	23.34	7.24	3120	22.9																																		
		10-Feb-11	1230	21.88	22.36	7.1	1714	26.4	0.01	0.003				0.006		0.003	0.09	<0.001	0.701	0.005		0.018	<0.0001	7.45	2900	25	39	501	22	26.9	581	26	<1	<1	587	587	28.6	3.23		0.06	9.43	<0.01	
		08-Jun-11	1210	21.47	21.95	7.30	2720	19.9																																		
		11-Oct-11	1300	21.20	21.68	7.30	3170	23.7	0.13	0.004	0.138	<0.001	<0.0001	0.002	0.002	0.012	0.62	0.003	1.06	0.007	<0.01	0.031	<0.0001	7.64	4060	29	55	709	23	37.4	819	22	<1	<1	706	706	37.7	0.38	41.2	2.75	7.22	9.97	2000
		8-Dec-11	1215	21.36	21.84	7.80	2490	23.3																																		
		04-Apr-12	1200	20.64	21.12	7.7	2150	25.8	0.29	0.002	0.084	<0.001	<0.0001	0.003	0.001	0.021	0.69	**0.515**	0.006	0.006	<0.01	0.175	<0.0001	7.87	2680	20	33	408	29	30.7	476	45	<1	<1	660	660	28.5	3.7	119	6.49	6.31	12.8	1150
		31-May-12	1200	20.71	21.19	7.31	2760	22.3																																		
		29-Aug-12	1250	20.63	21.11	7.45	2890	23.4	0.13	0.002	0.072	<0.001	<0.0001	0.003	0.002	0.066	0.38	0.008	0.601	0.005	<0.01	0.254	<0.0001	7.82	3120	21	34	411	31	32.6	512	53	<1	<1	764	764	30.8	2.84	110	11.1	6.4	17.5	1200
		10-Dec-12	1350	20.78	21.26	7.49	3500	23																																		
		03-Apr-13	1000	20.62	21.1	7.11	4920	21.8	0.73	0.002	0.212	<0.001	0.0002	0.003	0.003	0.147	1.73	0.011	1.06	0.008	<0.01	0.468	<0.0001	7.11	5150	42	74	835	40	45.5	846	<1	<1	<1	1310	1310	50	4.75	166	<0.01	0.03	0.03	2190
P20	NC-127	3-Mar-08	1610	13.52	14.39																																				
		2-Apr-08	1235	13.52	14.39																																				
		9-May-08	1039	13.62	14.49																																				
		2-Jun-08	1420	13.68	14.55																																				
		1-Jul-08	1408	13.64	14.51																																				
		11-Aug-08	1640	13.70	14.57																																				
		9-Sep-08	1000	13.48	14.35	6.7	1140	19.6		<0.001	4.80	0.002	0.0003	0.003	0.001	0.005	1.57	0.004	0.035	0.014	<0.01	0.009	<0.0001		10500	62	68	2860	118	136	425	<1	<1	<1	5970	5970	131	1.83	10.3				**9630**
		14-Nov-08	1118	13.79	14.68																																				
		01-Dec-08	1257	13.88	14.77																																				
		12-Jan-09	1010	13.97	14.86																																				
		23-Feb-09	0920	14.06	14.95																																				
		09-Jun-09	1000	14.83	15.68	7.1	13600	21		<0.001	4.12	<0.001	0.0002	0.002	<0.001	0.004	0.4	0.001	0.014	0.003	<0.01	0.036	<0.0001		12500	74	80	3290	114	156	174	<10	<1	<1	8420	8420	173	5	9.14				**9910**
		24-Aug-09	1330	20.77	21.68	SWL only																																				
		18-Nov-09	1430	17.20	18.11	7.26	10210	26.1	<0.01	<0.001				<0.005		0.002	0.13	0.002	0.046	0.016		0.1	<0.0001	7.52	10300	8	120	2510	96	122	599	26.9	<1	<1	5960	5960	136	4.97		<0.01	0.01	0.01	
		17-Feb-10	1215	30.15	31.06																																				
		16-Mar-10	1555	37.69	38.60	SWL only																																				
		7-May-10	1515	41.79	42.70																																				
		23-Jun-10	1030	49.45	50.36	6.95	5830	20	<0.01	<0.001				0.003		0.001	<0.05	<0.001	0.185	0.043		0.226	<0.0001	6.73	4840	169	219	826	21	62.9	1400	107	<1	<1	799	799	57.7	4.29		<0.01	0.1	0.1	
		Cemented up - No longer monitored																																								
P28		1-Jun-12	1000		0.93	Dry																																				
		24-Jul-12	1130		0.93	Dry																																				
		2-Sep-12	1240		0.93	Dry																																				
		10-Dec-12	1305		0.93	Dry																																				
		7-Mar-13	1035		0.93	Dry																																				
P29		1-Jun-12	1010	8.10	9.03	8.02	11700	21.4																																			
		24-Jul-12	1150	8.05	8.98	7.53	9950	23.1	**15.6**	0.008	0.448	<0.001	0.0001	0.018	0.013	0.044	24.9	**0.775**	0.576	0.024	0.04	0.278	<0.0001	7.8	13100	67	196	2590	16	132	3780	717	1	<1	1090	1090	143	3.94	<0.10	<0.01	0.93	0.93	**8170**
		2-Sep-12	1300	8.41	9.34	8.08	12440	22.7	2.34	0.002	0.259	<0.001	<0.0001	0.006	0.001	0.01	3.77	0.061	0.076	0.004	0.01	0.042	0.0002	7.83	14400	79	216	2690	16	139	4050	839	<1	<1	1100	1100	154	5	<0.01	<0.01	1.76	1.76	**8750**
		10-Dec-12	1315	8.04	8.97	7.69	10870	22.3																																		
		07-Mar-13	1050	8.05	8.98	7.7	11100	22.3	0.06	0.001	0.145	<0.001	<0.0001	0.002	<0.001	0.002	0.13	0.005	<0.001	<0.001	<0.01	0.012	<0.0001	7.73	14000	39	205	2720	16	138	3720	735	<1	<1	1130	1130	143	1.91	0.04	<0.01	0.44	0.44	**7800**
P30		1-Jun-12	1030		0.79	Dry																																				
		24-Jul-12	1200		0.79	Dry																																				
		2-Sep-12	1315		0.79	Dry																																				
		10-Dec-12	1325		0.79	Dry																																				
		7-Mar-13	1100		0.79	Dry																																				

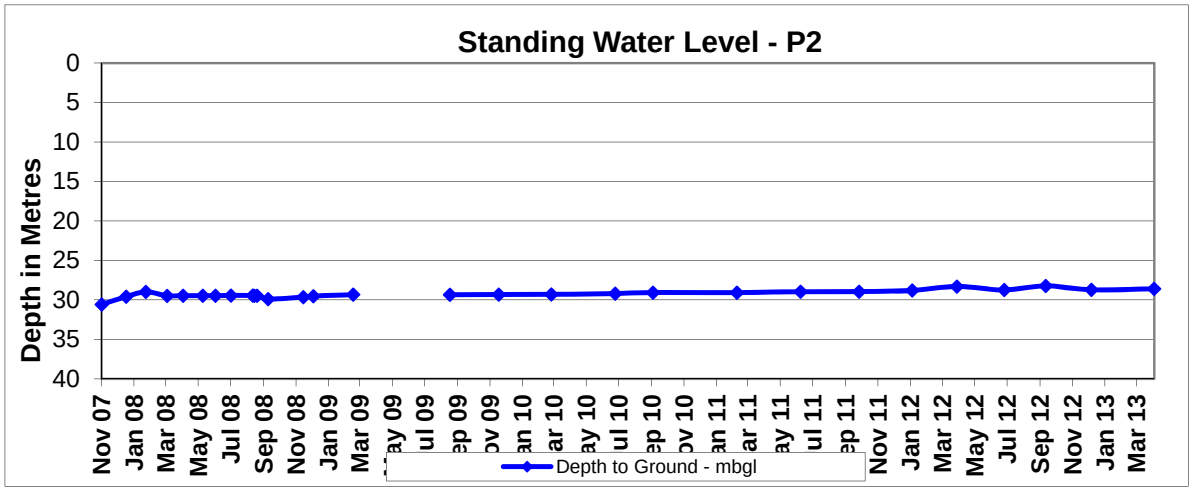
Site ID	Piezometer / Water Bore	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																Mercury (Hg) - mg/L	pH Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N - mg/L	Nitrate as N - mg/L	NOX as N - mg/L	Total Dissolved Solids
						pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L							
ANZECC Guideline - stock drinking water									*5*	*0.5*			*0.01*	*1*	*1*	*1*		*0.1*		*1*		*20*	*0.002*			*1000*						*1000*											
P31		**1-Jun-12**	950	15.59	16.52	7.06	7870	21.7																																			
		24-Jul-12	1110	15.57	16.50	7.38	6160	22.3	0.33	<0.001	0.232	<0.001	<0.0001	<0.001	<0.001	0.012	0.59	0.017	0.098	0.007	<0.01	0.07	<0.0001	7.61	8000	112	188	1380	16	81.5	1970	367	1	<1	854	854	80.3	0.73	0.08	<0.01	7.62	7.62	**4810**
		2-Sep-12	1230	15.50	16.43	7.64	6670	21.6	0.78	<0.001	0.161	<0.001	<0.0001	0.001	<0.001	0.01	1.24	0.024	0.029	0.006	<0.01	0.052	<0.0001	7.76	7460	82	154	1320	14	74.5	1680	379	<1	<1	918	918	73.6	0.59	0.02	<0.01	10.2	10.2	**4250**
		10-Dec-12	1255	15.49	16.42	7.28	6960	22.9																																			
		07-Mar-13	1025	15.47	16.4	7.46	6980	22.7	0.11	<0.001	0.177	<0.001	0.0002	<0.001	<0.001	0.012	0.17	0.009	0.018	0.004	<0.01	0.052	<0.0001	7.5	7790	48	176	1420	16	79.1	1690	346	<1	<1	858	858	72	4.63	0.08	<0.01	11.1	11.1	**4430**
P32		**1-Jun-12**	1040	7.21	8.17	7.39	13050	21.2																																			
		24-Jul-12	1220	7.23	8.19	7.79	6710	22.9	4.71	0.003	0.064	<0.001	<0.0001	0.008	0.004	0.016	7.31	**0.207**	0.163	0.008	0.02	0.162	<0.0001	7.89	8480	10	67	1810	1	84.8	1560	**1020**	1	<1	981	981	84.8	0.08	0.1	<0.01	11.6	11.6	**5500**
		2-Sep-12	1330	7.15	8.11	7.57	5590	24.2	0.09	<0.001	0.01	<0.001	<0.0001	<0.001	<0.001	0.006	0.19	0.003	0.003	<0.001	0.01	0.012	<0.0001	8.08	5940	4	32	1350	<1	61.6	927	828	<1	<1	1150	1150	66.4	3.81	<0.01	<0.01	7.22	7.22	3790
		26-Nov-12	1109	7.22	8.18	**Data Logger Installed**																																					
		10-Dec-12	1335	7.30	8.26	7.95	3620	23.4																																			
		07-Mar-13	1115	7.97	8.93	8.03	3620	22.9	0.09	<0.001	0.007	<0.001	<0.0001	0.002	<0.001	<0.001	0.12	0.002	0.001	<0.001	0.02	0.007	0.0002	8.08	3780	2	15	965	<1	43.3	376	411	<1	<1	1030	1030	39.7	4.24	<0.01	<0.01	2	2	2360
P33		**1-Jun-12**	930		0.97	Dry																																					
		24-Jul-12	1045		0.97	Dry																																					
		2-Sep-12	1340		0.97	Dry																																					
		10-Dec-12	1235		0.97	Dry																																					
		7-Mar-13	1000		0.97	Dry																																					
P34		**1-Jun-12**	940		0.95	Dry																																					
		24-Jul-12	1050		0.95	Dry																																					
		2-Sep-12	1350		0.95	Dry																																					
		10-Dec-12	1245		0.95	Dry																																					
		7-Mar-13	1010		0.95	Dry																																					
P47		**18-Jun-12**		24.00																																							
		17-Oct-12	1350	24.15	25.17																																						
		31-Oct-12	1400	24.12	25.14																																						
		14-Nov-12	1215	24.11	25.13																																						
		Data Logger Installed 14 November 2012																																									
VPW		**16-Apr-13**	1230			7.24	12000	27.8	0.05	0.002	4.71	<0.001	<0.0001	0.002	0.002	0.008	1.14	<0.001	0.027	0.002	<0.01	0.205	<0.0001	7.9	13200	37	66	4100	146	189	193	<1	<1	<1	8670	8670	179	2.84	12.3	<0.10	<0.10	<0.10	**9230**
WB1		**14-Aug-08**	1445	8.34	9.00																																						
		12-Sep-08	1330	8.34	9.00	7.9	1060	23.5		0.005	3.96	0.002	0.0003	0.001	<0.001	0.002	0.64	0.002	0.015	<0.001	<0.01	0.091	<0.0001		14200	102	209	3740	204	190	53	3	<1	<1	8700	8700	175	4.06	11.9				**8510**
		14-Nov-08	1139	8.46	9.12																																						
		01-Dec-08	1303	8.46	9.12																																						
WB2		**11-Aug-08**	1515	9.22	9.41																																						
		11-Sep-08	0930	8.81	9.00	7.2	1010	20.7		<0.001	0.033	<0.001	<0.0001	<0.001	<0.001	0.001	<0.05	<0.001	0.003	0.002	<0.01	<0.005	<0.0001		239	12	6	32	1	2.53	16	6	<1	<1	101	101	2.61		0.06				153
		14-Nov-08	1056	6.12	6.31																																						
		01-Dec-08	1212	6.30	6.49																																						
		18-Feb-09	1250	4.41	4.60																																						
		11-Jun-09	1500							<0.001	0.087	<0.001	<0.0001	<0.001	<0.001	0.106	0.3	0.002	0.02	0.001	<0.01	0.067	<0.0001		1130	64	57	83	2	11.6	156	17	<1	<1	340	340	11.5	0.21	<0.01				628
		17-Aug-09	1345	6.34	6.72	7.4	1150	18.5		<0.001	0.093	<0.001	<0.0001	<0.001	<0.001	0.003	0.06	<0.001	0.002	<0.001	<0.01	<0.005	<0.0001		1210	71	60	74	4	11.8	227	34.3	<1	<1	248	248	12.1	1.27	<0.01				744
		11-Nov-09	1200	8.18	8.56	7.3	1200	28.1		0.002	0.202	0.003	0.0007	0.021	0.008	0.064	16.8	0.012	0.203	0.02	0.03	0.058	<0.0001		1130	62	53	63	6	10.4	217	29.5	<1	<1	194	194	10.6	1.11	<0.01				1200
		17-Feb-10	1000	5.72	6.10																																						
		22-Jun-10	1105	7.02	7.40	7.83	1158	17	0.01	<0.001				<0.001		0.009	<0.05	<0.001	0.001	<0.001		<0.05	<0.0001	7.5	1080	61	53	60	6	10.2	197	27.6	<1	<1	215	215	10.4	1.24		<0.01	3.04	3.04	
		02-Sep-10	1045	5.41	5.79	7.53	1304	22.4																																			
		07-Feb-11	1120	3.22	3.60	7.2	855	24.5	0.11	<0.001				<0.001		0.012	0.06	<0.001	0.084	0.002		0.025	<0.0001	7.46	500	28	22	46	7	5.39	57	13	<1	<1	182	182	5.5	1.08		0.02	0.7	0.72	
		09-Jun-11	1050	7.92	8.30																																						
		11-Oct-11	1150	9.18	9.56	7.1	1654	23.9	2.38	0.004	0.132	<0.001	0.0001	<0.001	<0.001	0.166	0.48	0.008	0.078	0.007	<0.01	0.303	<0.0001	7.54	2350	137	115	137	1	22.3	495	62	<1	<1	359	359	22.4	0.31	0.24	0.12	4.1	4.22	1210
		8-Dec-11	1040			7.2	1160	24.6																																			
		04-Apr-12	1000			7	882	31.2	0.06	<0.001	0.108	<0.001	<0.0001	<0.001	<0.001	0.025	0.06	0.01	0.005	0.005	<0.01	0.192	<0.0001	7.54	1080	70	53	81	2	11.4	182	28	<1	<1	265	265	11	1.86	0.06	0.02	0.57	0.59	616
		31-May-12	1010			7.23	1105	19.4																																			
		29-Aug-12	1125			6.95	613	22.3	1.02	<0.001	0.109	<0.001	<0.0001	<0.001	<0.001	0.07	0.58	0.014	0.038	0.005	<0.01	0.547	<0.0001	7.44	609	36	22	47	3	5.73	112	13	<1	<1	123	123	5.89	1.37	0.01	0.03	1.09	1.12	340
		04-Dec-12	1310			7.26	1513	27.3																																			
		07-Mar-13	1215			7.15	1580	26.2	0.99	<0.001	0.12	<0.001	<0.0001	<0.001	<0.001	0.087	0.06	0.011	0.014	0.004	<0.01	0.604	<0.0001	7.18	1730	111	90	113	2	17.9	340	42	<1	<1	336	336	17.2	2.1	0.02	<0.01	0.4	0.4	1030

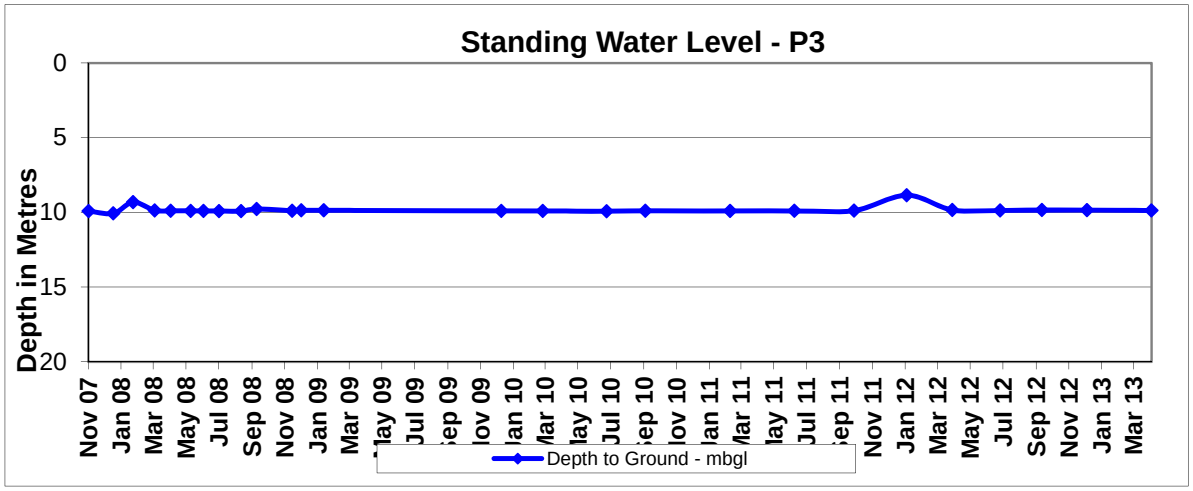
Site ID	Piezometer / Water Bore	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals														Major Cations					Major Anions												
						pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L	Mercury (Hg) - mg/L	pH Lab	EC - Lab - µs/cm	Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L	Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N - mg/L	Nitrate as N - mg/L	NOX as N - mg/L	Total Dissolved Solids
ANZECC Guideline - stock drinking water									*5*	*0.5*			*0.01*	*1*	*1*	*1*		*0.1*				*20*	*0.002*			*1000*						*1000*									*1500*	*400*		*4000*
WB3a		**11-Sep-08**	1230	8.09	8.60	7.7	1050	20.1		<0.001	0.179	<0.001	<0.0001	<0.001	<0.001	0.002	0.34	0.002	0.259	0.002	<0.01	0.009	<0.0001		703	39	20	78	4	7.11	54	10	<1	<1	268	268	7.08	0.10	0.26				431
		14-Nov-08	0856	8.14	8.65																																				
		01-Dec-08	1055	8.14	8.65																																				
		12-Jan-09	1301	7.94	8.45																																				
		01-Dec-09	1310	8.21	8.72																																				
		18-Feb-10	1205	8.11	8.62																																				
		23-Jun-10	1315	8.19	8.70																																				
		03-Sep-10	1210	8.03	8.54	7.29	919	22.5																																	
		09-Feb-11	1300	7.55	8.06																																				
		31-May-11	1155	7.41	7.92																																				
		27-Sep-11	1200	7.50	8.01																																				
		3-Jan-12	1150	6.79	7.30																																				
		22-Mar-12	1200	5.65	6.16																																				
		1-Jun-12	1200	6.21	6.72																																				
		10-Sep-12	1050	6.41	6.92																																				
		4-Dec-12	930	6.64	7.15																																				
		7-Mar-13	1325	6.21	6.72																																				
WB3b		**11-Sep-08**	1245	7.99	8.50	7.6	1250	19.8		<0.001	0.175	<0.001	<0.0001	<0.001	<0.001	0.002	0.31	0.001	0.255	0.001	<0.01	0.007	<0.0001		706	38	20	77	4	7.01	52	10	<1	<1	268	268	7.02	0.17	0.18				415
		14-Nov-08	0854	8.05	8.56																																				
		01-Dec-08	1057	7.99	8.50																																				
		12-Jan-09	1303	7.84	8.33																																				
		01-Dec-09	1310	8.20	8.71																																				
		18-Feb-10	1210	8.05	8.56																																				
		23-Jun-10	1320	8.10	8.61																																				
		03-Sep-10	1215	7.88	8.39	7.38	693	22.7																																	
		09-Feb-11	1310	7.20	7.71																																				
		31-May-11	1200	7.33	7.84																																				
		27-Sep-11	1210	7.45	7.96																																				
		3-Jan-12	1200	6.73	7.24																																				
		22-Mar-12	1220	5.61	6.12																																				
		1-Jun-12	1210	6.17	6.68																																				
		10-Sep-12	1100	6.34	6.85																																				
		4-Dec-12	935	6.57	7.08																																				
		7-Mar-13	1330	6.24	6.75																																				
WB4		**12-Sep-08**	1430	8.35	8.90	7.3	1120	19.8		<0.001	0.042	<0.001	<0.0001	<0.001	<0.001	0.002	<0.05	<0.001	0.003	0.002	<0.01	0.006	<0.0001		1040	61	35	116	1	11.0	93	30	<1	<1	360	360	10.4	2.39	0.06				461
		14-Nov-08	0902	8.30	8.85																																				
		12-Jan-09	1258	8.25	8.80																																				
		01-Dec-09	1305	8.38	8.93																																				
		18-Feb-10	1220	8.41	8.96																																				
		23-Jun-10	1310	8.41	8.96																																				
		03-Sep-10	1155	9.40	9.95	7.35	2174	21.8																																	
		09-Feb-11	1245	8.20	8.75																																				
		31-May-11	1145	8.04	8.59																																				
		27-Sep-11	1150	8.01	8.56																																				
		3-Jan-12	1140	7.98	8.53																																				
		22-Mar-12	1140	7.63	8.18																																				
		1-Jun-12	1145	7.42	7.97																																				
		10-Sep-12	1110	7.24	7.79																																				
		4-Dec-12	945	7.21	7.76																																				
		7-Mar-13	1315	6.98	7.53																																				
WB5a		**12-Sep-08**	1430	9.98	11.10	7.5	1200	21		<0.001	0.026	<0.001	<0.0001	<0.001	<0.001	0.004	0.1	0.006	0.033	<0.001	<0.01	0.008	<0.0001		510	36	18	32	2	4.66	29	28	<1	<1	160	160	4.59	0.72	0.05				281
		14-Nov-08	0832	10.29	11.41																																				
		01-Dec-08	1035	10.15	11.27																																				
		12-Jan-09	1319	9.89	11.01																																				
		01-Dec-09	1345	10.38	11.50																																				
		18-Feb-10	1245	10.35	11.47																																				
		23-Jun-10	1350	10.38	11.50																																				
		03-Sep-10	1330	9.71	10.83																																				
		09-Feb-11	1034																																						
		31-May-11	1230	9.48	10.60																																				
		27-Sep-11	1250	9.50	10.62																																				
		3-Jan-12	1250	8.52	9.64																																				
		22-Mar-12	1310	8.30	9.42																																				
		1-Jun-12	1245	8.50	9.62																																				
		10-Sep-12	1030	8.39	9.51																																				
		4-Dec-12	900	8.47	9.59																																				
		7-Mar-13	1350	7.15	8.27																																				

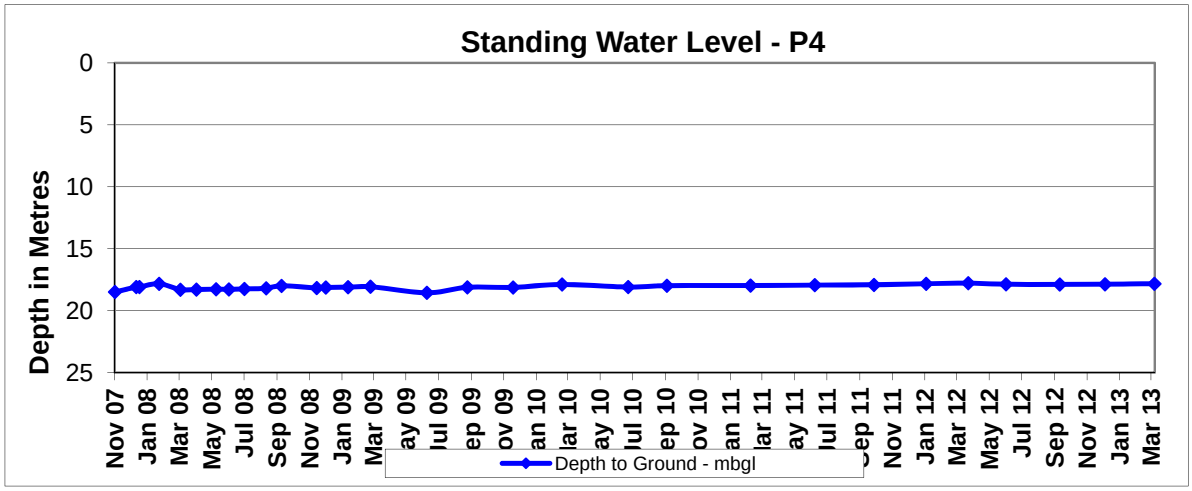
Site ID	Piezometer / Water Bore	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals															Major Cations					Major Anions													
						pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L	Mercury (Hg) - mg/L	pH Lab	EC - Lab - µs/cm	Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L	Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N - mg/L	Nitrate as N - mg/L	NOX as N - mg/L	Total Dissolved Solids
ANZECC Guideline - stock drinking water									*5*	*0.5*			*0.01*	*1*	*1*	*1*		*0.1*		*1*		*20*	*0.002*			*1000*						*1000*									*1500*	*400*		*4000*
WB5b		**12-Sep-08**	1430	10.08	11.20	7.6	1150	21		<0.001	0.028	<0.001	<0.0001	<0.001	<0.001	0.003	<0.05	0.006	0.031	0.001	<0.01	0.007	<0.0001		505	35	17	31	2	4.56	28	28	<1	<1	166	166	4.68	1.39	0.05				278
		14-Nov-08	0833	10.43	11.55																																				
		01-Dec-08	1037	10.15	11.27																																				
		12-Jan-09	1321	10.21	11.33																																				
		01-Dec-09	1345	10.78	11.90																																				
		18-Feb-10	1250	10.69	11.81																																				
		23-Jun-10	1355	10.36	11.48																																				
		09-Feb-11	1350																																						
		31-May-11	1240	9.50	10.62																																				
		27-Sep-11	1300	9.84	10.96																																				
		3-Jan-12	1300	9.07	10.19																																				
		22-Mar-12	1320	8.44	9.56																																				
		1-Jun-12	1300	8.45	9.57																																				
		10-Sep-12	1035	8.37	9.49																																				
		4-Dec-12	905	8.94	10.06																																				
		7-Mar-13	1355	7.50	8.62																																				
WB6a		**12-Sep-08**	1530	13.93	14.80	6.8	1120	20.4		<0.001	0.050	<0.001	<0.0001	<0.001	<0.001	0.008	0.22	0.029	0.302	0.002	<0.01	0.022	<0.0001		706	45	22	77	3	7.48	33	21	<1	<1	294	294	7.24	1.55	0.09				389
		12-Sep-08	1530	13.93	14.80	6.8	1120	20.4		<0.001	0.052	<0.001	<0.0001	<0.001	<0.001	0.005	0.29	0.014	0.419	0.004	<0.01	0.017	<0.0001		981	58	36	74	3	9.13	89	53	<1	<1	266	266	8.94	1.04	0.87				525
		14-Nov-08	0823	14.31	15.19																																				
		01-Dec-08	1030	14.29	15.17																																				
		12-Jan-09	1326	14.24	15.12																																				
		01-Dec-09	1400	14.38	15.22																																				
		18-Feb-10	1310	14.31	15.15																																				
		03-Sep-10	1345	14.31	15.15																																				
		09-Feb-11	1400	11.68	12.52																																				
		31-May-11	1250	11.41	12.25																																				
		27-Sep-11	1320	11.36	12.20																																				
		3-Jan-12	1320	11.29	12.13																																				
		22-Mar-12	1340	11.09	11.93																																				
		1-Jun-12	1320	10.59	11.43																																				
		10-Sep-12	930	10.35	11.19																																				
		4-Dec-12	1355	10.96	11.80																																				
		7-Mar-13	1410	11.57	12.41																																				
WB6b		**12-Sep-08**	1530	11.33	12.20	7.2	1080	20.7		<0.001	0.052	<0.001	<0.0001	<0.001	<0.001	0.007	0.28	0.028	0.297	0.006	<0.01	0.050	<0.0001		781	45	22	83	3	7.78	35	21	<1	<1	305	305	7.52	1.62	0.09				405
		14-Nov-08	0825	12.21	13.09																																				
		01-Dec-08	1032	11.21	12.09																																				
		12-Jan-09	1328	17.89	18.77																																				
		01-Dec-09	1400	19.70	20.54																																				
		18-Feb-10	1315	13.94	14.78																																				
		03-Sep-10	1350	11.09	11.93																																				
		09-Feb-11	1410	20.34	21.18																																				
		31-May-11	1300	10.98	11.82																																				
		27-Sep-11	1330	18.55	19.39																																				
		3-Jan-12	1330	16.81	17.65																																				
		22-Mar-12	1350	9.98	10.82																																				
		1-Jun-12	1335	9.74	10.58																																				
		10-Sep-12	940	14.80	15.64																																				
		4-Dec-12	1400	19.32	20.16																																				
		7-Mar-13	1415	10.96	11.80																																				
WB7		**11-Sep-08**	1330			6.9	1175	20.5		<0.001	0.006	<0.001	<0.0001	<0.001	<0.001	0.013	<0.05	<0.001	<0.001	<0.001	<0.01	0.040	<0.0001		765	33	18	92	2	7.16	60	23	<1	<1	250	250	7.16	0.06	0.04				410
		14-Nov-08	0841	4.11	4.99																																				
		01-Dec-08	1045	2.27	3.15																																				
		12-Jan-09	1315	4.30	5.18																																				
		25-Aug-09	1500							<0.001	0.006	<0.001	<0.0001	<0.001	<0.001	0.049	<0.05	0.006	0.002	<0.001	<0.01	0.044	<0.0001		633	26	14	80	2		47.4	23	<1	<1	224	224			<0.01				348
		01-Dec-09	1330	4.79		8.18	1002	23.3	0.05	0.005				<0.001		0.013	0.32	<0.001	0.038	0.004		<0.005	<0.0001	7.91	848	12	7	164	1	8.35	65.2	32	<1	<1	272	272	8.05	1.82		0.02	1.45	1.48	
		18-Feb-10	1240	4.64																																					
		23-Jun-10	1340		4.81	8.2	796	21	<0.01	<0.001				<0.001		0.01	<0.05	<0.001	<0.001	<0.001		0.007	<0.0001	7.22	621	29	16	93	2	6.89	51	17.8	<1	<1	250	250	6.81	0.59		<0.01	0.31	0.31	
		03-Sep-10	1305		1.93	7.39	625	22.3																																			
		08-Feb-11	1330		2.12	7.36	964	27.3	0.02	<0.001				<0.005		0.023	<0.05	<0.001	<0.001	<0.001		0.012	<0.001	7.2	766	41	24	125	2	9.52	65	33	<1	<1	345	345	9.41	0.52		<0.01	0.43	0.43	
		31-May-11	1215	3.01	3.01	7.55	613	14.8																																			
		27-Sep-11	1240	2.85	2.85	7.61	701	22.3	<0.01	<0.001	0.007	<0.001	<0.0001	<0.001	<0.001	0.016	0.2	0.002	0.004	<0.001	<0.01	0.009	<0.0001	7.95	740	30	17	105	2	7.51	61	25	<1	<1	260	260	7.44	0.5	<0.01	<0.01	0.35	0.35	402
		3-Jan-12	1230	1.90	1.90	7.52	732	25.7																																			
		22-Mar-12	1250	3.09	3.09	7.45	722	24.2	<0.01	0.007	0.011	<0.001	<0.0001	<0.001	<0.001	0.016	1.14	0.006	0.163	0.002	<0.01	0.012	<0.0001	7.69	654	24	14	112	3	7.3	60	23	<1	<1	245	245	7.07	1.58	0.14	<0.01	<0.01	<0.01	490
		01-Jun-12	1230	3.76	3.76	7.55	704	16.1																																			
		10-Sep-12	1015	1.14	1.14	7.27	597	17.5	0.01	<0.001	0.008	<0.001	<0.0001	<0.001	<0.001	0.008	<0.05	<0.001	0.027	<0.001	<0.01	0.005	<0.0001	7.65	636	23	12	98	2	6.45	56	20	<1	<1	234	234	6.67	1.72	<0.01	<0.01	0.05	0.05	362
		04-Dec-12	920	3.12	3.12																																				
		07-Mar-13	1340	1.7	1.7	7.4	673	25.2	<0.01	<0.001	0.009	<0.001	<0.0001	<0.001	<0.001	0.064	0.16	0.042	0.01	<0.001	<0.01	0.015	<0.0001	7.3	693	34	17	90	2	7.06	54	18	<1	<1	255	255	6.99	0.46	<0.01	<0.01	0.51	0.51	398
WB8		**12-Sep-08**																																								
		14-Nov-08																																								
WB9	NC-008	**1-Dec-08**	1235	19.2	19.67																																					

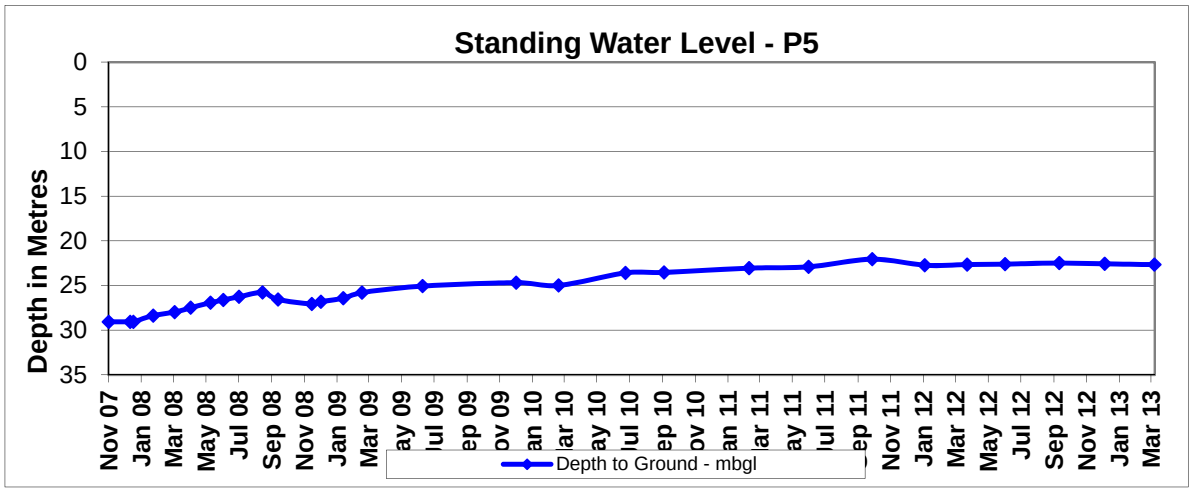
Denotes dissolved metals

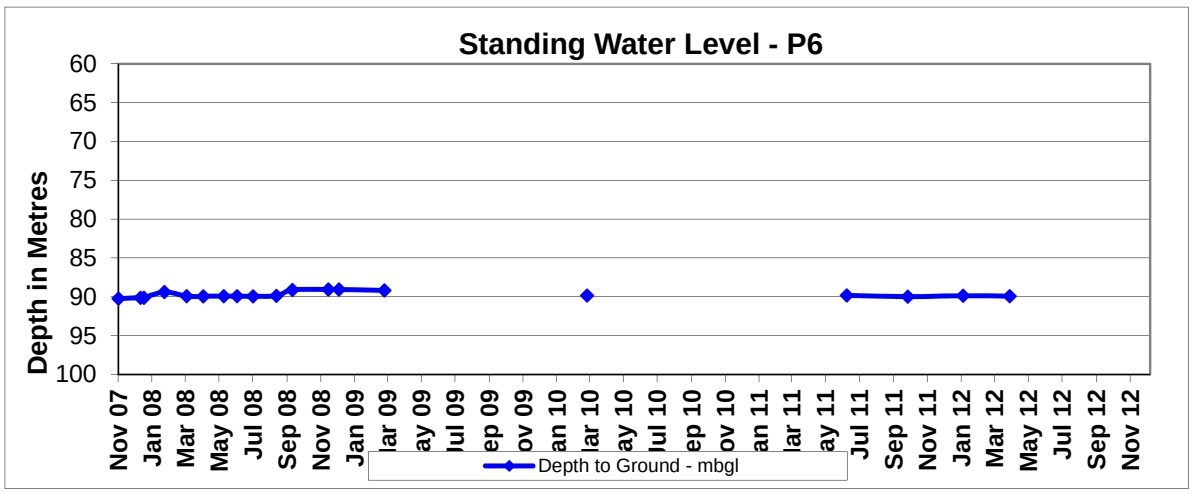

Standing Water Level - P1
Depth in Metres
0
10
20
30
40
50
60
70
80
90
100
Nov 07
Jan 08
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Jan 13
Mar 13
Depth to Ground - mbgl

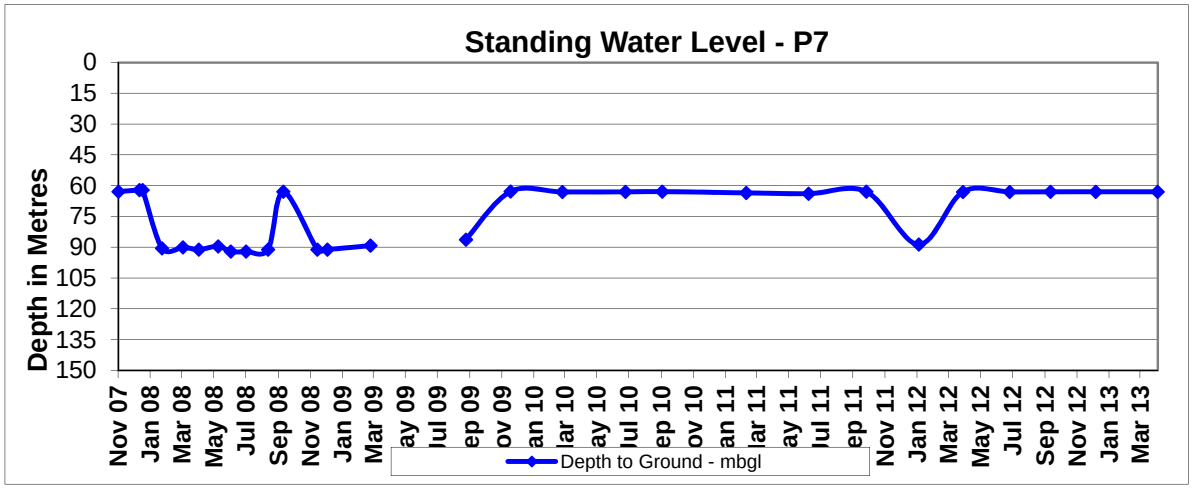

Standing Water Level - P2
Depth in Metres
0
5
10
15
20
25
30
35
40
Nov 07
Jan 08
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Jan 13
Mar 13
Depth to Ground - mbgl

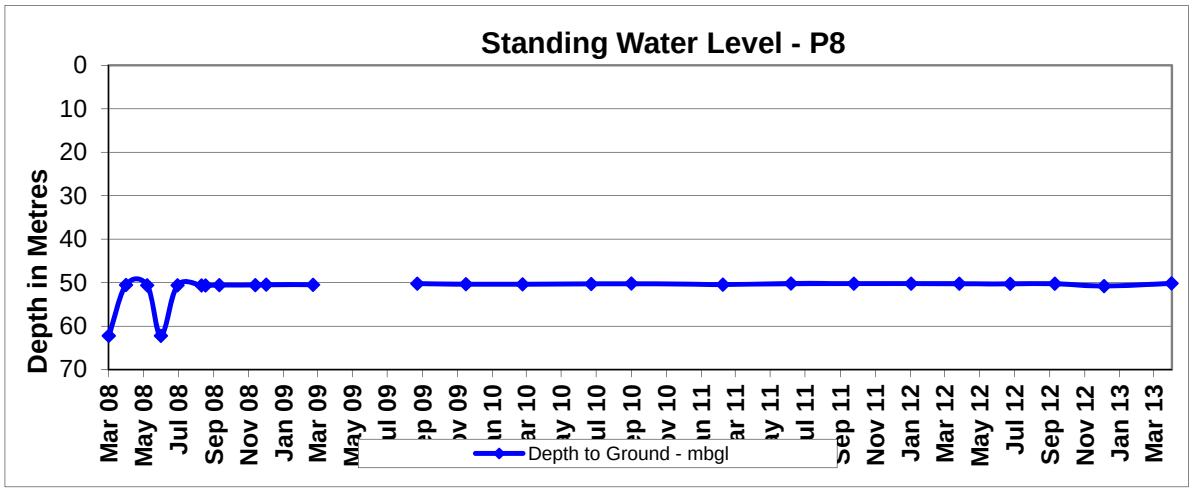

Standing Water Level - P3
Depth in Metres
0
5
10
15
20
Nov 07
Jan 08
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Jan 13
Mar 13
Depth to Ground - mbgl

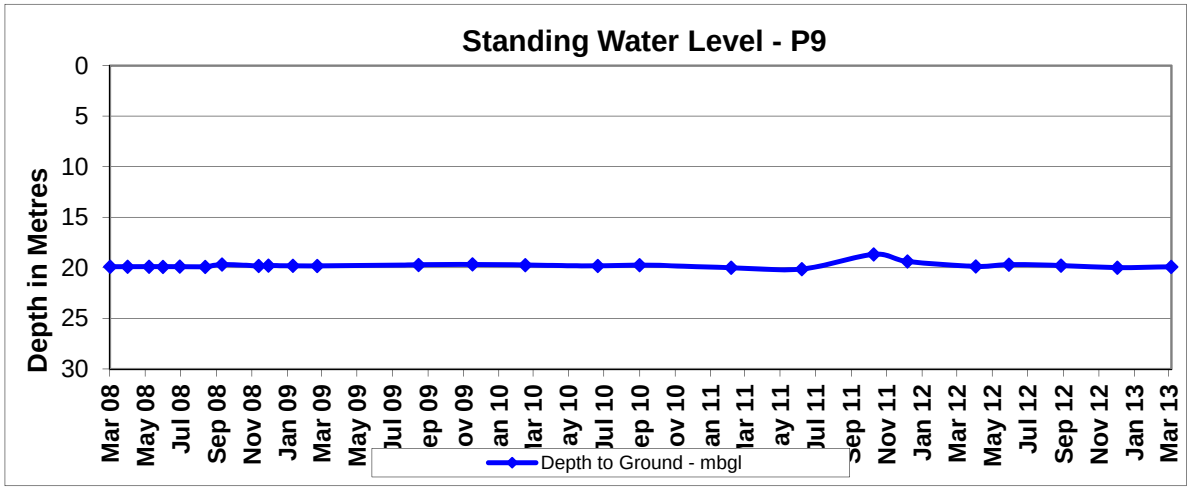

Standing Water Level - P4
Depth in Metres
0
5
10
15
20
25
Nov 07
Jan 08
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Nov 11
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Jan 13
Mar 13
Depth to Ground - mbgl

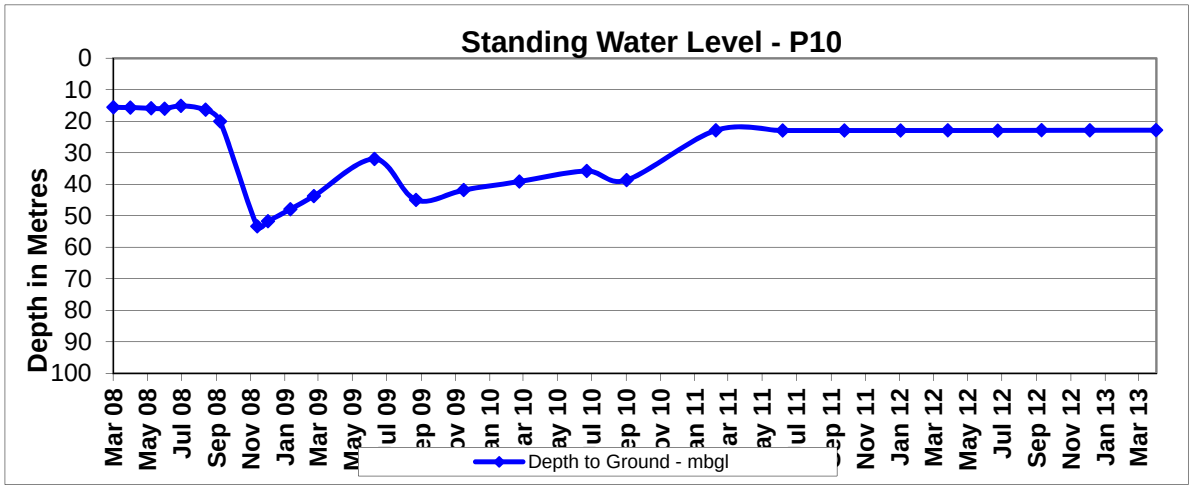

Standing Water Level - P5
Depth in Metres
0
5
10
15
20
25
30
35
Nov 07
Jan 08
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Nov 11
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Jan 13
Mar 13
Depth to Ground - mbgl

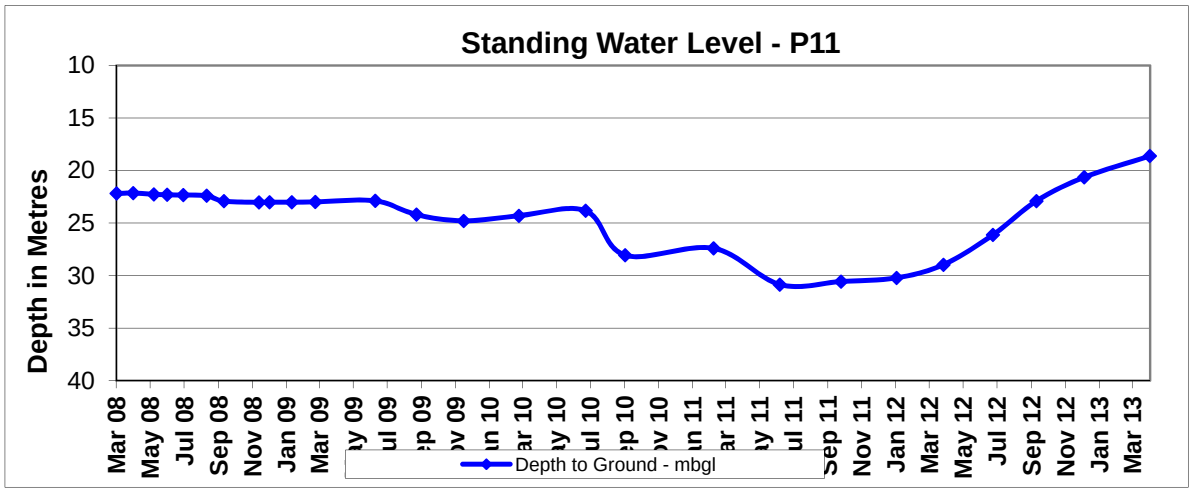

Standing Water Level - P6
Depth in Metres
60
65
70
75
80
85
90
95
100
Nov 07
Jan 08
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Jul 11
Sep 11
Nov 11
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Depth to Ground - mbgl

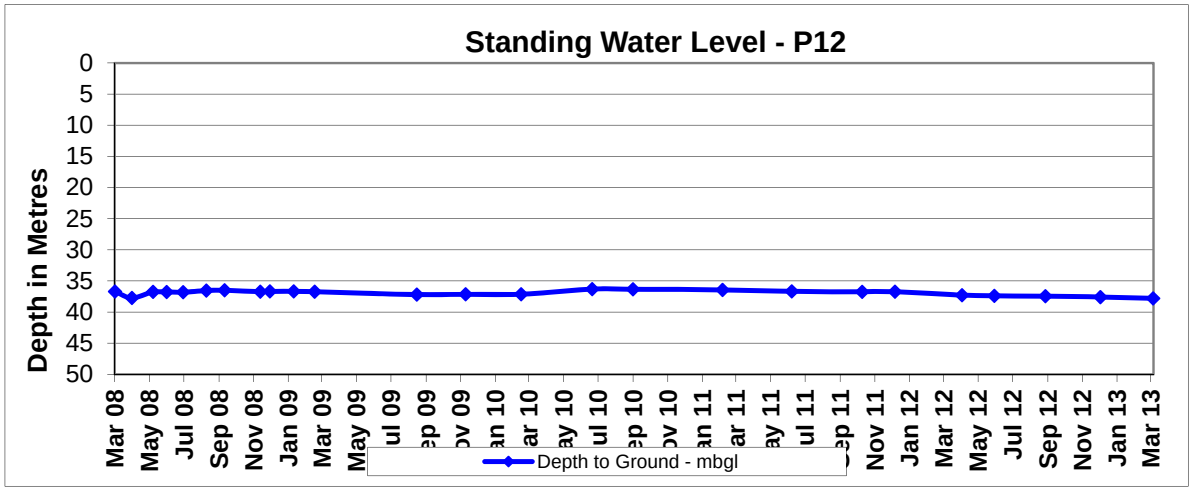

Standing Water Level - P7
Depth in Metres
0
15
30
45
60
75
90
105
120
135
150
Nov 07
Jan 08
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Nov 11
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Jan 13
Mar 13
Depth to Ground - mbgl

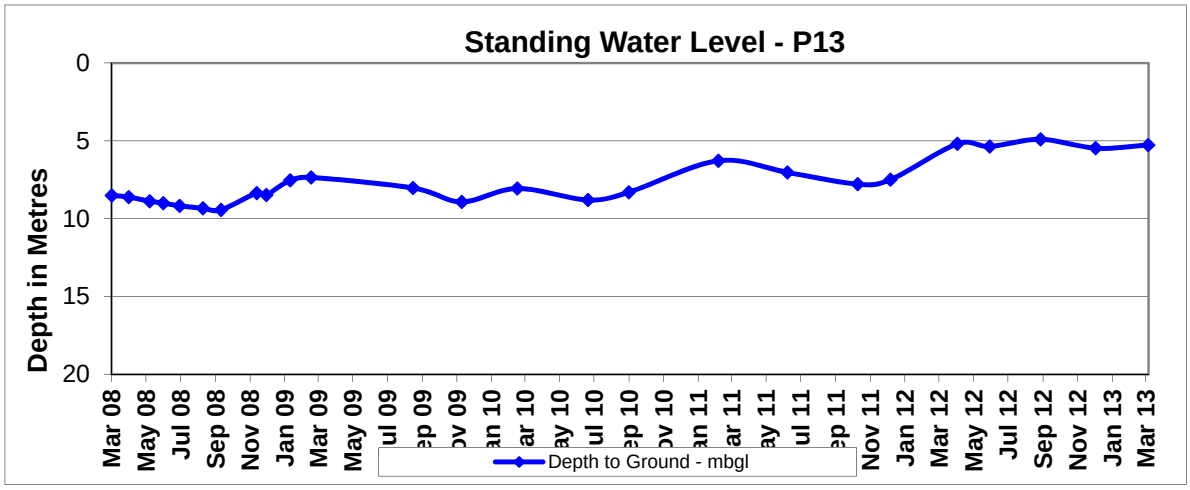

Standing Water Level - P8
Depth in Metres
0
10
20
30
40
50
60
70
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Nov 11
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Jan 13
Mar 13
Depth to Ground - mbgl

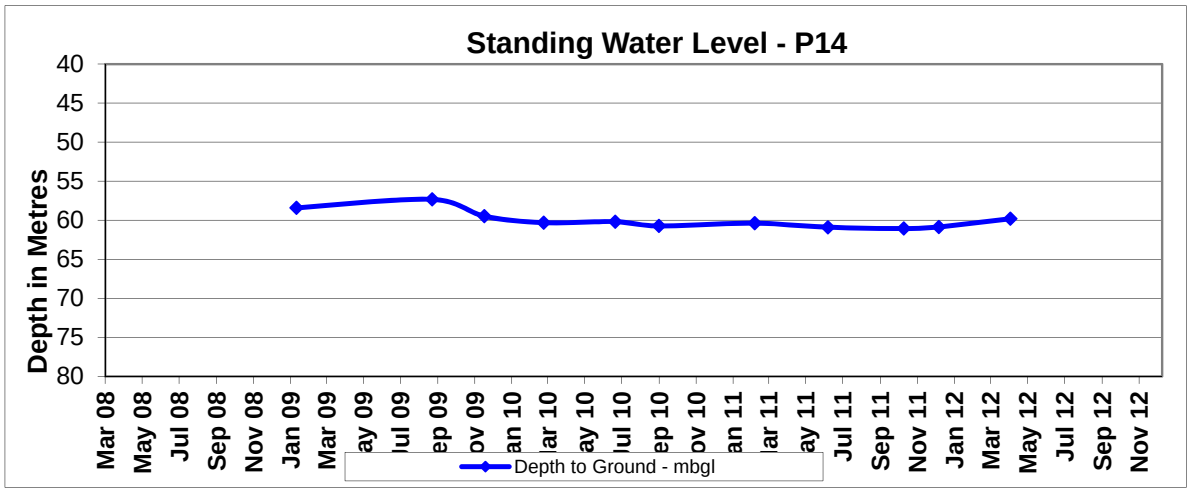

Standing Water Level - P9
Depth in Metres
0
5
10
15
20
25
30
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Nov 11
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Jan 13
Mar 13
Depth to Ground - mbgl

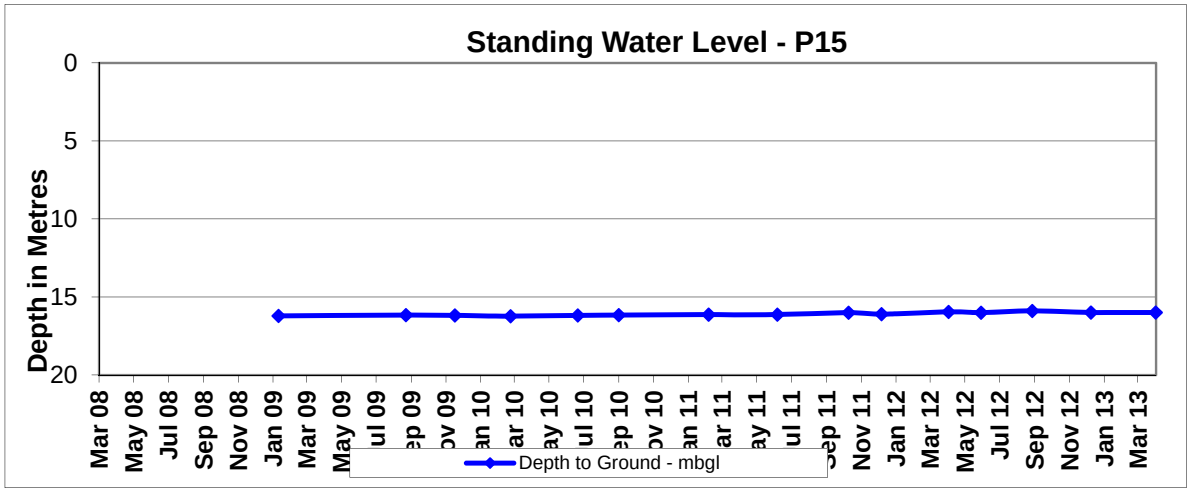

Standing Water Level - P10
Depth in Metres
0
10
20
30
40
50
60
70
80
90
100
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Nov 11
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Jan 13
Mar 13
Depth to Ground - mbgl

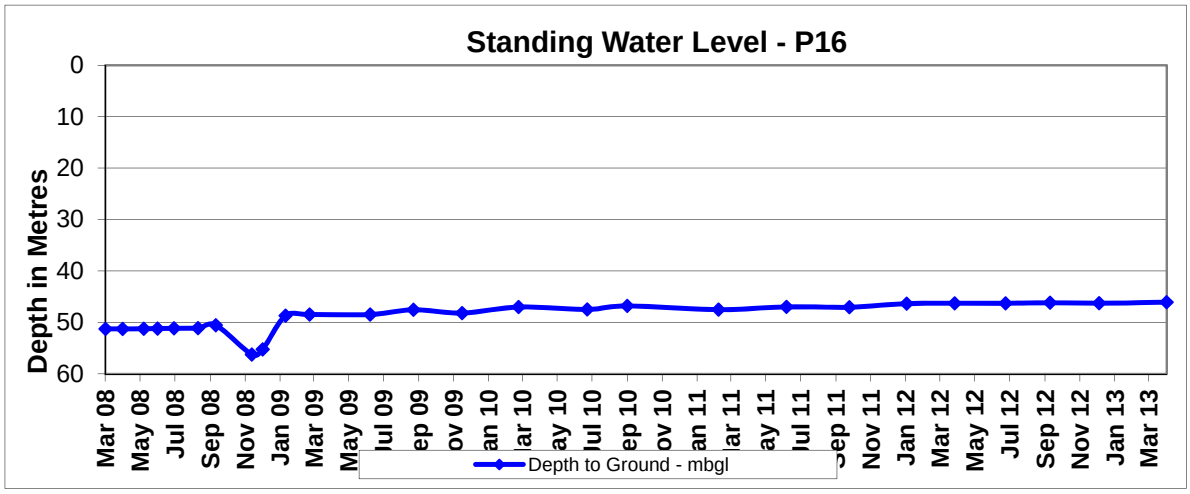

Standing Water Level - P11
Depth in Metres
10
15
20
25
30
35
40
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Nov 11
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Jan 13
Mar 13
Depth to Ground - mbgl

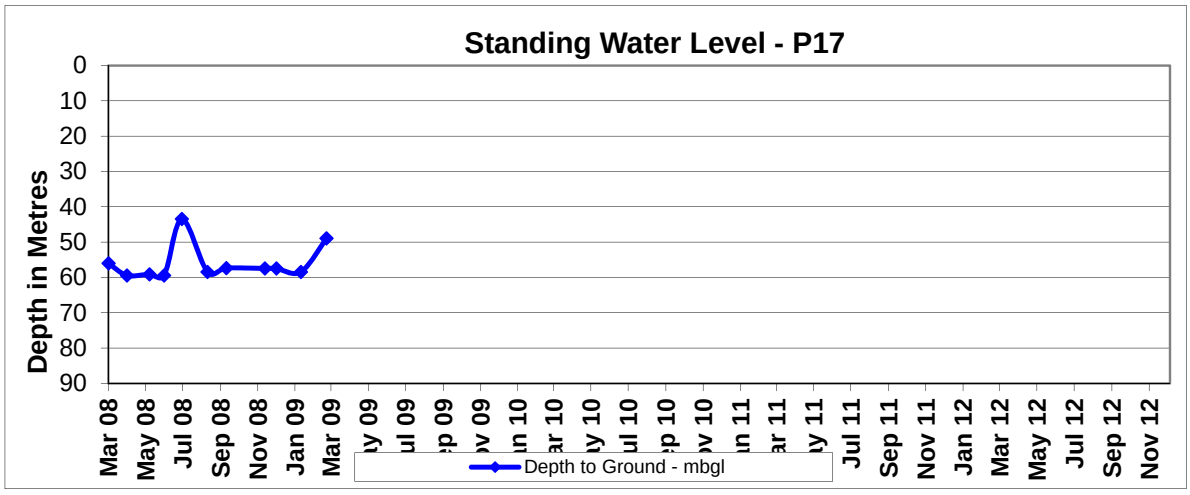

Standing Water Level - P12
Depth in Metres
0
5
10
15
20
25
30
35
40
45
50
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Nov 11
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Jan 13
Mar 13
Depth to Ground - mbgl

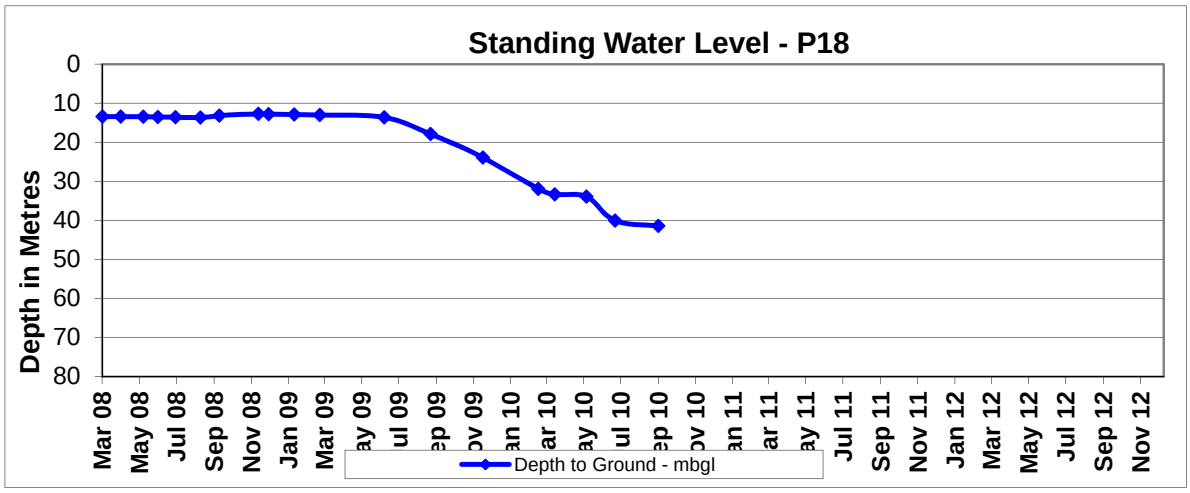

Standing Water Level - P13
Depth in Metres
0
5
10
15
20
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Nov 11
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Jan 13
Mar 13
Depth to Ground - mbgl

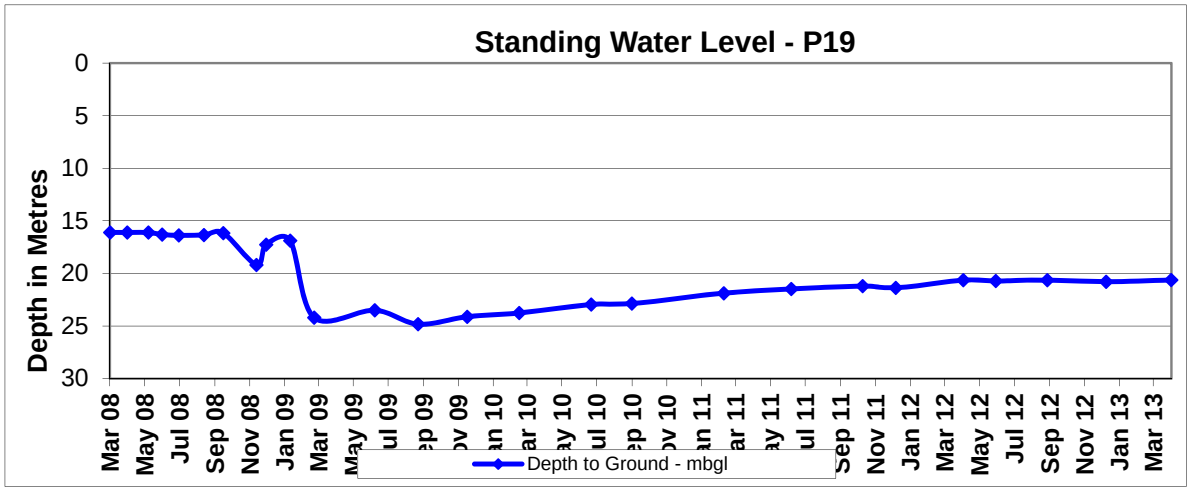

Standing Water Level - P14
Depth in Metres
40
45
50
55
60
65
70
75
80
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Jul 11
Sep 11
Nov 11
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Depth to Ground - mbgl

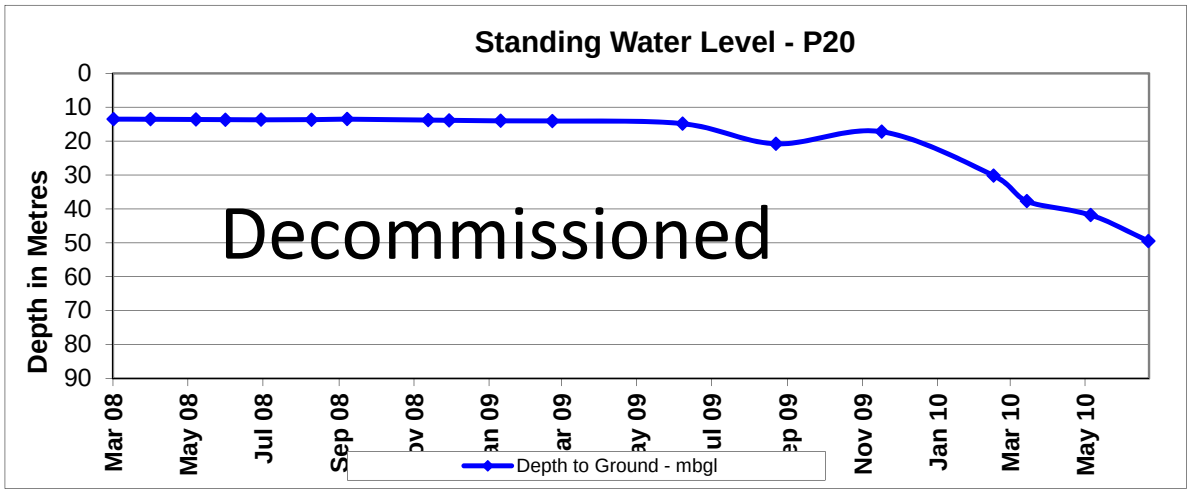

Standing Water Level - P15
Depth in Metres
0
5
10
15
20
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Nov 11
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Jan 13
Mar 13
Depth to Ground - mbgl

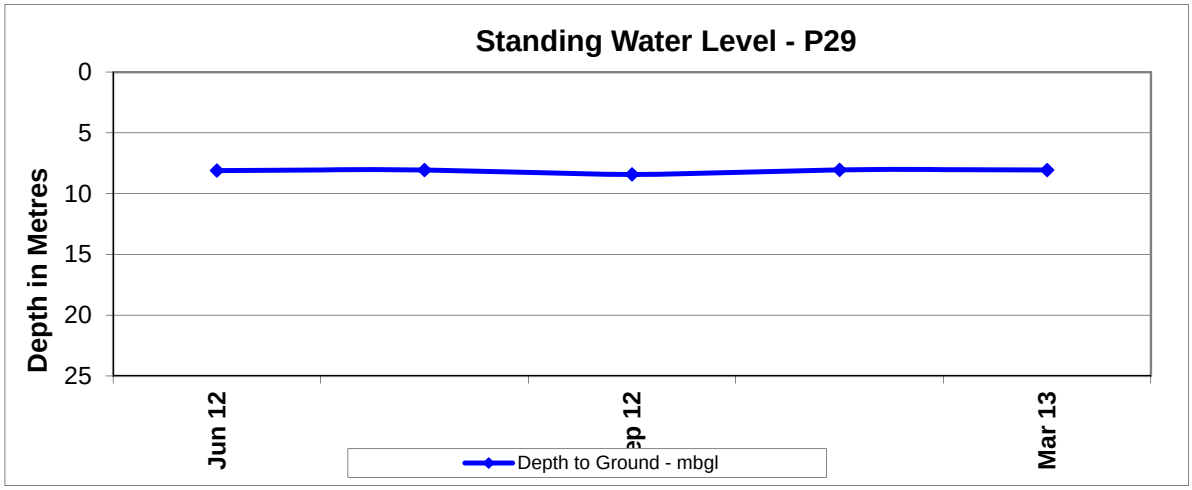

Standing Water Level - P16
Depth in Metres
0
10
20
30
40
50
60
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Nov 11
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Jan 13
Mar 13
Depth to Ground - mbgl

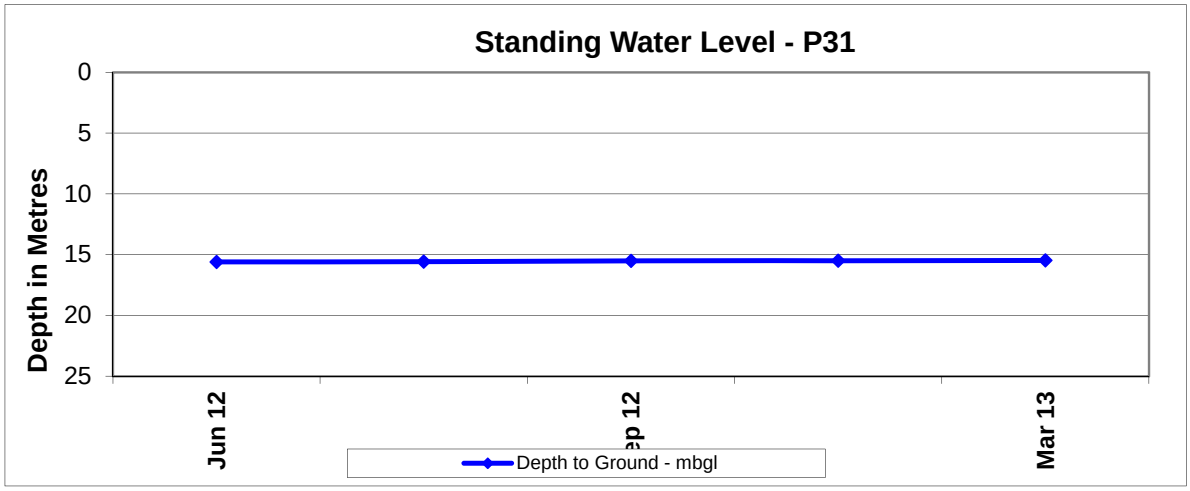

Standing Water Level - P17
Depth in Metres
0
10
20
30
40
50
60
70
80
90
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Jul 11
Sep 11
Nov 11
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Depth to Ground - mbgl

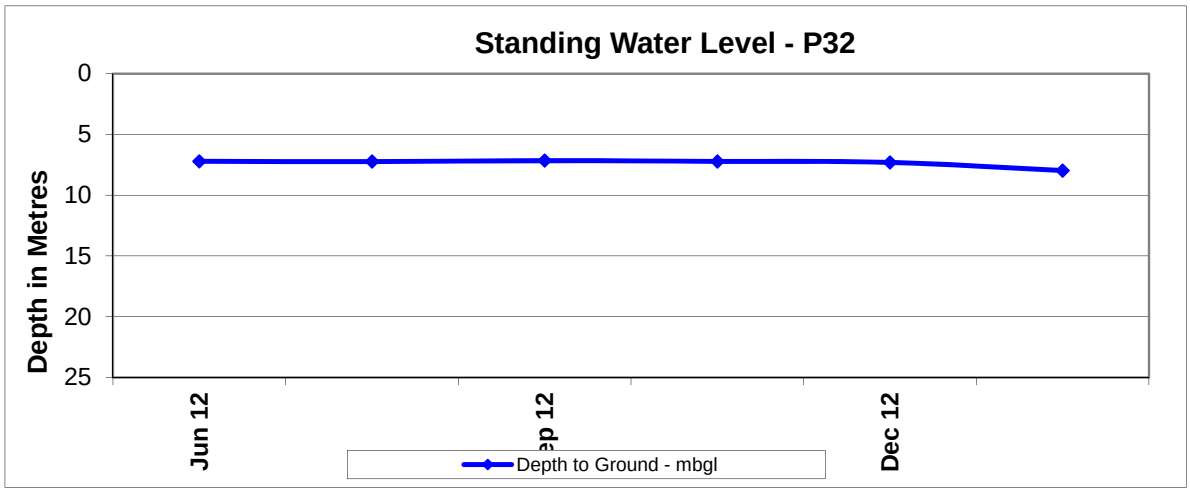

Standing Water Level - P18
Depth in Metres
0
10
20
30
40
50
60
70
80
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Jul 11
Sep 11
Nov 11
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Depth to Ground - mbgl

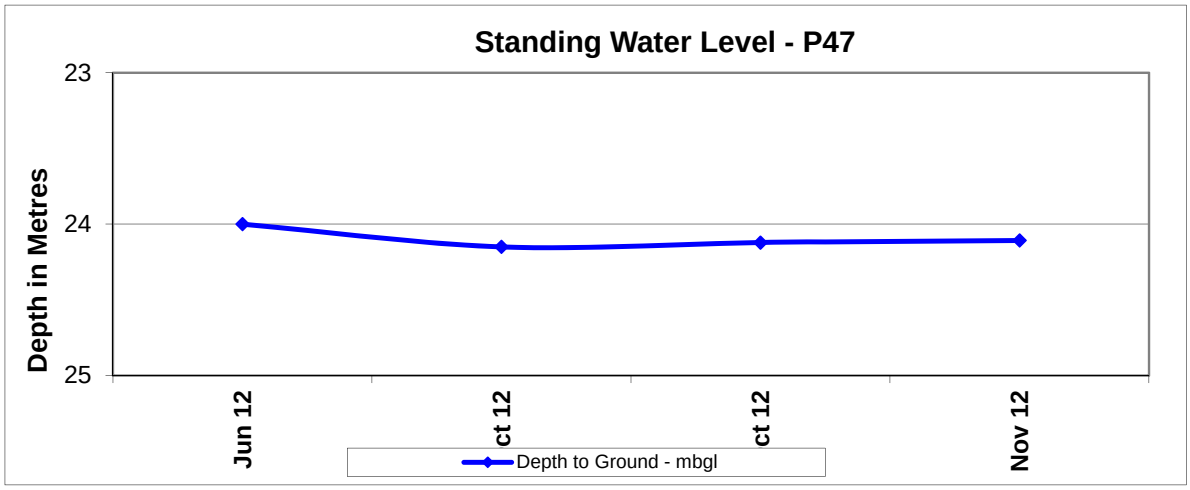

Standing Water Level - P19
Depth in Metres
0
5
10
15
20
25
30
Mar 08
May 08
Jul 08
Sep 08
Nov 08
Jan 09
Mar 09
Sep 09
Nov 09
Sep 11
Nov 11
Jan 12
Mar 12
May 12
Jul 12
Sep 12
Nov 12
Jan 13
Mar 13
Depth to Ground - mbgl


Standing Water Level - P20
Depth in Metres
0
10
20
30
40
50
60
70
80
90
Decommissioned
Mar 08
May 08
Jul 08
Sep 08
Nov 09
Jan 10
Mar 10
May 10
Depth to Ground - mbgl


Standing Water Level - P29
Depth in Metres
0
5
10
15
20
25
Jun 12
Mar 13
Depth to Ground - mbgl


Standing Water Level - P31
Depth in Metres
0
5
10
15
20
25
Jun 12
Mar 13
Depth to Ground - mbgl


Standing Water Level - P32
Depth in Metres
0
5
10
15
20
25
Jun 12
Dec 12
Depth to Ground - mbgl


Standing Water Level - P47
Depth in Metres
23
24
25
Jun 12
Nov 12
Depth to Ground - mbgl

Appendix 7

NOISE MONITORING RESULTS

ATTENDED NOISE MONITORING

June 2012

July 2012

August 2012

September 2012

December 2012

March 2013

Project No: 05168

ATTENDED NOISE MONITORING – JUNE 2012
Narrabri Coal Mine
Narrabri, NSW

Prepared for:

Whitehaven Coal Limited
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Baan Baa NSW 2390

Author:

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B.Sc.(Hons)
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Review:

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Neil Pennington
B.Sc., B. Math.(Hons), MAAS, MASA
Principal / Director

July 2012

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EXECUTIVE SUMMARY

Attended noise monitoring has been carried out for the Narrabri Coal Mine (NCM) over a period of four days between 20th and 23rd June, 2012 in accordance with requirements of Environment Protection Licence (EPL 12789) and other relevant Australian Standards and guidelines.

The mine was in full operation during the entire survey period.

No exceedance of the site-specific operational noise criterion was recorded. Noise levels higher than the noise criterion were recorded at "Naroo" on the night of June 20th, however, this measurement was made at a time of non-compliant atmospheric conditions (i.e. a noise enhancing +8°/100m temperature gradient).

No exceedance of the sleep disturbance criterion was recorded.

As there was no exceedance of the noise criteria no noise management actions were required.

Data from those times where NCM operations were audible were analysed using Bruel & Kjaer *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions of "modifying factor corrections" in the NSW Industrial Noise Policy.

The operation of NCM was therefore found to be in compliance with all noise-related requirements of EPL 12789 during the June 2012 attended noise monitoring survey.

1.0 INTRODUCTION

This letter report presents the results of attended noise compliance monitoring and measurements conducted for the Narrabri Coal Mine (NCM) between Wednesday 20th June and Saturday 23rd June, 2012.

1.1 Noise Monitoring Locations

Section M3.6 of EPL 12789 (variation dated February 20, 2012) contains a table detailing a list of residences and corresponding EPA identification numbers (spellings are as per the EPL). The residences are listed below:

N1	Bow Hills
N3	Naroo
N4	Greylands
N5	Oakleigh
N6	Newhaven[1]
N7	Belah Park[2]
N8	Haylin View[3]
N9	Merrilong[3]

1. The owner denied access to Newhaven so the monitoring was carried out at the southern boundary to the property.
2. Belah Park is now owned by the owner of Merriman and monitoring was carried out at the residence at Merriman.
3. Monitoring at Haylin View and Merrilong is to commence when surface activities approach the eastern end of the southern longwall panels.

These monitoring locations are illustrated in **Figure 1**.

1.2 Monitoring Frequency and Duration

Section M 7.1 of EPL 12789 indicates that the attended noise monitoring must be conducted;

a) at each of the locations detailed above (except that identified as N4);
b) quarterly in a reporting period;
c) during each day, evening and night period for a minimum of:
    - 1.5 hours during the day;
    - 30 minutes during the evening; and
    - 1 hour during the night.
d) occur for three consecutive operating days.

At location N4 the monitoring is to be carried out for a 15 minute period over each of the day, evening and night time periods during one 24 hour period.

Figure 1
Noise Monitoring Locations

2.0 CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

At all of the residences, the noise criterion is **35 dB(A) Leq (15 min)** (operational noise criterion) for each of the day, evening and night time periods, with "day" defined as 7am to 10pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays, "evening" being 6pm to 10pm and "night" being all other times.

In addition to the above the noise level at night must not exceed **45 dB(A) L1 (1 min)** (sleep disturbance criterion) at any residence.

2.2 Monitoring Location Definition

EPL 12789 states that to determine compliance with the Leq (15 min) operational noise criteria the noise measurement equipment must be located:

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

2.3 Applicable Meteorological Conditions

EPL 12798 states that the noise limits apply under all meteorological conditions except for the following;

1. Wind speeds greater than 3m/s at 10m above ground level; or
2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
3. Stability category G temperature inversion conditions.

The Project Approval for the mine PA 08_0144 provides further definition and states that these noise limits apply to applicable receivers under all meteorological conditions except for any one of the following;

- wind speeds greater than 3 metres/second at 10 metres above ground level; or
- temperature inversions of 1.5 - 4°C/100 metres and a source to receiver wind speed greater than 2 metres/second at 10 metres above ground level; or
- temperature inversions of greater than 4°C/100 metres.

2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW industrial Noise policy must be applied, as appropriate, to the measured noise levels.

To determine compliance with the L1 (1 min) sleep disturbance noise criterion the noise measurement equipment must be located within 1m of a dwelling façade.

The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom

window. To avoid undue disturbance to residents, observations and measurements made during the 60 minute long operational noise measurement are noted.

For consideration of the worst case, the L1 (1 min) noise level made at the operational noise measurement location is considered to be representative of the level at the bedroom façade of each residence (with the exception of the Newhaven location which is significantly removed from the residence).

3.0 NOISE MONITORING PROCEDURE

3.1 Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (90 minutes/day, 30 minutes/evening and 60 minutes/night) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The operational noise criteria for compliance with Section L 3.1 of EPL 12789 are based on a 15 minute Leq noise level. The procedures detailed in Section M. 7.1 of EPL 12789 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Section L 3.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from NCM was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall. Mine noise from NCM is shown in the tables in bold type.

When no mine noise was audible at a monitoring location, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

3.3 Meteorological Data

Meteorological data used in this report were supplied from the mine operated weather station.

3.3.1 Inversion Monitoring

Gemini Tiny Tag temperature loggers were attached to star pickets at a height of approximately 2m above ground level at locations marked T1 and T2 in Figure 1 to coincide with the attended noise surveys. Location T1 is at 246m AHD and Location T2 is at 296m AHD to give the required 50m vertical separation for

calculation of temperature gradients in accordance with the INP. Temperature gradients (normalised to ^{0}C/100m) during noise monitoring events are included in the following tables of results. Positive gradients indicate inversion conditions and negative gradients indicate a temperature lapse.

3.4 Special Conditions

Before the noise surveys, Spectrum Acoustics personnel were briefed on the current location(s) of activities.

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

Measured noise levels for each monitoring location and each period are summarised in **Tables 1 - 9**.

Table 1
NCM Operational Noise Monitoring Results – 20 June 2012 (day)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	2:50 pm	40	3.1/281	n/a	Traffic (38), birds & insects (32), **NCM (31)**
N3 Naroo	2:05 pm	39	2.7/290	n/a	Traffic (37), birds (34), **NCM (30)**
N5 Oakleigh	1:10 pm	30	1.8/281	n/a	Traffic (26), cattle (25), birds & insects (24), **NCM inaudible**
N6 Newhaven	3:30 pm	31	2.7/281	n/a	Birds (31), **NCM (<20)**
N7 Merriman	4:30 pm	45	1.9/274	n/a	Traffic (44), birds (40), **NCM inaudible**
N4 Greylands	4:50 pm	49	2.6/279	n/a	Farm noise (49), birds (35), traffic (33), **NCM inaudible**

Table 2
NCM Operational Noise Monitoring Results – 20 June 2012 (evening)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	8:36 pm	47	1.9/306	+7.2	Traffic (47), **NCM (35)**
N3 Naroo	9:01 pm	45	1.9/294	+7.7	Traffic (45), **NCM (33)**, insects (30)
N5 Oakleigh	7:45 pm	38	1.6/300	+6.9	Traffic (38), **NCM inaudible**
N6 Newhaven	8:02 pm	33	1.9/308	+7.5	Traffic (33), **NCM (26)***
N7 Merriman	9:12 pm	45	1.9/295	+7.9	Traffic (45), **NCM (21)**
N4 Greylands	8:38 pm	40	1.8/298	+7.2	Traffic (39), **NCM (31)**

*Noise from gas drainage wells

Table 3 NCM Operational Noise Monitoring Results – 20 June 2012 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temp Grad (°C/100m)**	**Identified Noise Sources**
N1 Bow Hills	10:01 pm	41	1.2/298	+7.6	Traffic (41), **NCM (33)**
N3 Naroo	11:05 pm	45	0.7/277	+8.0	Traffic (44), **NCM (40)**, insects (37)
N5 Oakleigh	12:11 am	41	0.2/330	+8.1	Traffic (41), **NCM (32)**
N6 Newhaven	12:20 am	32	1.2/298	+7.6	**NCM (32)***
N7 Merriman	11:25 pm	47	0.5/270	+7.7	Traffic (47), **NCM (<25)**
N4 Greylands	11:05 pm	37	0.4/326	+8.0	Traffic (37), **NCM (<25)**

*Noise from gas drainage wells

Table 4 NCM Operational Noise Monitoring Results – 21 June 2012 (day)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temp Grad (°C/100m)**	**Identified Noise Sources**
N1 Bow Hills	1:05 pm	44	5.1/305	n/a	Traffic (41), wind (41), **NCM inaudible**
N3 Naroo	2:33 pm	47	5.8/305	n/a	Wind (44), traffic (44), **NCM inaudible**
N5 Oakleigh	11:25 am	44	6.0/307	n/a	Traffic (41), wind in trees (40), birds (35), **NCM inaudible**
N6 Newhaven	11:15 am	34	6.0/307	n/a	Wind (34), **NCM inaudible**
N7 Merriman	12:50 pm	45	6.8/305	n/a	Wind (43), birds (39), traffic (37), **NCM inaudible**

Table 5 NCM Operational Noise Monitoring Results – 21 June 2012 (evening)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temp Grad (°C/100m)**	**Identified Noise Sources**
N1 Bow Hills	8:30 pm	45	2.7/316	+5.7	Traffic (45), **NCM (31)**
N3 Naroo	8:45 pm	49	2.8/313	+5.2	Traffic (49), **NCM (33)**
N5 Oakleigh	9:07 pm	45	3.2/315	+8.3	Cattle (43), traffic (40), **NCM (28)**
N6 Newhaven	7:55 pm	28	2.0/303	+5.1	Traffic (28), **NCM inaudible**
N7 Merriman	7:50 pm	35	2.0/303	+5.1	Traffic (35), insects (26), **NCM inaudible**

Table 6 NCM Operational Noise Monitoring Results – 21 June 2012 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temp Grad (°C/100m)**	**Identified Noise Sources**
N1 Bow Hills	10:02 pm	40	4.2/313	+8.1	Traffic (40), **NCM (31)**
N3 Naroo	12:12 am	46	6.2/314	+4.6	Traffic (45), insects (40), **NCM (<30)**
N5 Oakleigh	11:10 pm	38	3.2/315	+3.6	Traffic (35), insects (33), **NCM (31)**
N6 Newhaven	10:01 pm	37	4.2/313	+8.1	Insects (35), traffic (32), **NCM inaudible**
N7 Merriman	11:06 pm	41	4.7/311	+3.6	Traffic (39), insects (36), **NCM inaudible**

Table 7 NCM Operational Noise Monitoring Results – 22 June 2012 (day)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temp Grad (°C/100m)**	**Identified Noise Sources**
N1 Bow Hills	12:25 pm	47	4.9/268	n/a	Traffic (47), **NCM (32)**
N3 Naroo	10:50 am	50	5.5/289	n/a	Traffic (49), birds (44), wind (40), **NCM inaudible**
N5 Oakleigh	9:40 am	46	6.5/293	n/a	Wind (45), traffic (40), **NCM inaudible**
N6 Newhaven	9:02 am	43	6.7/292	n/a	Wind (43), traffic (30), **NCM inaudible**
N7 Merriman	8:01 am	50	7.6/292	n/a	Wind (50), birds (35), **NCM inaudible**

Table 8 NCM Operational Noise Monitoring Results – 22 June 2012 (evening)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temp Grad (°C/100m)**	**Identified Noise Sources**
N1 Bow Hills	6:35 pm	47	2.7/258	Lapse	Traffic (47), **NCM (29)**
N3 Naroo	6:01 pm	37	3.6/240	Lapse	Traffic (35), **NCM (31)**, insects (26)
N5 Oakleigh	6:00 pm	32	3.6/240	Lapse	Traffic (30), **NCM (27)**, insects (22)
N6 Newhaven	7:11 pm	33	1.4/315	Lapse	**NCM (33)***
N7 Merriman	6:40 pm	31	2.7/258	Lapse	**NCM (30)**, insects (24)

*Noise from gas drainage wells

Table 9 NCM Operational Noise Monitoring Results – 22 June 2012 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temp Grad (°C/100m)**	**Identified Noise Sources**
N1 Bow Hills	11:10 pm	46	1.6/299	+3.2	Traffic (46), **NCM (35)**
N3 Naroo	11:07 pm	38	1.6/299	+3.2	Traffic (38), **NCM (30)**
N5 Oakleigh	10:01 pm	40	1.6/319	+0.9	Traffic (40), **NCM (27)**
N6 Newhaven	10:01 pm	29	1.6/319	+0.9	**NCM (29)***
N7 Merriman	12:18 am	40	1.7/282	+1.2	Traffic (39), **NCM (35)**

*Noise from gas drainage wells

4.2 Discussion of Results

The results in Tables 1 to 9 show that, under the operating and meteorological conditions at the times, for the worst case 15 minute compliance measurement periods, the mine noise was at variable levels but exceeded the operational noise criterion at the Naroo monitoring location during the night on June 20.

At this time there was a noise enhancing +8.0°/100m temperature inversion (based on the data from the temperature loggers as per **Section 3.3.1**). As such the elevated noise level was measured under non-compliant atmospheric conditions as per the Project Approval (see **Section 2.3**).

4.2.1 Audible Noise Sources

At the Bow Hills, Merriman and Naroo monitoring locations mine related noise was measureable during several of the monitoring periods. This noise was audible as a general hum with occasional noise from mobile plant and reverse beepers. Dozer tracks were audible at times.

On the night of June 20 the noise at Naroo was from machinery working in the vicinity of the surface facilities. The noise was relatively steady state with very little variation in level.

At the Newhaven monitoring location the noise was from the gas drainage wells in the vicinity. The monitoring location is near the boundary of the property and not at the residence. Noise levels at the residence would be significantly lower than those shown in the tables.

At Oakleigh the mine noise was only audible as low level mine hum with no discernible individual sources.

4.2.2 Modifying Factor Corrections

Data from those times where NCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions of "modifying factor corrections" in the NSW Industrial Noise Policy.

4.2.3 Sleep Disturbance

Measured L1 (1 min) noise levels for each night time monitoring period are summarised in **Tables 10- 12**. The results in these tables show that, under the operating and meteorological conditions at the times, the maximum L1 (1 min) noise emission from NCM did not exceed the sleep disturbance criterion. L1 (1 min) noise levels above 40 dB(A) were measured at four of the monitoring locations.

Table 10
NCM Sleep Disturbance Monitoring Results – 20 June 2012 (night)

Location	Time	dB(A),L1 (1 min)	Wind speed/ direction	Temp Grad(°C/100m)
N1 Bow Hills	10:01 pm	37.6	1.2/298	+7.6
N3 Naroo	11:05 pm	43.8	0.7/277	+8.0
N5 Oakleigh	12:11 am	38.2	0.2/330	+8.1
N6 Newhaven	12:20 am	42.1	1.2/298	+7.6
N7 Merriman	11:25 pm	29.8	0.5/270	+7.7
N4 Greylands	11:05 pm	27.0	0.4/326	+8.0

Table 11
NCM Sleep Disturbance Monitoring Results – 21 June 2012 (night)

Location	Time	dB(A),L1 (1 min)	Wind speed/ direction	Temp Grad(°C/100m)
N1 Bow Hills	10:02 pm	37.5	4.2/313	+8.1
N3 Naroo	12:12 am	32.6	6.2/314	+4.6
N5 Oakleigh	11:10 pm	36.2	3.2/315	+3.6
N6 Newhaven	10:01 pm	n/a	4.2/313	+8.1
N7 Merriman	11:06 pm	n/a	4.7/311	+3.6

Table 12 NCM Sleep Disturbance Monitoring Results – 22 June 2012 (night)				
Location	**Time**	**dB(A),L1 (1 min)**	**Wind speed/ direction**	**Temp Grad(°C/100m)**
N1 Bow Hills	11:10 pm	43.2	1.6/299	+3.2
N3 Naroo	11:07 pm	36.5	1.6/299	+3.2
N5 Oakleigh	10:01 pm	30.0	1.6/319	+0.9
N6 Newhaven	10:01 pm	37.4	1.6/319	+0.9
N7 Merriman	12:18 am	42.5	1.7/282	+1.2

4.2.4 Noise Management

Section R 4.1 (b) of EPL 12789 states that the noise monitoring report should include "*an outline of any management actions taken within the monitoring period to address any exceedances of the limits detailed in the limit conditions of this licence.*"

As there were no exceedances of any noise criteria no noise management actions were necessary. The only measured noise levels that exceeded the applicable noise criterion occurred during a period of non–compliant atmospheric conditions.

APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS

Table A1

Definition of acoustical terms

Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

27 July 2012

Ref: 05168/4444

Mr Danny Young
Narrabri Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: JULY 2012 ATTENDED NOISE MONITORING RESULTS – NARRABRI MINE

This letter report presents the results of attended noise compliance monitoring conducted for the Narrabri Coal Mine (NCM) on Sunday 22nd July 2012. Noise monitoring was carried out in accordance with the conditions of the NCM Noise Management Plan (NMP) as detailed below.

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

Noise impact assessment criteria for the various stages and activities associated with the mine's development were established in the *Environmental Assessment* using relevant DECC guidelines. These criteria have been incorporated in PA 05_0102 *Condition 3(12)* which is reproduced below. Additionally, PA 05_0102 *Condition 3(13)* identifies criteria for ensuring continuous improvement in noise mitigation actions at the mine site.

Noise Limits

3(12) The Proponent shall ensure that the noise generated by the project does not exceed the levels set out in Table 1 at any privately-owned residence.

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

- *To determine compliance with the $LA_{eq(15\ minute)}$ limit, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Relations Policy.*
- *To determine compliance with the $LA1(1\ minute)$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*

NOISE MONITORING LOCATIONS

Noise measurement locations for the attended noise survey are listed below and shown in Figure 1:

Location R17: Bow Hills
Location R21: Westhaven
Location R24: Naroo
Location R13: Greylands
Location R22: Kurrajong*

* Measurements were taken near the boundary fence with R19 “Claremont”, which is approximately half way between the box cut and the “Kurrajong” residence. An indeterminate correction factor between 4 and 8 dB should be subtracted from these results to estimate the noise level at “Kurrajong”.

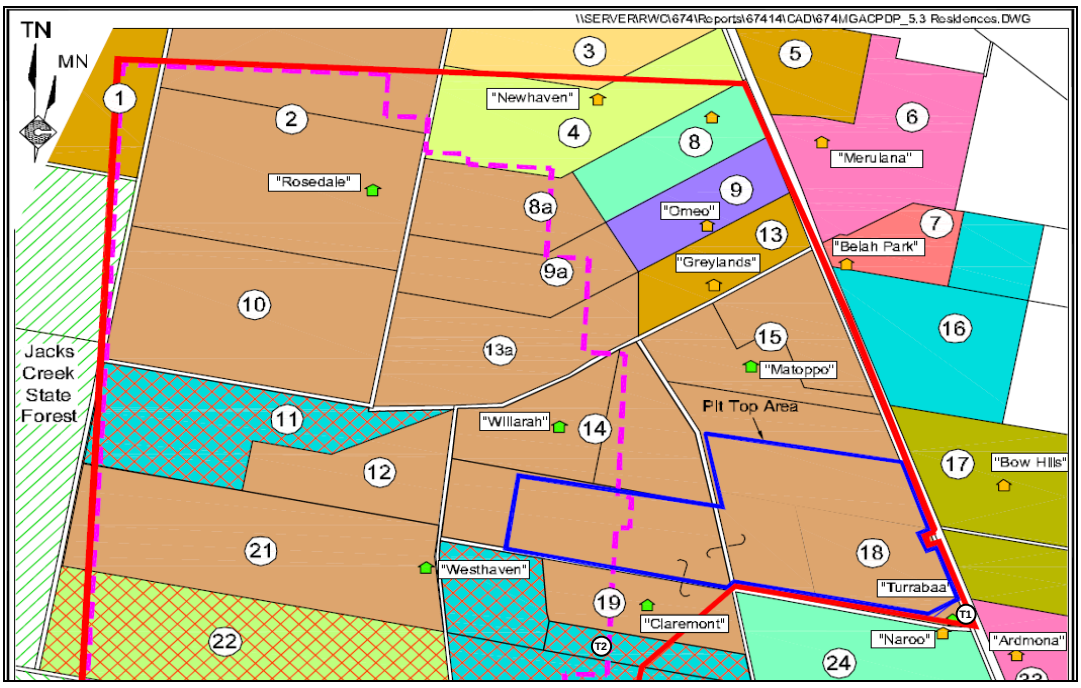

FIGURE 1. Noise monitoring locations.

NOISE MEASUREMENTS

Noise emission levels were measured with a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instrument was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Meteorological data used in this report was obtained from the mine operated weather station. Temperature inversion data (normalised to ^{0}C/100m) was extrapolated from the 2m and 10m high temperature gauges on the weather station. Positive gradients indicate inversion conditions and negative gradients indicate a temperature lapse.

Winds were light to gentle generally from the south east throughout the survey. Wind speeds were also measured with a hand held anemometer at an approximate height of 2.5m above ground level. These measurements indicated wind speeds at this height were generally 1 to 3 m/s lower than those measured at the 10m height on the mine operated weather station.

RESULTS

The measured noise levels, over 1 second intervals, were analysed using Brüel & Kjær "*Evaluator*" software. The software enables the contributions of the mine and other significant noise sources to the overall to be quantified.

Noise levels were recorded for each of the Leq (15 min), Lmax, L1, L10, L90 and Lmin percentiles. As shown in Table 1, the noise criterion for the operational phase of the NCM project is **35 dB(A) $L_{eq\ (15\ min)}$** for all operating times.

The results shown in **Tables 1**, **2** and **3** below represent the total 15 minute Leq noise level for all noise sources and the relative contributions of each. This is the compliance criterion for the operation of the mine. Levels for the other percentiles are not shown as they have no compliance criteria for comparison but are available on request. The exception is the L1 (1 min) noise level (which is the standard measure of sleep disturbance) which is applicable to noise emissions at night (i.e. between 10 pm and 7 am).

Measured noise levels are shown in **Tables 1-3**. Where the noise from NCM was audible the Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level.

Noise from NCM is shown in bold type. Where noise from NCM is listed as inaudible, this means the maximum levels from the mine were at least 10 dB below the minimum level during the measurement and not measurable.

Table 1
NCM Noise Monitoring Results – 22 July 2012 (Day)

Location	Time	dB(A), $L_{eq(15min)}$	Wind speed (m/s)/ direction^0	Identified Noise Sources
Bow Hills	3:22 pm	48	6.6/136	Traffic (46), birds & insects (43), NCM inaudible
Naroo	3:46 pm	59	6.6/123	Birds (59), traffic (43), wind in trees (40), NCM inaudible
Claremont*	4:11 pm	50	5.5/132	Birds (50), sheep (38), NCM inaudible
Westhaven	4:36 pm	39	5.4/124	Birds (37), traffic (32), NCM (30)
Greylands	4:58 pm	53	4.3/136	Birds (53), traffic (32), NCM (<30)

* Correction of 4-8dB to be subtracted from the *mine noise component only* to estimate levels at "Kurrajong".

Table 2
NCM Noise Monitoring Results – 22 July 2012 (Evening)

Location	Time	dB(A), $L_{eq(15min)}$	Wind speed (m/s)/ direction^0	Identified Noise Sources
Bow Hills	9:18 pm	41	4.4/144	Frogs & insects (41), NCM inaudible
Naroo	8:54 pm	45	4.2/142	Birds (43), wind in trees (40), NCM inaudible
Claremont*	8:29 pm	38	4.2/138	NCM (34), birds (33), sheep (32)
Westhaven	8:03 pm	35	4.3/132	Birds & frogs (33), NCM (31)
Greylands	7:39 pm	42	4.2/137	Frogs (38), traffic (36), NCM (34), wind (32)

* Correction of 4-8dB to be subtracted from the *mine noise component only* to estimate levels at "Kurrajong".

Table 3
NCM Noise Monitoring Results – 22 July 2012 (Night)

Location	Time	dB(A), $L_{eq(15min)}$	Wind speed (m/s)/ direction^0	Temp Grad (^{o}C/100m)	Identified Noise Sources
Bow Hills	11:33 pm	46	3.6/159	+11.6	Train (45), frogs & insects (40), traffic (30), NCM inaudible
Naroo	11:13 pm	35	4.0/150	+14.6	Traffic (34), NCM (28), frogs & insects (25)
Claremont*	10:49 pm	38	3.1/148	+14.0	NCM (35), sheep (33), insects (31)
Westhaven	10:23 pm	36	4.2/142	+14.0	NCM (32), traffic (31), insects (30)
Greylands	10:01 pm	43	4.2/138	+14.6	Train (41), insects (36), NCM (34), traffic (34)

* Correction of 4-8dB to be subtracted from the *mine noise component only* to estimate levels at "Kurrajong".

The results shown in Tables 1-3 indicate that noise emissions from the NCM did not exceed the criterion of 35 dB(A),$L_{eq(15min)}$ at any location.

Data for the 15 minute Leq noise levels were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, emissions from NCM must not exceed 45 dB(A) L1 (1 min) between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine. During the night time measurement circuit the L1 (1 min) noise from NCM did not exceed 45 dB(A) at any monitoring location.
We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:

Ross Hodge
Acoustical Consultant

9 August 2012

Ref: 05168/4472

Mr Steve Farrar
Narrabri Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: AUGUST 2012 ATTENDED NOISE MONITORING RESULTS – NARRABRI MINE

This letter report presents the results of attended noise compliance monitoring conducted for the Narrabri Coal Mine (NCM) on Sunday 5th August 2012. Noise monitoring was carried out in accordance with the conditions of the NCM Noise Management Plan (NMP) as detailed below.

NOISE CRITERIA

The following is an extract from the Narrabri Coal NMP:

Noise impact assessment criteria for the various stages and activities associated with the mine's development were established in the *Environmental Assessment* using relevant DECC guidelines. These criteria have been incorporated in PA 05_0102 *Condition 3(12)* which is reproduced below. Additionally, PA 05_0102 *Condition 3(13)* identifies criteria for ensuring continuous improvement in noise mitigation actions at the mine site.

Noise Limits

3(12) The Proponent shall ensure that the noise generated by the project does not exceed the levels set out in Table 1 at any privately-owned residence.

Location	Day	Evening	Night	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{A1(1\ minute)}$
All Privately owned Residences	35	35	35	45

Table 1: Impact assessment criteria dB(A)

Notes:

- *To determine compliance with the $LA_{eq(15\ minute)}$ limit, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Relations Policy.*
- *To determine compliance with the $LA1(1\ minute)$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits do not apply if the Proponent has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.*

NOISE MONITORING LOCATIONS

Noise measurement locations for the attended noise survey are listed below and shown in Figure 1:

Bow Hills
Westhaven
Naroo
Greylands
Kurrajong*
Newhaven**
Oakleigh
Belah Park***

* Measurements were taken near the boundary fence with R19 “Claremont”, which is approximately half way between the box cut and the “Kurrajong” residence. An indeterminate correction factor between 4 and 8 dB should be subtracted from these results to estimate the noise level at “Kurrajong”.

** The owner denied access to Newhaven so the monitoring was carried out at the southern boundary to the property. A correction factor of between 4 and 8 dB should be subtracted from these results to estimate the noise level at the boundary.

*** Belah Park is now owned by the owner of Merriman and monitoring was carried out at the residence at Merriman.
.

FIGURE 1. Noise monitoring locations.

NOISE MEASUREMENTS

Noise emission levels were measured with a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instrument was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Meteorological data used in this report was obtained from the mine operated weather station. Temperature inversion data (normalised to ^{0}C/100m) was extrapolated from the 2m and 10m high temperature gauges on the weather station. Positive gradients indicate inversion conditions and negative gradients indicate a temperature lapse.

RESULTS

The measured noise levels, over 1 second intervals, were analysed using Brüel & Kjær "*Evaluator*" software. The software enables the contributions of the mine and other significant noise sources to the overall to be quantified.

Noise levels were recorded for each of the Leq (15 min), Lmax, L1, L10, L90 and Lmin percentiles. As shown in Table 1, the noise criterion for the operational phase of the NCM project is **35 dB(A) $L_{eq\ (15\ min)}$** for all operating times.

The results shown in **Tables 1**, **2** and **3** below represent the total 15 minute Leq noise level for all noise sources and the relative contributions of each. This is the compliance criterion for the operation of the mine. Levels for the other percentiles are not shown as they have no compliance criteria for comparison but are available on request. The exception is the L1 (1 min) noise level (which is the standard measure of sleep disturbance) which is applicable to noise emissions at night (i.e. between 10 pm and 7 am).

Measured noise levels are shown in **Tables 1-3**. Where the noise from NCM was audible the Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level.

Noise from NCM is shown in bold type. Where noise from NCM is listed as inaudible, this means the maximum levels from the mine were at least 10 dB below the minimum level during the measurement and not measurable.

Table 1 NCM Noise Monitoring Results – 5 August 2012 (Day)				
Location	Time	dB(A), $L_{eq(15min)}$	Wind speed (m/s)/ direction°	Identified Noise Sources
Merriman	5:33 pm	49	2.0/238	Traffic (49), NCM inaudible
Bow Hills	5:02 pm	47	2.4/295	Train (44), traffic (43), NCM inaudible
Oakleigh	4:36 pm	35	2.4/264	Cattle (34), traffic (30), NCM inaudible
Naroo	4:10 pm	44	3.0/265	Traffic (44), NCM (33)
Claremont	4:34 pm	38	2.4/264	Sheep (38), NCM inaudible
Westhaven	4:57 pm	37	2.4/295	Birds (36), NCM (31)
Newhaven	5:21 pm	41	2.0/251	Birds (41), traffic (25), NCM inaudible
Greylands	5:42 pm	32	2.2/239	Birds (31), traffic (25), NCM inaudible

Table 2 NCM Noise Monitoring Results – 5 August 2012 (Evening)				
Location	Time	dB(A), $L_{eq(15min)}$	Wind speed (m/s)/ direction°	Identified Noise Sources
Merriman	9:00 pm	50	2.3/268	Traffic (50), NCM (27)
Bow Hills	8:33 pm	40	2.3/256	Traffic (38), frogs & insects (33), NCM (32)
Oakleigh	8:02 pm	35	2.9/239	Traffic (35), NCM (25)
Naroo	9:07 pm	47	2.1/279	Train (46), traffic (38), NCM (33)
Claremont	8:44 pm	31	2.0/263	Sheep (31), NCM (<20)
Westhaven	8:20 pm	36	2.5/251	NCM (35), insects (27)
Newhaven	7:57 pm	32	2.9/239	NCM (32)
Greylands	9:24 pm	31	2.0/282	NCM (31), traffic (25)

Table 3 NCM Noise Monitoring Results – 5 August 2012 (Night)					
Location	Time	dB(A), $L_{eq(15min)}$	Wind speed (m/s)/ direction°	Temp Grad (°C/100m)	Identified Noise Sources
Merriman	10:51 pm	41	2.1/306	>+5	Traffic (41), NCM (31)
Bow Hills	10:26 pm	46	1.5/320	>+5	Traffic (45), NCM (38), insects (30)
Oakleigh	10:01 pm	34	1.9/271	>+5	Traffic (33), NCM (28)
Naroo	11:11 pm	49	1.1/306	>+5	Traffic (49), NCM (35), insects (26)
Claremont	10:46 pm	29	2.1/310	>+5	Sheep (29), NCM (<20)
Westhaven	10:23 pm	35	1.3/319	>+5	NCM (35)
Newhaven	10:01 pm	26	1.9/271	>+5	NCM (26)
Greylands	11:15 pm	40	1.1/302	>+5	Traffic (40), NCM (28)

The results shown in **Tables 1 - 3** indicate that, under the operational and atmospheric conditions at the time, noise emission from NCM exceeded the criterion of 35 dB(A) Leq at the Bow Hills during the night time monitoring period.

NCM environmental licence conditions indicate that compliance with noise emission criteria is not applicable under “relevant atmospheric conditions”, which are defined below;

- wind speeds greater than 3 metres/second at 10 metres above ground level; or
- temperature inversions of 1.5 - 4°C/100 metres and a source to receiver wind speed greater than 2 metres/second at 10 metres above ground level; or
- temperature inversions of greater than 4°C/100 metres.

Data from the mine operated weather station indicated that the elevated noise level was measured whilst there was a strong temperature inversion in place (i.e. >+4° C/100m) and, therefore, under non-compliant atmospheric conditions.

The mine operated weather station has temperature gauges at heights of 2m and 10m above ground level. The data showed that the temperature gradient in the range from 2m to 10m was greater than >+4° C. This can be extrapolated further to approximate the gradient over 100m.

At the Westhaven and Newhaven monitoring locations the noise attributed to NCM was from gas drainage wells.

Data for the 15 minute Leq noise levels were analysed using the *“Evaluator”* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, emissions from NCM must not exceed 45 dB(A) L1 (1 min) between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine. The measured L1 (1 min) noise levels, from NCM, during the night time measurement circuit are shown below in **Table 4**.

The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents observations measurements made during the 60 minute long operational noise measurement are noted. Where maximum noise levels from mining activity approach 45 dB(A) L1 (1 min) then, where practical, further measurements are made at the sleep disturbance monitoring location.

Note that, as the internal layout of each residence is not known, the measurements are made at the worst case façade in relation to the mine noise. This is not necessarily at the façade of a bedroom window.

Table 4 L1 (1 min) – 5 August 2012 (Night)		
Location	Time	dB(A), $L_{(1\ 1min)}$
Merriman	10:51 pm	40
Bow Hills	10:26 pm	44
Oakleigh	10:01 pm	30
Naroo	11:11 pm	41
Claremont	10:46 pm	22
Westhaven	10:23 pm	44
Newhaven	10:01 pm	32
Greylands	11:15 pm	32

As shown in Table 4, during the night time measurement circuit the (1 min) noise from NCM did not exceed 45 dB(A) at any monitoring location.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:

Ross Hodge
Acoustical Consultant

Project No: 05168

ATTENDED NOISE MONITORING – SEPTEMBER 2012
Narrabri Coal Mine
Narrabri, NSW

Prepared for:

Whitehaven Coal Limited
10 Kurrajong Creek Road
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B.Sc., B. Math.(Hons), MAAS, MASA
Principal / Director

October 2012

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Attended noise monitoring has been carried out for the Narrabri Coal Mine (NCM) over a period of three days between 25th and 27th September, 2012 in accordance with requirements of Environment Protection Licence (EPL 12789) and other relevant Australian Standards and guidelines.

The mine was in full operation during the entire survey period.

No exceedance of the site-specific operational noise criterion was recorded.

No exceedance of the sleep disturbance criterion was recorded.

As there was no exceedance of the noise criteria no noise management actions were required.

Data from those times where NCM operations were audible were analysed using Bruel & Kjaer *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions of "modifying factor corrections" in the NSW Industrial Noise Policy.

The operation of NCM was therefore found to be in compliance with all noise-related requirements of EPL 12789 during the September 2012 attended noise monitoring survey.

1.0 INTRODUCTION

This letter report presents the results of attended noise compliance monitoring and measurements conducted for the Narrabri Coal Mine (NCM) between Tuesday 25th September and Thursday 27th September, 2012.

1.1 Noise Monitoring Locations

Section M3.6 of EPL 12789 (variation dated February 20, 2012) contains a table detailing a list of residences and corresponding EPA identification numbers (spellings are as per the EPL). The residences are listed below:

N1	Bow Hills
N3	Naroo
N4	Greylands
N5	Oakleigh
N6	Newhaven[1]
N7	Belah Park[2]
N8	Haylin View[3]
N9	Merrilong[3]

1. The owner denied access to Newhaven so the monitoring was carried out at the southern boundary to the property.
2. Belah Park is now owned by the owner of Merriman and monitoring was carried out at the residence at Merriman.
3. Monitoring at Haylin View and Merrilong is to commence when surface activities approach the eastern end of the southern longwall panels.

These monitoring locations are illustrated in **Figure 1**.

1.2 Monitoring Frequency and Duration

Section M 7.1 of EPL 12789 indicates that the attended noise monitoring must be conducted;

a) at each of the locations detailed above (except that identified as N4);
b) quarterly in a reporting period;
c) during each day, evening and night period for a minimum of:
    - 1.5 hours during the day;
    - 30 minutes during the evening; and
    - 1 hour during the night.
d) occur for three consecutive operating days.

At location N4 the monitoring is to be carried out for a 15 minute period over each of the day, evening and night time periods during one 24 hour period.

Figure 1
Noise Monitoring Locations

2.0 CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

At all of the residences, the noise criterion is **35 dB(A) Leq (15 min)** (operational noise criterion) for each of the day, evening and night time periods, with "day" defined as 7am to 10pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays, "evening" being 6pm to 10pm and "night" being all other times.

In addition to the above the noise level at night must not exceed **45 dB(A) L1 (1 min)** (sleep disturbance criterion) at any residence.

2.2 Monitoring Location Definition

EPL 12789 states that to determine compliance with the Leq (15 min) operational noise criteria the noise measurement equipment must be located:

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

2.3 Applicable Meteorological Conditions

EPL 12798 states that the noise limits apply under all meteorological conditions except for the following;

1. Wind speeds greater than 3m/s at 10m above ground level; or
2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
3. Stability category G temperature inversion conditions.

The Project Approval for the mine PA 08_0144 provides further definition and states that these noise limits apply to applicable receivers under all meteorological conditions except for any one of the following;

- wind speeds greater than 3 metres/second at 10 metres above ground level; or
- temperature inversions of 1.5 - 4°C/100 metres and a source to receiver wind speed greater than 2 metres/second at 10 metres above ground level; or
- temperature inversions of greater than 4°C/100 metres.

2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW industrial Noise policy must be applied, as appropriate, to the measured noise levels.

To determine compliance with the L1 (1 min) sleep disturbance noise criterion the noise measurement equipment must be located within 1m of a dwelling façade.

The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom

window. To avoid undue disturbance to residents, observations and measurements made during the 60 minute long operational noise measurement are noted.

For consideration of the worst case, the L1 (1 min) noise level made at the operational noise measurement location is considered to be representative of the level at the bedroom façade of each residence (with the exception of the Newhaven location which is significantly removed from the residence).

3.0 NOISE MONITORING PROCEDURE

3.1 Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (90 minutes/day, 30 minutes/evening and 60 minutes/night) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The operational noise criteria for compliance with Section L 3.1 of EPL 12789 are based on a 15 minute Leq noise level. The procedures detailed in Section M. 7.1 of EPL 12789 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Section L 3.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from NCM was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall. Mine noise from NCM is shown in the tables in bold type.

When no mine noise was audible at a monitoring location, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

3.3 Meteorological Data

Meteorological data used in this report were supplied from the mine operated weather station.

3.3.1 Inversion Monitoring

Gemini Tiny Tag temperature loggers were attached to star pickets at a height of approximately 2m above ground level at locations marked T1 and T2 in Figure 1 to coincide with the attended noise surveys. Location T1 is at 246m AHD and Location T2 is at 296m AHD to give the required 50m vertical separation for

calculation of temperature gradients in accordance with the INP. Temperature gradients (normalised to ^{0}C/100m) during noise monitoring events are included in the following tables of results. Positive gradients indicate inversion conditions and negative gradients indicate a temperature lapse.

3.4 Special Conditions

Before the noise surveys, Spectrum Acoustics personnel were briefed on the current location(s) of activities.

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

Measured noise levels for each monitoring location and each period are summarised in **Tables 1 - 9**.

Table 1
NCM Operational Noise Monitoring Results – 25 September 2012 (day)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	4:04 pm	41	2.8/152	n/a	Traffic (41), birds & insects (25), **NCM inaudible**
N3 Naroo	11:47 am	40	1.7/163	n/a	Traffic (38), birds & insects (34), **NCM (29)**
N5 Oakleigh	12:38 pm	39	2.3/132	n/a	Birds & insects (37), traffic (36), **NCM inaudible**
N6 Newhaven	12:40 pm	33	2.3/132	n/a	Insects (32), **NCM (24)***
N7 Merriman	2:27 pm	46	1.7/162	n/a	Birds & insects (46), traffic (30), **NCM inaudible**
N4 Greylands	2:02 pm	44	1.8/161	n/a	Birds & insects (42), traffic (39), **NCM inaudible**

*Noise from gas drainage wells

Table 2
NCM Operational Noise Monitoring Results – 25 September 2012 (evening)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	8:07 pm	43	3.0/158	+4.9	Traffic (43), frogs (30), **NCM (23)**
N3 Naroo	8:46 pm	48	2.0/142	+2.9	Traffic (48), insects (34), **NCM inaudible**
N5 Oakleigh	7:25 pm	36	3.1/162	+4.8	Traffic (36), insects (22), **NCM inaudible**
N6 Newhaven	9:29 pm	30	2.6/144	+3.4	**NCM (28)***, traffic (23)
N7 Merriman	8:51 pm	36	2.0/142	+4.4	Traffic (35), **NCM (29)**, frogs (25)

*Noise from gas drainage wells (25), mine noise (25)

Table 3 NCM Operational Noise Monitoring Results – 25 September 2012 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temp Grad (°C/100m)**	**Identified Noise Sources**
N1 Bow Hills	11:20 pm	34	3.8/154	+4.0	**NCM (31)**, insects & frogs (31)
N3 Naroo	10:07 pm	44	3.7/148	+4.0	Traffic (44), **NCM inaudible**
N5 Oakleigh	10:14 pm	32	3.7/148	+3.6	Traffic (32), **NCM inaudible**
N6 Newhaven	12:20 am	33	4.6/158	+4.5	Traffic (31), **NCM (28)***
N7 Merriman	11:12 pm	31	3.8/154	+4.0	**NCM (31)**

*Noise from gas drainage wells (25), mine noise (25)

Table 4 NCM Operational Noise Monitoring Results – 26 September 2012 (day)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temp Grad (°C/100m)**	**Identified Noise Sources**
N1 Bow Hills	1:17 pm	34	2.2/252	n/a	Traffic (34), birds (20), **NCM inaudible**
N3 Naroo	12:02 pm	42	3.3/310	n/a	Birds & insects (40), wind (38), **NCM (28)**
N5 Oakleigh	11:13 am	36	4.0/309	n/a	Insects (36), traffic (22), **NCM inaudible**
N6 Newhaven	3:19 pm	36	1.6/268	n/a	Birds & insects (35), **NCM (27)***
N7 Merriman	1:37 pm	42	2.2/253	n/a	Traffic (41), birds & insects (35), **NCM inaudible**

*Noise from gas drainage wells

Table 5 NCM Operational Noise Monitoring Results – 26 September 2012 (evening)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temp Grad (°C/100m)**	**Identified Noise Sources**
N1 Bow Hills	8:10 pm	44	1.2/106	+1.6	Traffic (44), frogs (35), **NCM inaudible**
N3 Naroo	8:11 pm	48	1.2/106	+1.6	Insects (46), traffic (44), **NCM (25)**
N5 Oakleigh	8:34 pm	36	1.0/131	+1.2	**NCM (33)**, traffic (33)
N6 Newhaven	6:38 pm	30	1.0/197	+0.9	**NCM (29)***, insects (23)
N7 Merriman	7:35 pm	48	1.2/173	+0.4	Traffic (48), insects & frogs (31), **NCM (30)**
N4 Greylands	7:12 pm	42	1.1/171	+0.6	Insects (41), **NCM (33)**, traffic (32)

*Noise from gas drainage wells

Table 6 NCM Operational Noise Monitoring Results – 26 September 2012 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temp Grad (°C/100m)**	**Identified Noise Sources**
N1 Bow Hills	10:01 pm	48	0.6/1331	+3.6	Traffic (47), frogs & insects (38), **NCM (34)**
N3 Naroo	12:43 am	50	1.2/261	+4.5	Frogs (50), **NCM (26)**
N5 Oakleigh	11:10 pm	33	0.7/163	+3.7	Traffic (31), **NCM (29)**
N6 Newhaven	10:02 pm	32	0.6/131	+3.6	**NCM (31)**, traffic (25)
N7 Merriman	11:38 pm	35	1.0/173	+3.0	Dog (32), traffic (31), **NCM (28)**
N4 Greylands	10:58 pm	31	0.7/163	+3.7	**NCM (29)**, traffic (25)

Table 7 NCM Operational Noise Monitoring Results – 27 September 2012 (day)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temp Grad (°C/100m)**	**Identified Noise Sources**
N1 Bow Hills	12:36 pm	39	4.6/311	n/a	Traffic (38), insects (31), wind (30), **NCM inaudible**
N3 Naroo	10:36 am	45	5.5/315	n/a	Traffic (42), insects (40), wind (40), **NCM (24)**
N5 Oakleigh	3:10 pm	37	4.2/304	n/a	**NCM (33)**, traffic (33), birds & insects (30)
N6 Newhaven	12:15 pm	37	4.7/309	n/a	Wind (37), **NCM inaudible**
N7 Merriman	10:41 am	44	5.5/315	n/a	Birds & insects (41), traffic (41), **NCM inaudible**

Table 8 NCM Operational Noise Monitoring Results – 27 September 2012 (evening)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temp Grad (°C/100m)**	**Identified Noise Sources**
N1 Bow Hills	9:30 pm	47	0.8/292	+3.0	Traffic (47), frogs & insects (37), **NCM inaudible**
N3 Naroo	9:25 pm	47	0.8/292	+3.0	Traffic (47), insects (30), **NCM (29)**
N5 Oakleigh	7:27 pm	42	2.1/309	+0.7	Traffic (40), insects (38), **NCM (28)**
N6 Newhaven	8:46 pm	28	0.1/202	+0.3	Traffic (27), insects (21), **NCM inaudible**
N7 Merriman	8:14 pm	37	0.8/5	+1.7	Birds & insects (36), traffic (33), **NCM inaudible**

*Noise from gas drainage wells

Table 9 NCM Operational Noise Monitoring Results – 27 September 2012 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction**	**Temp Grad (°C/100m)**	**Identified Noise Sources**
N1 Bow Hills	10:04 pm	48	0.5/328	+3.7	Traffic (48), birds & frogs (35), **NCM inaudible**
N3 Naroo	12:14 am	44	1.8/289	+3.6	Traffic (44), **NCM (33)**, insects (30)
N5 Oakleigh	11:02 pm	40	0.5/30	+3.7	Traffic (39), **NCM (33)**
N6 Newhaven	10:01 pm	28	0.5/238	+3.7	**NCM (25)**, traffic (24), insects (20)
N7 Merriman	11:05 am	47	0.5/30	+3.5	Traffic (46), frogs & insects (30), **NCM inaudible**

*Noise from gas drainage wells

4.2 Discussion of Results

The results in Tables 1 to 9 show that, under the operating and meteorological conditions at the times, for the worst case 15 minute compliance measurement periods, the mine noise was at variable levels but did not exceed the operational noise criterion at any monitoring location at any time.

4.2.1 Audible Noise Sources

At the Bow Hills, Merriman and Naroo monitoring locations mine related noise was measureable during several of the monitoring periods. This noise was audible as a general hum with occasional noise from mobile plant and reverse beepers. Dozer tracks were audible at times.

At the Newhaven monitoring location the noise was from the gas drainage wells in the vicinity and from the stackers/reclaimers. The monitoring location is near the boundary of the property and not at the residence. Noise levels at the residence would be significantly lower than those shown in the tables.

At Oakleigh the mine noise was generally audible as low level mine hum with no discernible individual sources.

4.2.2 Modifying Factor Corrections

Data from those times where NCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions of "modifying factor corrections" in the NSW Industrial Noise Policy.

4.2.3 Sleep Disturbance

Measured L1 (1 min) noise levels for each night time monitoring period are summarised in **Tables 10- 12**. The results in these tables show that, under the operating and meteorological conditions at the times, the maximum L1 (1 min) noise emission from NCM did not exceed the sleep disturbance criterion. L1 (1 min) noise levels above 40 dB(A) were measured at four of the monitoring periods.

Table 10
NCM Sleep Disturbance Monitoring Results – 25 September 2012 (night)

Location	Time	dB(A),L1 (1 min)	Wind speed/ direction	Temp Grad(°C/100m)
N1 Bow Hills	10:01 pm	37	3.8/154	+4.0
N3 Naroo	11:05 pm	n/a	3.7/148	+4.0
N5 Oakleigh	12:11 am	n/a	3.7/148	+3.6
N6 Newhaven	12:20 am	29	4.6/158	+4.5
N7 Merriman	11:25 pm	39	3.8/154	+4.0

Table 11
NCM Sleep Disturbance Monitoring Results – 26 September 2012 (night)

Location	Time	dB(A),L1 (1 min)	Wind speed/ direction	Temp Grad(°C/100m)
N1 Bow Hills	10:02 pm	41	0.6/133	+3.6
N3 Naroo	12:12 am	40	1.2/261	+4.5
N5 Oakleigh	11:10 pm	36	0.7/163	+3.7
N6 Newhaven	10:01 pm	35	0.6/131	+3.6
N7 Merriman	11:06 pm	35	1.0/173	+3.0
N4 Greylands	11:05 pm	36	0.7/163	+3.7

Table 12 NCM Sleep Disturbance Monitoring Results – 27 September 2012 (night)				
Location	**Time**	**dB(A),L1 (1 min)**	**Wind speed/ direction**	**Temp Grad(°C/100m)**
N1 Bow Hills	11:10 pm	n/a	0.5/328	+3.7
N3 Naroo	11:07 pm	41	1.8/289	+3.6
N5 Oakleigh	10:01 pm	41	0.5/30	+3.7
N6 Newhaven	10:01 pm	30	0.5/238	+3.7
N7 Merriman	12:18 am	n/a	0.5/30	+3.5

4.2.4 Noise Management

Section R 4.1 (b) of EPL 12789 states that the noise monitoring report should include "*an outline of any management actions taken within the monitoring period to address any exceedances of the limits detailed in the limit conditions of this licence.*"

As there were no exceedances of any noise criteria no noise management actions were necessary. The only measured noise levels that exceeded the applicable noise criterion occurred during a period of non–compliant atmospheric conditions.

APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS

Table A1
Definition of acoustical terms

Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

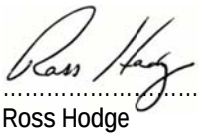
Project No: 05168

ATTENDED NOISE MONITORING – DECEMBER 2012
Narrabri Coal Mine
Narrabri, NSW

Prepared for:

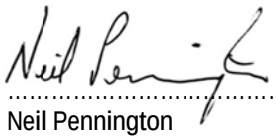
Whitehaven Coal Limited
10 Kurrajong Creek Road
Baan Baa NSW 2390

Author:



Ross Hodge
B.Sc.(Hons)
Principal / Director

Review:



Neil Pennington
B.Sc., B. Math.(Hons), MAAS, MASA
Principal / Director

January 2013

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EXECUTIVE SUMMARY

Attended noise monitoring has been carried out for the Narrabri Coal Mine (NCM) over a period of three days between 18th and 20th December, 2012 in accordance with requirements of Environment Protection Licence (EPL 12789) and other relevant Australian Standards and guidelines.

The mine was in full operation during the entire survey period.

No exceedance of the site-specific operational noise criterion was recorded.

No exceedance of the sleep disturbance criterion was recorded.

Data from those times where NCM operations were audible were analysed using Bruel & Kjaer *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions of "modifying factor corrections" in the NSW Industrial Noise Policy.

The operation of NCM was therefore found to be in compliance with all noise-related requirements of EPL 12789 during the December 2012 attended noise monitoring survey.

1.0 INTRODUCTION

This letter report presents the results of attended noise compliance monitoring and measurements conducted for the Narrabri Coal Mine (NCM) between Tuesday 18th and Thursday 20th December, 2012.

1.1 Noise Monitoring Locations

Section M3.6 of EPL 12789 (variation dated February 20, 2012) contains a table detailing a list of residences and corresponding EPA identification numbers (spellings are as per the EPL). The residences are listed below:

N1	Bow Hills
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N4	Greylands
N5	Oakleigh
N6	Newhaven[1]
N7	Belah Park[2]
N8	Haylin View[3]
N9	Merrilong[3]

1. The owner denied access to Newhaven so the monitoring was carried out at the southern boundary to the property.
2. Belah Park is now owned by the owner of Merriman and monitoring was carried out at the residence at Merriman.
3. Monitoring at Haylin View and Merrilong is to commence when surface activities approach the eastern end of the southern longwall panels.

These monitoring locations are illustrated in **Figure 1**.

1.2 Monitoring Frequency and Duration

Section M 7.1 of EPL 12789 indicates that the attended noise monitoring must be conducted;

a) at each of the locations detailed above (except that identified as N4);
b) quarterly in a reporting period;
c) during each day, evening and night period for a minimum of:
    - 1.5 hours during the day;
    - 30 minutes during the evening; and
    - 1 hour during the night.
d) occur for three consecutive operating days.

At location N4 (Greylands) the monitoring is to be carried out for a 15 minute period over each of the day, evening and night time periods during one 24 hour period.

Figure 1
Noise Monitoring Locations

2.0 CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

At all of the residences, the noise criterion is **35 dB(A) Leq (15 min)** (operational noise criterion) for each of the day, evening and night time periods, with "day" defined as 7am to 10pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays, "evening" being 6pm to 10pm and "night" being all other times.

In addition to the above the noise level at night must not exceed **45 dB(A) L1 (1 min)** (sleep disturbance criterion) at any residence.

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EPL 12789 states that to determine compliance with the Leq (15 min) operational noise criteria the noise measurement equipment must be located:

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- Within 50m of the boundary of a National Park or Nature Reserve.

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EPL 12798 states that the noise limits apply under all meteorological conditions except for the following;

1. Wind speeds greater than 3m/s at 10m above ground level; or
2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
3. Stability category G temperature inversion conditions.

The Project Approval for the mine PA 08_0144 provides further definition and states that these noise limits apply to applicable receivers under all meteorological conditions except for any one of the following;

- wind speeds greater than 3 metres/second at 10 metres above ground level; or
- temperature inversions of 1.5 - 4°C/100 metres and a source to receiver wind speed greater than 2 metres/second at 10 metres above ground level; or
- temperature inversions of greater than 4°C/100 metres.

2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW industrial Noise policy must be applied, as appropriate, to the measured noise levels.

To determine compliance with the L1 (1 min) sleep disturbance noise criterion the noise measurement equipment must be located within 1m of a dwelling façade.

The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom

window. To avoid undue disturbance to residents, observations and measurements made during the 60 minute long operational noise measurement are noted.

For consideration of the worst case, the L1 (1 min) noise level made at the operational noise measurement location is considered to be representative of the level at the bedroom façade of each residence (with the exception of the Newhaven location which is significantly removed from the residence).

3.0 NOISE MONITORING PROCEDURE

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Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (90 minutes/day, 30 minutes/evening and 60 minutes/night) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The operational noise criteria for compliance with Section L 3.1 of EPL 12789 are based on a 15 minute Leq noise level. The procedures detailed in Section M. 7.1 of EPL 12789 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Section L 3.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from NCM was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall. Mine noise from NCM is shown in the tables in bold type.

When no mine noise was audible at a monitoring location, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

3.3 Meteorological Data

The NCM operated weather station was not operating throughout the monitoring period. Meteorological data used in this report were sourced from the MINE operated unattended noise monitor and weather station at the "Matilda" property south of the mine. The wind speed and direction monitor is at approximately 2m above ground level.

3.3.1 Inversion Monitoring

Gemini Tiny Tag temperature loggers were attached to star pickets at a height of approximately 2m above ground level at locations marked T1 and T2 in Figure 1 to coincide with the attended noise surveys. Location T1 is at 246m AHD and Location T2 is at 296m AHD to give the required 50m vertical separation for calculation of temperature gradients in accordance with the INP. Temperature gradients (normalised to ^{0}C/100m) during noise monitoring events are included in the following tables of results. Positive gradients indicate inversion conditions and negative gradients indicate a temperature lapse.

3.4 Special Conditions

Before the noise surveys, Spectrum Acoustics personnel were briefed on the current location(s) of activities.

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

Measured noise levels for each monitoring location and each period are summarised in **Tables 1 - 9**.

Table 1
NCM Operational Noise Monitoring Results – 18 December 2012 (day)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (^{o}C/100m)	Identified Noise Sources
N1 Bow Hills	11:52 am	45	1.7/NW	n/a	Traffic (44), birds & insects (38), NCM (22)
N3 Naroo	11:52 pm	41	1.7/NW	n/a	Traffic (40), birds & insects (33), NCM inaudible
N5 Oakleigh	9:44 am	43	1.3/S	n/a	Birds & insects (43), traffic (25), NCM barely audible
N6 Newhaven	3:28 pm	43	1.6/W	n/a	Birds & insects (42), NCM (32)*
N7 Merriman	1:57 pm	39	2.2/WSW	n/a	Traffic (37), birds & insects (35), NCM inaudible

*Noise from gas drainage wells

Table 2
NCM Operational Noise Monitoring Results – 18 December 2012 (evening)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (^{o}C/100m)	Identified Noise Sources
N1 Bow Hills	8:59 pm	46	0.4/WSW	Lapse	Traffic (46), NCM (33), insects (30)
N3 Naroo	9:12 pm	36	0.4/WSW	Lapse	Traffic (33), NCM (32), birds & insects (25)
N5 Oakleigh	8:18 pm	27	0.2/WSW	Lapse	Insects (26), traffic (20), NCM (15)
N6 Newhaven	8:38 pm	33	0.2/WSW	Lapse	Insects (29), NCM (29)*, sheep (25)
N7 Merriman	9:30 pm	45	0.2/WSW	+0.8	Traffic (43), insects (40), NCM (28)

*Noise from gas drainage wells (25), mine noise (25)

Table 3 NCM Operational Noise Monitoring Results – 18 December 2012 (night)					
Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	12:05 am	39	0.8/WSW	+2.1	Traffic (38), NCM (28), insects (28)
N3 Naroo	11:08 pm	43	Calm	+0.8	Traffic (43), NCM (27), birds & insects (25)
N5 Oakleigh	10:01 pm	31	0.3/WSW	+0.6	Traffic (29), insects (27), NCM inaudible
N6 Newhaven	10:01 pm	34	0.3/WSW	+0.6	NCM (33)*, insects (25)
N7 Merriman	11:05 pm	36	Calm	+0.8	Insects (34), NCM (32)

*Noise from gas drainage wells (29), mine noise (31)

Table 4 NCM Operational Noise Monitoring Results – 19 December 2012 (day)					
Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	7:55 am	39	3.3/NE	n/a	Birds & insects (37), traffic (32), NCM barely audible
N3 Naroo	9:37 am	47	4.3/NNE	n/a	Traffic (45), wind (40), birds & insects (38), NCM inaudible
N5 Oakleigh	11:10 am	45	3.6/ENE	n/a	Wind (45), traffic (35), NCM inaudible
N6 Newhaven	8:06 am	31	3.3/NE	n/a	Birds & insects (29), traffic (26), NCM inaudible
N7 Merriman	9:35 am	46	4.3/NNE	n/a	Birds & insects (44), traffic (41), NCM inaudible
N4 Greylands	11:11 am	40	3.6/ENE	n/a	Wind (37), traffic (36), birds & insects (30), NCM inaudible

Table 5 NCM Operational Noise Monitoring Results – 19 December 2012 (evening)					
Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	8:33 pm	39	Calm	Lapse	Traffic (37), NCM (32), insects (30)
N3 Naroo	8:38 pm	43	Calm	Lapse	Traffic (43), birds & insects (33), NCM (20)
N5 Oakleigh	9:15 pm	40	0.4/NNW	+0.2	Insects (39), traffic (32), NCM (28)
N6 Newhaven	8:01 pm	42	Calm	Lapse	Birds & insects (42), NCM (20)*
N7 Merriman	7:55 pm	47	Calm	Lapse	Birds & insects (47), traffic (36), NCM inaudible
N4 Greylands	9:08 pm	34	0.4/NNW	+0.2	Birds & insects (33), NCM (26)

*Noise from gas drainage wells

Table 6
NCM Operational Noise Monitoring Results – 19 December 2012 (night)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	6:00 am*	45	4.1/n	Lapse	Birds & insects (42), traffic (40), wind (37), NCM inaudible
N3 Naroo	5:30 am*	46	3.9/N	Lapse	Traffic (44), birds (42), NCM inaudible
N5 Oakleigh	4:56 am*	39	4.2/N	Lapse	Traffic (37), NCM (31), birds & insects (30)
N6 Newhaven	10:01 pm	33	3.6/NNW	Lapse	Insects (30), NCM (27)**, traffic (25)
N7 Merriman	10:01 pm	42	3.6/NNW	Lapse	Frogs & insects (41), traffic (35), NCM inaudible
N4 Greylands	5:03 am*	41	4.2/N	Lapse	Birds & insects (40), traffic (33), wind (33), NCM inaudible

*morning of 20 December

**Noise from gas drainage wells

Table 7
NCM Operational Noise Monitoring Results – 20 December 2012 (day)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	8:45 am	43	4.8/N	n/a	Traffic (41), insects (38), NCM occasionally audible
N3 Naroo	2:02 pm	50	2.4/NE	n/a	Wind (50)*, NCM inaudible
N5 Oakleigh	7:10 am	46	3.9/N	n/a	Birds & insects (45), traffic (38), NCM occasionally audible
N6 Newhaven	8:06 am	35	4.3/N	n/a	Birds & insects (35), traffic (26), NCM inaudible
N7 Merriman	10:35 am	48	5.1/N	n/a	Traffic (46), wind (40), birds (38), NCM inaudible

*Survey abandoned at 2.35pm due to storms

Table 8
NCM Operational Noise Monitoring Results – 20 December 2012 (evening)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	8:35 pm	45	1.5/N	Lapse	Traffic (43), birds & insects (37), NCM (29)
N3 Naroo	9:12 pm	44	2.7/N	+0.2	Traffic (43), insects (37), NCM (35)
N5 Oakleigh	9:15 pm	40	2.7/N	+0.2	Insects (38), traffic (33), NCM (32)
N6 Newhaven	8:39 pm	35	1.5/N	Lapse	Birds & insects (35), traffic (20), NCM inaudible
N7 Merriman	8:02 pm	40	0.6/NNW	Lapse	Birds & insects (38), traffic (34), cattle (30), NCM inaudible

Table 9 NCM Operational Noise Monitoring Results – 20 December 2012 (night)					
Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	11:05 pm	50	3.3/N	+0.9	Insects (50), NCM (25)
N3 Naroo	11:09 pm	38	3.8/N	+0.9	NCM (36), insects (33)
N5 Oakleigh	12:10 am	36	5.2/N	Lapse	NCM (35) insects (27), traffic (25)
N6 Newhaven	10:01 pm	35	2.3/N	+0.2	Insects (35), traffic (25), NCM inaudible
N7 Merriman	10:01 pm	45	2.3/N	+0.2	Insects (45), traffic (35), NCM inaudible

4.2 Discussion of Results

The results in Tables 1 to 9 show that, under the operating and meteorological conditions at the times, for the worst case 15 minute compliance measurement periods, the mine noise was at variable levels and was higher than the operational noise criterion at the Naroo monitoring location during the night (early morning) of 20 December.

NCM environmental licence conditions indicate that compliance with noise emission criteria is not applicable under atmospheric conditions where winds speeds are greater than 3 metres/second at 10 metres above ground level. Data from the weather station indicated that the elevated noise level at Naroo was measured whilst winds were in excess of 3 m/s and, therefore, under non-compliant atmospheric conditions.

4.2.1 Audible Noise Sources

Mine related noise was measureable on occasion at all of the monitoring locations. The noise was audible as a general hum with occasional noise from mobile plant and reverse beepers. Dozer tracks were audible at times.

At the time of the noise monitoring the railway line was closed due to a train derailment. As a result of this trains could not be loaded at NCM and the coal stockpile was relatively high. Dozers working on the stockpile were sometimes, therefore, at exposed locations in relation to some receivers and the noise from the dozer activity was audible at several monitoring locations.

At the Newhaven monitoring location the majority of mine related noise was from the gas drainage wells in the vicinity and from the stackers/reclaimers. The monitoring location is near the boundary of the property and not at the residence. Noise levels at the residence would be significantly lower than those shown in the tables.

At Oakleigh the mine noise was generally audible as low level mine hum with no discernible individual sources.

4.2.2 Modifying Factor Corrections

Data from those times where NCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions of "modifying factor corrections" in the NSW Industrial Noise Policy.

4.2.3 Sleep Disturbance

Measured L1 (1 min) noise levels for each night time monitoring period are summarised in **Tables 10 - 12**. The results in these tables show that, under the operating and meteorological conditions at the times, the maximum L1 (1 min) noise emission from NCM was higher than the sleep disturbance criterion at the Oakleigh monitoring location during the night of 20 December. The measurement was made under non-compliant atmospheric conditions (i.e. wind speed > 3 m/s). The noise was related to emissions from dozers. L1 (1 min) noise levels above 40 dB(A) were measured at one other the monitoring location.

Table 10
NCM Sleep Disturbance Monitoring Results – 18 December 2012 (night)

Location	Time	dB(A),L1 (1 min)	Wind speed / direction	Temp Grad(°C/100m)
N1 Bow Hills	12:05 am	38	0.8/WSW	+2.1
N3 Naroo	11:08 pm	35	Calm	+0.8
N5 Oakleigh	10:01 pm	n/a	0.3/WSW	+0.6
N6 Newhaven	10:01 pm	38	0.3/WSW	+0.6
N7 Merriman	11:05 pm	39	Calm	+0.8

Table 11
NCM Sleep Disturbance Monitoring Results – 19 December 2012 (night)

Location	Time	dB(A),L1 (1 min)	Wind speed / direction	Temp Grad(°C/100m)
N1 Bow Hills	6:00 am*	n/a	4.1/n	Lapse
N3 Naroo	5:30 am*	n/a	3.9/N	Lapse
N5 Oakleigh	4:56 am*	38	4.2/N	Lapse
N6 Newhaven	10:01 pm	30	3.6/NNW	Lapse
N7 Merriman	10:01 pm	n/a	3.6/NNW	Lapse
N4 Greylands	5:03 am*	n/a	4.2/N	Lapse

*morning of 20 December

Table 12
NCM Sleep Disturbance Monitoring Results – 20 December 2012 (night)

Location	Time	dB(A),L1 (1 min)	Wind speed / direction	Temp Grad(°C/100m)
N1 Bow Hills	11:05 pm	35	3.3/N	+0.9
N3 Naroo	11:06 pm	43	3.8/N	+0.9
N5 Oakleigh	12:10 am	48	5.2/N	Lapse
N6 Newhaven	10:01 pm	n/a	2.3/N	+0.2
N7 Merriman	10:01 pm	n/a	2.3/N	+0.2

4.2.4 Noise Management

Section R 4.1 (b) of EPL 12789 states that the noise monitoring report should include "*an outline of any management actions taken within the monitoring period to address any exceedances of the limits detailed in the limit conditions of this licence.*"

As there were no exceedances of any noise criteria no noise management actions were necessary. The only measured noise levels that exceeded the applicable noise criterion occurred during a period of non–compliant atmospheric conditions.

APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS

Table A1

Definition of acoustical terms

Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

Project No: 05168

ATTENDED NOISE MONITORING – MARCH 2013
Narrabri Coal Mine
Narrabri, NSW

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March 2013

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EXECUTIVE SUMMARY

Attended noise monitoring has been carried out for the Narrabri Coal Mine (NCM) over a period of three days between 8th and 10th March, 2013 in accordance with requirements of Environment Protection Licence (EPL 12789) and other relevant Australian Standards and guidelines.

The mine was in full operation during the entire survey period.

No exceedance of the site-specific operational noise criterion was recorded.

No exceedance of the sleep disturbance criterion was recorded.

Data from those times where NCM operations were audible were analysed using Bruel & Kjaer *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions of "modifying factor corrections" in the NSW Industrial Noise Policy.

The operation of NCM was therefore found to be in compliance with all noise-related requirements of EPL 12789 during the March 2013 attended noise monitoring survey.

1.0 INTRODUCTION

This letter report presents the results of attended noise compliance monitoring and measurements conducted for the Narrabri Coal Mine (NCM) between Friday 8th and Sunday 10th March, 2013.

1.1 Noise Monitoring Locations

Section M3.6 of EPL 12789 (variation dated February 20, 2012) contains a table detailing a list of residences and corresponding EPA identification numbers (spellings are as per the EPL). The residences are listed below:

N1	Bow Hills
N3	Naroo
N4	Greylands
N5	Oakleigh
N6	Newhaven[1]
N7	Belah Park[2]
N8	Haylin View[3]
N9	Merrilong[3]

1. The owner denied access to Newhaven so the monitoring was carried out at the southern boundary to the property.
2. Belah Park is now owned by the owner of Merriman and monitoring was carried out at the residence at Merriman.
3. Monitoring at Haylin View and Merrilong is to commence when surface activities approach the eastern end of the southern longwall panels.

These monitoring locations are illustrated in **Figure 1**.

1.2 Monitoring Frequency and Duration

Section M 7.1 of EPL 12789 indicates that the attended noise monitoring must be conducted;

a) at each of the locations detailed above (except that identified as N4);
b) quarterly in a reporting period;
c) during each day, evening and night period for a minimum of:
    - 1.5 hours during the day;
    - 30 minutes during the evening; and
    - 1 hour during the night.
d) occur for three consecutive operating days.

At location N4 (Greylands) the monitoring is to be carried out for a 15 minute period over each of the day, evening and night time periods during one 24 hour period.

Figure 1
Noise Monitoring Locations

2.0 CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

At all of the residences, the noise criterion is **35 dB(A) Leq (15 min)** (operational noise criterion) for each of the day, evening and night time periods, with "day" defined as 7am to 10pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays, "evening" being 6pm to 10pm and "night" being all other times.

In addition to the above the noise level at night must not exceed **45 dB(A) L1 (1 min)** (sleep disturbance criterion) at any residence.

2.2 Monitoring Location Definition

EPL 12789 states that to determine compliance with the Leq (15 min) operational noise criteria the noise measurement equipment must be located:

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

2.3 Applicable Meteorological Conditions

EPL 12798 states that the noise limits apply under all meteorological conditions except for the following;

1. Wind speeds greater than 3m/s at 10m above ground level; or
2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
3. Stability category G temperature inversion conditions.

The Project Approval for the mine PA 08_0144 provides further definition and states that these noise limits apply to applicable receivers under all meteorological conditions except for any one of the following;

- wind speeds greater than 3 metres/second at 10 metres above ground level; or
- temperature inversions of 1.5 - 4°C/100 metres and a source to receiver wind speed greater than 2 metres/second at 10 metres above ground level; or
- temperature inversions of greater than 4°C/100 metres.

2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW industrial Noise policy must be applied, as appropriate, to the measured noise levels.

To determine compliance with the L1 (1 min) sleep disturbance noise criterion the noise measurement equipment must be located within 1m of a dwelling façade.

The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom

window. To avoid undue disturbance to residents, observations and measurements made during the 60 minute long operational noise measurement are noted.

For consideration of the worst case, the L1 (1 min) noise level made at the operational noise measurement location is considered to be representative of the level at the bedroom façade of each residence (with the exception of the Newhaven location which is significantly removed from the residence).

3.0 NOISE MONITORING PROCEDURE

3.1 Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (90 minutes/day, 30 minutes/evening and 60 minutes/night) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The operational noise criteria for compliance with Section L 3.1 of EPL 12789 are based on a 15 minute Leq noise level. The procedures detailed in Section M. 7.1 of EPL 12789 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Section L 3.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from NCM was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall level. Mine noise from NCM is shown in the tables in bold type.

When no mine noise was audible at a monitoring location, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

3.3 Meteorological Data

The NCM operated weather station was not operating throughout the monitoring period. Meteorological data used in this report were sourced from the MINE operated unattended noise monitor and weather station at the "Matilda" property south of the mine. The wind speed and direction monitor is at approximately 2m above ground level.

3.3.1 Inversion Monitoring

Gemini Tiny Tag temperature loggers were attached to star pickets at a height of approximately 2m above ground level at locations marked T1 and T2 in Figure 1 to coincide with the attended noise surveys. Location T1 is at 246m AHD and Location T2 is at 296m AHD to give the required 50m vertical separation for calculation of temperature gradients in accordance with the INP. Temperature gradients (normalised to ^{0}C/100m) during noise monitoring events are included in the following tables of results. Positive gradients indicate inversion conditions and negative gradients indicate a temperature lapse.

3.4 Special Conditions

Before the noise surveys, Spectrum Acoustics personnel were briefed on the current location(s) of activities.

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

Measured noise levels for each monitoring location and each period are summarised in **Tables 1 - 9**.

Table 1
NCM Operational Noise Monitoring Results – 8 March 2013 (day)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	2:42 pm	39	1.8 / S	n/a	Traffic (38), birds & insects (31), NCM inaudible
N3 Naroo	1:45 pm	39	1.8 / S	n/a	Birds & insects (36), traffic (36), NCM inaudible
N5 Oakleigh	4:22 pm	30	2.7 / S	n/a	Traffic (29), birds & insects (23), NCM inaudible
N6 Newhaven	3:37 pm	38	1.8 / S	n/a	Birds & insects (33), traffic (33), NCM (32)*
N7 Belah Park	1:02 pm	36	1.8 / S	n/a	Birds & insects (34), traffic (32), NCM inaudible
N4 Greylands	5:21 pm	42	2.2 / S	n/a	Birds & insects (40), traffic (36), NCM inaudible

*Noise from gas drainage wells

Table 2
NCM Operational Noise Monitoring Results – 8 March 2013 (evening)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	8:48 pm	42	Calm	Lapse	Traffic (41), insects (35), NCM inaudible
N3 Naroo	8:39 pm	40	Calm	Lapse	Traffic (40), insects (27), NCM inaudible
N5 Oakleigh	9:25 pm	37	Calm	+0.4	Traffic (36), insects (28), NCM inaudible
N6 Newhaven	9:25 pm	38	Calm	+0.4	Insects (37), NCM (32)*
N7 Belah Park	8:06 pm	42	Calm	Lapse	Frogs & insects (42), traffic (31), NCM (28)
N4 Greylands	8:15 pm	38	Calm	Lapse	Insects & frogs (36), NCM (32), traffic (27)

*Noise from gas drainage wells (29), mine noise (29)

Table 3 NCM Operational Noise Monitoring Results – 8 March 2013 (night)					
Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	11:10 am	37	0.9 / WSW	+1.3	Insects & frogs (36), traffic (29), NCM (25)
N3 Naroo	10:33 pm	33	1.3 / SSE	+0.7	Insects (30), traffic (28), NCM (26)
N5 Oakleigh	12:40 am	30	0.9 / SW	+0.7	Traffic (27), insects (26), NCM (<20)
N6 Newhaven	11:47 pm	47	0.9 / WSW	+1.3	Insects (46), NCM (36)*, traffic (30)
N7 Belah Park	10:03 pm	41	Calm	+0.6	Frogs & insects (41), traffic (25), NCM (<15)
N4 Greylands	10:03 pm	33	Calm	+0.6	Frogs & insects (31), NCM (30), traffic (25)

*Noise from gas drainage wells (33), mine noise (32)

Table 4 NCM Operational Noise Monitoring Results – 9 March 2013 (day)					
Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	12:45 pm	43	2.7 / S	n/a	Birds & insects (41), traffic (39), NCM inaudible
N3 Naroo	8:55 am	45	2.2 / S	n/a	Traffic (42), birds & insects (42), NCM inaudible
N5 Oakleigh	11:05 am	39	2.2 / S	n/a	Birds & insects (36), traffic (36), NCM inaudible
N6 Newhaven	10:39 am	35	2.7 / SSE	n/a	Birds & insects (32), NCM (32)*
N7 Belah Park	9:25 am	38	1.8 / SSE	n/a	Insects (36), traffic (35), NCM barely audible

*Noise from gas drainage wells (29), mine noise (28)

Table 5 NCM Operational Noise Monitoring Results – 9 March 2013 (evening)					
Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	6:35 pm	41	Calm	+0.4	Traffic (39), birds & insects (37), NCM inaudible
N3 Naroo	6:40 pm	45	Calm	+0.4	Traffic (43), birds & insects (40), NCM inaudible
N5 Oakleigh	7:15 pm	38	Calm	Lapse	Birds & insects (37), traffic (30), NCM inaudible
N6 Newhaven	6:01 pm	37	1.8 / S	+1.4	Birds & insects (36), NCM (31)*
N7 Belah Park	6:02 pm	38	1.8 / S	+1.4	Birds & insects (36), traffic (34), NCM inaudible

*Noise from gas drainage wells (27), mine noise (28)

Table 6 NCM Operational Noise Monitoring Results – 9 March 2013 (night)					
Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	11:05 pm	37	Calm	+1.6	Traffic (35), frogs & insects (33), NCM inaudible
N3 Naroo	11:12 pm	38	Calm	+1.6	Traffic (32), insects (32), NCM inaudible
N5 Oakleigh	12:15 am	38	Calm	+0.3	Traffic (35), insects (34), NCM (25)
N6 Newhaven	10:02 pm	39	Calm	+0.6	Insects (39), NCM (29)*
N7 Belah Park	10:01 pm	37	Calm	+0.6	Insects (37), traffic (20), NCM inaudible

*Noise from gas drainage wells

Table 7 NCM Operational Noise Monitoring Results – 10 March 2013 (day)					
Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	11:52 am	36	1.3 / S	n/a	Traffic (33), insects (33), NCM occasionally audible (<25)
N3 Naroo	9:15 am	40	0.9 / SW	n/a	Traffic (38), insects (36), NCM inaudible
N5 Oakleigh	10:12 am	33	0.9 / S	n/a	Birds & insects (33), traffic (30), NCM inaudible
N6 Newhaven	10:55 am	36	1.3 / SW	n/a	NCM (34)*, birds & insects (32),
N7 Belah Park	8:38 am	36	1.3 / SW	n/a	Birds (34), traffic (31), NCM (<20)

*Noise from gas drainage wells (32), mine noise (29)

Table 8 NCM Operational Noise Monitoring Results – 10 March 2013 (evening)					
Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	8:36 pm	40	Calm	+1.3	Traffic (38), birds & insects (36), NCM inaudible
N3 Naroo	8:28 pm	39	Calm	+1.0	Traffic (38), insects (33), NCM inaudible
N5 Oakleigh	9:15 pm	39	Calm	+1.3	Traffic (39), insects (28), NCM inaudible
N6 Newhaven	9:10 pm	35	Calm	+0.3	NCM (33)*, insects (31)
N7 Belah Park	8:00 pm	39	Calm	Lapse	Insects (37), traffic (34), NCM (35)

*Noise from gas drainage wells (33), mine noise (28)

Table 9 NCM Operational Noise Monitoring Results – 10 March 2013 (night)					
Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction	Temp Grad (°C/100m)	Identified Noise Sources
N1 Bow Hills	11:09 pm	32	0.9 / SW	+2.5	Insects (30), traffic (27), NCM (22)
N3 Naroo	10:02 pm	38	0.9 / S	+1.9	Traffic (36), insects (32), NCM (28)
N5 Oakleigh	12:22 am	26	Calm	+2.5	Traffic (24), insects (19), NCM inaudible
N6 Newhaven	11:14 pm	35	0.9 / SW	+2.8	NCM (32)*, insects (31)
N7 Belah Park	10:04 pm	35	0.9 / S	+1.9	Frogs & insects (35), NCM inaudible

*Noise from gas drainage wells (29), mine noise (28)

4.2 Discussion of Results

The results in Tables 1 to 9 show that, under the operating and meteorological conditions at the times, for the worst case 15 minute compliance measurement periods, the mine noise did not exceed the operational noise criterion at any monitoring location during any of the monitoring periods.

4.2.1 Audible Noise Sources

Mine related noise was measureable on occasion at all of the monitoring locations. The noise was audible as a general hum with occasional noise from mobile plant and reverse beepers. Dozer tracks were audible at times.

At the Newhaven monitoring location the majority of mine related noise was from the gas drainage wells in the vicinity and from the stackers/reclaimers. The monitoring location is near the boundary of the property and not at the residence. Noise levels at the residence would be significantly lower than those shown in the tables.

4.2.2 Modifying Factor Corrections

Data from those times where NCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions of "modifying factor corrections" in the NSW Industrial Noise Policy.

4.2.3 Sleep Disturbance

Measured L1 (1 min) noise levels for each night time monitoring period are summarised in **Tables 10 - 12**. The results in these tables show that, under the operating and meteorological conditions at the times, the maximum L1 (1 min) noise emission from NCM did not exceed the sleep disturbance criterion at any location during the night time measurement periods.

Table 10 NCM Sleep Disturbance Monitoring Results – 8 March 2013 (night)				
Location	Time	dB(A),L1 (1 min)	Wind speed / direction	Temp Grad(°C/100m)
N1 Bow Hills	11:10 am	38	0.9 / WSW	+1.3
N3 Naroo	10:33 pm	30	1.3 / SSE	+0.7
N5 Oakleigh	12:40 am	25	0.9 / SW	+0.7
N6 Newhaven	11:47 pm	41	0.9 / WSW	+1.3
N7 Belah Park	10:03 pm	20	Calm	+0.6

Table 11 NCM Sleep Disturbance Monitoring Results – 9 March 2013 (night)				
Location	Time	dB(A),L1 (1 min)	Wind speed / direction	Temp Grad(°C/100m)
N1 Bow Hills	11:05 pm	n/a	Calm	+1.6
N3 Naroo	11:12 pm	n/a	Calm	+1.6
N5 Oakleigh	12:15 am	33	Calm	+0.3
N6 Newhaven	10:02 pm	33	Calm	+0.6
N7 Belah Park	10:01 pm	n/a	Calm	+0.6

Table 12 NCM Sleep Disturbance Monitoring Results – 10 March 2013 (night)				
Location	Time	dB(A),L1 (1 min)	Wind speed / direction	Temp Grad(°C/100m)
N1 Bow Hills	11:09 pm	32	0.9 / SW	+2.5
N3 Naroo	10:02 pm	35	0.9 / S	+1.9
N5 Oakleigh	12:22 am	n/a	Calm	+2.5
N6 Newhaven	11:14 pm	36	0.9 / SW	+2.8
N7 Belah Park	10:04 pm	n/a	0.9 / S	+1.9

4.2.4 Noise Management

Section R 4.1 (b) of EPL 12789 states that the noise monitoring report should include "*an outline of any management actions taken within the monitoring period to address any exceedances of the limits detailed in the limit conditions of this licence.*"

As there was no exceedance of any noise criteria no noise management actions were necessary.

APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS

Table A1

Definition of acoustical terms

Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

Appendix 8

METEOROLOGICAL DATA

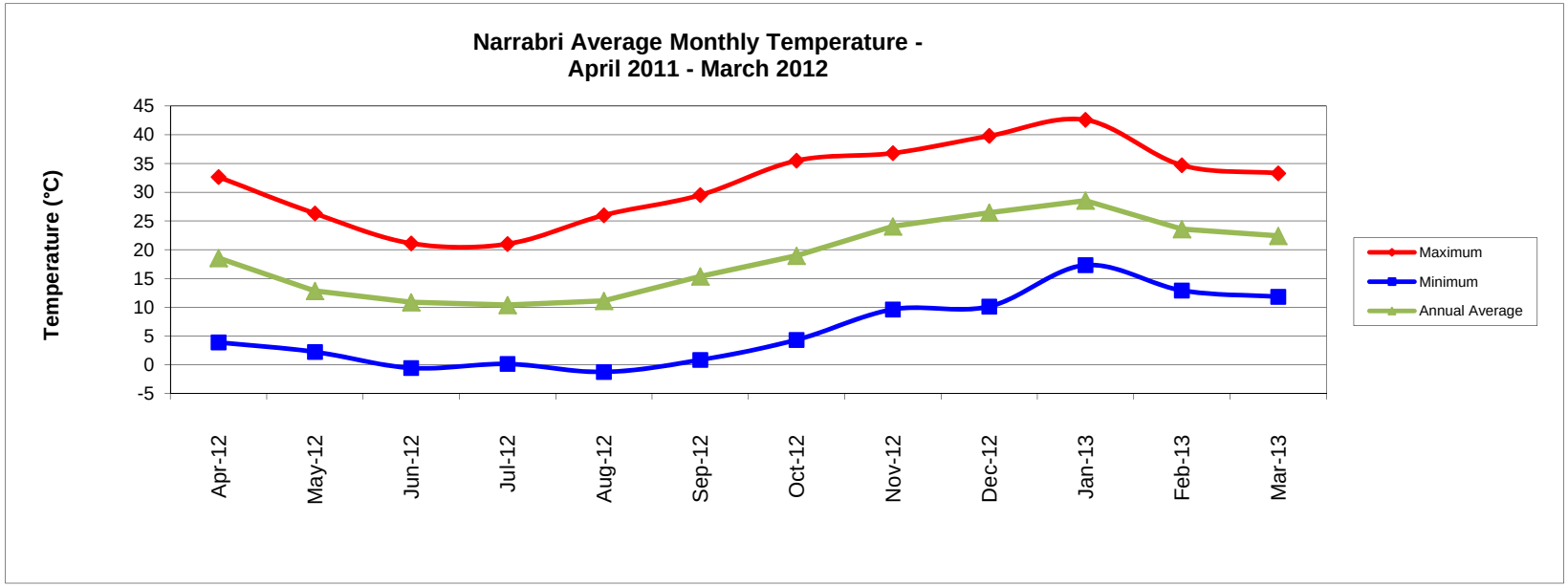
Narrabri Mine Average Monthly Results

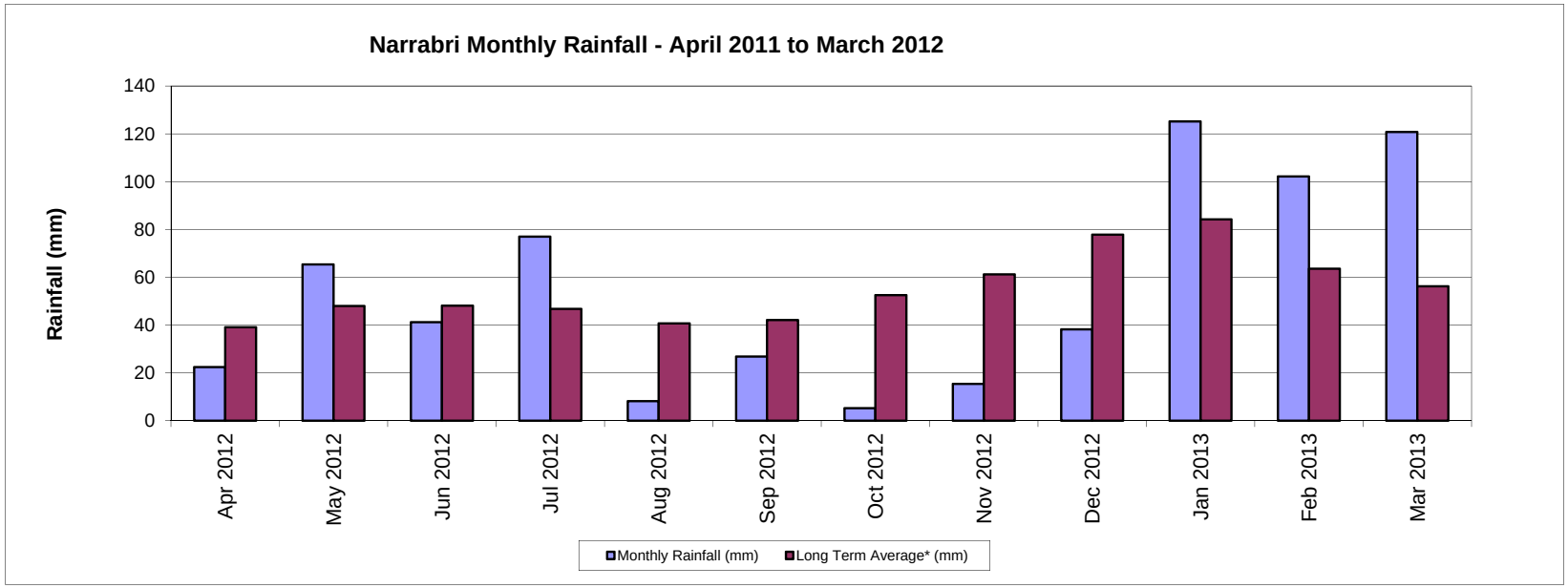
Month	Minimum Air Temp (°C)	Average Air Temp(°C)	Maximum Air Temp (°C)	Minimum Relative Humidity (%)	Average Relative Humidity(%)	Maximum Relative Humidity (%)	Minimum Wind Speed (m/s)	Average Wind Speed (m/s)	Maximum Wind Speed (m/s)
Apr 2012	3.9	18.5	32.7	20.3	61.0	95.8	0.0	2.2	8.8
May 2012	2.2	12.8	26.3	18.1	59.6	97.3	0.0	1.8	9.4
Jun 2012	-0.6	10.9	21.1	25.7	74.9	98.9	0.0	2.7	10.2
Jul 2012	0.1	10.4	21.0	27.8	70.9	97.4	0.0	2.5	9.6
Aug 2012	-1.3	11.1	26.0	22.2	57.6	95.2	0.0	2.2	12.5
Sep 2012	0.8	15.3	29.5	11.5	50.0	98.0	0.0	2.2	12.4
Oct 2012	4.3	18.9	35.5	6.8	41.3	96.4	0.0	0.5	12.3
Nov 2012	9.6	24.1	36.8	8.7	44.0	95.5	0.0	2.5	12.2
Dec 2012	10.1	26.4	39.8	12.6	45.2	94.5	0.0	2.9	17.2
Jan 2013	17.3	28.5	42.6	7.9	47.0	97.1	0.0	3.1	14.8
Feb 2013	12.9	23.6	34.7	21.9	59.1	97.9	0.0	3.2	12.7
Mar 2013	11.8	22.4	33.3	16.2	61.2	97.8	0.0	2.9	15.1
Annual Average	**5.9**	**18.6**	**31.6**	**17**	**56**	**97**	**0.0**	**2.4**	**12.3**
Minimum	**-1.3**	**10.4**	**21.0**	**7**	**41**	**95**	**0.0**	**0.5**	**8.8**
Maximum	**17.3**	**28.5**	**42.6**	**28**	**75**	**99**	**0.0**	**3.2**	**17.2**

Month	Monthly Rainfall (mm)	Cumulative Rainfall (mm)	Long Term Average* (mm)	Number of Rain Days**	Long Term Average Rain Days*
Apr 2012	22.4	22.4	39.1	4	2.3
May 2012	65.4	87.8	48.0	4	2.6
Jun 2012	41.2	129.0	48.1	4	3.3
Jul 2012	77.0	206.0	46.8	8	3.2
Aug 2012	8.2	214.2	40.7	2	3.0
Sep 2012	26.8	241.0	42.1	2	3.0
Oct 2012	5.2	246.2	52.5	3	3.5
Nov 2012	15.4	261.6	61.2	3	3.9
Dec 2012	38.2	299.8	77.8	8	4.1
Jan 2013	125.2	425.0	84.2	7	3.7
Feb 2013	102.2	527.2	63.6	6	3.1
Mar 2013	120.8	648.0	56.2	4	2.8
Total	**648.0**	**648.0**	**660.3**	**55**	**38.5**

* Long term average is from Narrabri West Post Office (053030) 1891 - 2013

** ≥1mm


Narrabri Average Monthly Temperature -
April 2011 - March 2012
Temperature (°C)
45
40
35
30
25
20
15
10
5
0
-5
Apr-12
May-12
Jun-12
Jul-12
Aug-12
Sep-12
Oct-12
Nov-12
Dec-12
Jan-13
Feb-13
Mar-13
Maximum
Minimum
Annual Average


Narrabri Monthly Rainfall - April 2011 to March 2012
Rainfall (mm)
140
120
100
80
60
40
20
0
Apr 2012
May 2012
Jun 2012
Jul 2012
Aug 2012
Sep 2012
Oct 2012
Nov 2012
Dec 2012
Jan 2013
Feb 2013
Mar 2013
Monthly Rainfall (mm)
Long Term Average* (mm)

Daily Summary **April 2012** **Narrabri Mine Weather Station**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
1/04/2012	13.2	21.3	29.7	20.3	46.0	72.7	0	0.0	2.8	5.9
2/04/2012	15.7	22.9	30.8	25.2	47.0	73.2	0	0.0	2.2	5.8
3/04/2012	11.8	22.5	31.5	21.8	46.5	81.3	0	0.0	2.3	6.0
4/04/2012	15.7	24.1	32.7	27.1	44.9	65.2	0	0.0	1.1	3.9
5/04/2012	16.2	23.7	30.7	32.5	52.0	76.1	0	0.0	1.3	4.5
6/04/2012	16.3	22.1	29.4	35.5	58.6	79.3	0	0.0	1.1	4.5
7/04/2012	15.5	22.5	30.1	36.4	58.1	81.4	0	0.0	1.0	5.5
8/04/2012	16.8	23.3	31.9	26.5	61.7	90.4	7.2	0.1	1.4	8.6
9/04/2012	14.0	18.1	24.1	26.0	50.1	87.9	0	0.3	2.7	5.8
10/04/2012	10.5	14.5	19.7	21.8	42.6	67.0	0	2.9	4.8	7.9
11/04/2012	5.9	14.1	21.8	36.8	55.5	76.2	0	1.6	5.3	8.8
12/04/2012	8.7	16.2	24.1	31.8	60.0	89.1	0	2.6	4.8	7.4
13/04/2012	10.2	17.4	25.0	22.8	53.0	83.5	0	1.0	3.3	5.3
14/04/2012	13.3	19.1	25.6	35.2	55.1	75.3	0	1.2	2.7	4.6
15/04/2012	17.1	21.4	27.0	42.8	56.3	68.7	0	0.6	2.3	4.8
16/04/2012	16.4	19.1	26.3	49.5	74.1	88.9	0.6	0.4	2.6	5.8
17/04/2012	13.9	16.8	20.5	65.8	79.9	91.4	0	1.3	3.0	6.6
18/04/2012	13.4	18.6	25.7	43.2	75.1	95.0	1.2	0.1	1.5	4.1
19/04/2012	13.4	19.1	27.4	35.8	71.6	94.9	0.2	0.0	1.4	4.7
20/04/2012	12.1	19.2	28.2	29.8	63.4	90.7	0	0.0	0.8	3.7
21/04/2012	12.8	19.8	29.0	28.1	56.8	82.5	0	0.0	0.9	3.3
22/04/2012	12.5	20.8	30.2	25.4	53.8	80.0	0	0.1	1.2	4.7
23/04/2012	16.6	17.9	21.0	50.8	85.5	95.5	9.6	0.0	0.7	4.1
24/04/2012	10.3	17.2	22.7	39.5	73.0	95.0	0.2	1.2	2.7	7.1
25/04/2012	3.9	10.5	17.3	38.1	64.7	91.0	0	0.0	1.8	5.5
26/04/2012	4.2	12.3	20.9	40.1	67.0	94.1	0	0.0	1.2	4.6
27/04/2012	9.5	15.0	21.9	44.0	66.9	84.9	0	0.0	1.3	3.6
28/04/2012	12.6	15.0	18.1	70.6	82.2	92.0	3.2	0.2	2.4	4.6
29/04/2012	9.8	16.0	23.5	25.5	67.1	95.8	0.2	0.9	3.5	6.8
30/04/2012	9.3	15.6	22.9	33.4	63.0	91.5	0	1.1	3.8	5.7
Average	**12.4**	**18.5**	**25.7**	**35.4**	**61.0**	**84.4**		**0.5**	**2.2**	**5.5**
Maximum	**17.1**	**24.1**	**32.7**	**70.6**	**85.5**	**95.8**	**9.6**	**2.9**	**5.3**	**8.8**
Minimum	**3.9**	**10.5**	**17.3**	**20.3**	**42.6**	**65.2**	**0.0**	**0.0**	**0.7**	**3.3**
Total							**22.4**			

Daily Summary **May 2012** **Narrabri Mine Weather Station**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
1/05/2012	9.3	15.6	22.9	33.4	63	91.5	0	1.1	3.8	5.7
2/05/2012	9.7	16.3	24.6	33	59.6	83.5	0	0.1	2.1	4.7
3/05/2012	10.3	16.6	24.9	41.2	70.6	95.9	2	0.1	0.7	7.2
4/05/2012	10.8	15.8	21.3	60.2	86.9	97.2	24.6	0	0.8	4.5
5/05/2012	7.5	13.9	22.9	30.4	62.2	84.6	0	0	1.7	4.4
6/05/2012	5	12.5	20	35.4	60.5	87.3	0	0.1	2.2	4.4
7/05/2012	4.1	11.7	20.1	30.3	62.6	91.7	0	0	0.9	3.6
8/05/2012	6.4	12.8	21.6	27.1	60.5	87.3	0	0	0.7	3.8
9/05/2012	6.7	14	23.4	27.6	55.6	80.3	0	0	1.3	3.6
10/05/2012	5.4	15.2	26	23	51.6	83	0	0	1.4	3.1
11/05/2012	7.8	15.9	26.2	19.1	48.1	74.4	0	0	1.5	4.9
12/05/2012	6.3	15.7	26.3	24.9	51.4	79.2	0	0	1	4.4
13/05/2012	6.9	16	24.9	29.6	48.7	78.7	0	0.4	2	6.1
14/05/2012	3	10.6	17.3	30.3	52.6	80.8	0	0	1.9	6.1
15/05/2012	3	10.6	17.7	24.6	52.2	87.6	0	0.1	2.1	5
16/05/2012	3.9	10.4	18.9	20.3	47.6	71.4	0	0.1	2.6	5.3
17/05/2012	3.9	11.3	20.8	21.9	48.6	75.4	0	0	2.1	5.8
18/05/2012	4.5	11.8	21.6	24.9	55.5	88	0	0	1.3	4.1
19/05/2012	4.2	11.6	22.3	21.5	50	73.4	0	0	1.1	3.5
20/05/2012	2.5	11.5	21.9	18.1	45	70.2	0	0	0.8	3.8
21/05/2012	3.9	11.9	21	20.2	41.6	68.2	0	0.6	2.6	4.5
22/05/2012	3.5	12.7	22.1	31.9	58	90.9	0	0	0.8	5.8
23/05/2012	2.9	11.2	21.7	20.5	51.6	82.6	0	0	1	4.8
24/05/2012	2.2	11.5	23	19.6	48.2	73.4	0	0	0.5	4.7
25/05/2012	10.2	14.7	22.9	39.2	71.2	97.3	24.2	0	0.7	8.4
26/05/2012	5.6	11.6	15.9	56.9	80.7	95.6	14.4	1.3	3.8	9.4
27/05/2012	2.8	8.5	15.6	45.9	72.8	93.1	0	0	1.6	4.1
28/05/2012	4.5	10.3	16.6	50	72.8	91.8	0	0	1.2	5.1
29/05/2012	4.6	10.5	18	48.8	74.1	92.2	0	0.7	3.5	6.9
30/05/2012	6.2	12	19.8	44.9	73.9	90.5	0	2.3	4.3	6.9
31/05/2012	7.6	12.7	20.1	35.4	71	95.1	0.2	2.2	4.5	6.5
Average	**5.7**	**12.8**	**21.4**	**31.9**	**59.6**	**84.9**		**0.3**	**1.8**	**5.2**
Maximum	**10.8**	**16.6**	**26.3**	**60.2**	**86.9**	**97.3**	**24.6**	**2.3**	**4.5**	**9.4**
Minimum	**2.2**	**8.5**	**15.6**	**18.1**	**41.6**	**68.2**	**0.0**	**0.0**	**0.5**	**3.1**
Total							**65.4**			

Daily Summary **June 2012** **Narrabri Mine Weather Station**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
1/06/2012	7.5	13.3	20.3	36.4	66.6	89.7	0	1.6	4	6.1
2/06/2012	9.9	13.6	18	52	73.2	89.1	1.2	0.4	2.8	5
3/06/2012	12.1	12.6	13	86.8	93.5	97.1	9.2	1.8	3.3	5.3
4/06/2012	12	13.2	15.6	86.3	95.3	98.2	25.8	0	1.6	4.7
5/06/2012	6.7	12	15.6	69	86.8	97.3	0.4	1.1	3.1	6.7
6/06/2012	6	8.2	12	63.8	81.7	95.4	0.2	0	3	7.8
7/06/2012	5.8	10.7	15.5	51.8	74.4	95.7	0	0	3.7	10.2
8/06/2012	4.8	10.3	15.9	50.3	76	95.8	0	0	3	6.6
9/06/2012	6.5	10.6	17.3	47.5	77.6	91.7	0.4	0	2	5.4
10/06/2012	6	9.9	16.6	48.2	69.9	84.1	0	0.8	2.9	5
11/06/2012	5.9	10.3	17.6	33.3	64.6	88	0	2.1	3.9	5.7
12/06/2012	4.9	9.9	15.7	60.8	82.9	96.3	0	1.3	3.8	6.5
13/06/2012	5.9	11.7	18.6	51.7	78	96.6	0.2	1.6	4	7.9
14/06/2012	5.8	11.2	18.6	45.9	78.9	97.6	0	1.3	3.3	5.6
15/06/2012	6	11.4	19.5	49.2	78.1	95.8	0.2	0	1.2	4.6
16/06/2012	4.9	12.8	21.1	38.1	68.7	95.4	0.2	0	1.5	6.8
17/06/2012	11.8	15.7	19.8	45.5	62.6	94.6	3	1.8	4.5	8.8
18/06/2012	4.4	10.6	16.4	44.7	77.1	98.1	0.2	0	2	4.3
19/06/2012	4.8	10.8	16.9	43.1	67	89.4	0	0	1.5	4.9
20/06/2012	2.4	9.8	17.4	43.7	71.8	94.8	0	0	1.4	5.2
21/06/2012	1.3	8	16.9	42.6	77.8	98.7	0	0	0.9	3.9
22/06/2012	1	10	18.6	34.8	65.8	98.1	0	0	2	8.2
23/06/2012	4.7	12.4	15.6	41.1	66	94.9	0	1.1	4.7	9.6
24/06/2012	-0.2	6.8	13.1	47.9	75.2	98.9	0	0	1.2	4.9
25/06/2012	-0.6	6.3	14.9	38.6	71.5	93.9	0	0	2.2	5.1
26/06/2012	-0.5	7.5	18.2	25.7	68.3	97.8	0.2	0.1	1.6	4.7
27/06/2012	3.7	9.7	18.3	31.7	67.5	92.3	0	0.1	3.2	5.2
28/06/2012	8.2	11.1	15.4	65.1	81.8	95.2	0	1.6	4.3	7
29/06/2012	8.6	12.8	19.1	47.2	71.8	91.3	0	1.4	3.9	7.6
30/06/2012	6.2	12.3	19.4	51.2	75.8	94.7	0	0	1.1	4.1
Average	**5.6**	**10.9**	**17.0**	**49.1**	**74.9**	**94.6**		**0.6**	**2.7**	**6.1**
Maximum	**12.1**	**15.7**	**21.1**	**86.8**	**95.3**	**98.9**	**25.8**	**2.1**	**4.7**	**10.2**
Minimum	**-0.6**	**6.3**	**12.0**	**25.7**	**62.6**	**84.1**	**0.0**	**0.0**	**0.9**	**3.9**
Total							**41.2**			

Daily Summary **July 2012** **Narrabri Mine Weather Station**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
1/07/2012	6.8	12.2	19.4	37.9	68.1	95.2	0	0	1.7	5.2
2/07/2012	3.8	9.9	15.6	33	58.3	78.5	0	0	2.1	6.4
3/07/2012	0.1	7.6	14.4	43.8	66.8	92.5	0	0.2	2.1	5
4/07/2012	3.6	9.1	14.8	38.5	63.3	87.5	0	0	2.3	5
5/07/2012	0.1	6.4	13.3	39.8	69.2	96.9	0	0	2.2	5.8
6/07/2012	1.7	8.2	15.2	43.3	68.7	89.7	0	0.5	3.6	6.8
7/07/2012	2.9	9.1	16.4	44.5	72.1	94	0.2	0.9	4.4	7.7
8/07/2012	3.9	9.2	17.1	32.7	68.5	95.4	0	1.6	3.8	6.2
9/07/2012	5.1	10.4	18.6	33.8	61.2	84.8	0	0.5	3.3	5.1
10/07/2012	6	11.7	21	27.8	55.4	79.6	2.6	0.2	2.2	5.3
11/07/2012	8.7	13.8	18.9	45.9	68	87.5	17.4	0.5	2	8.5
12/07/2012	11.9	14.6	18.3	68.7	85.8	97	20.6	0.3	2.9	9.2
13/07/2012	12.2	14.7	16.9	88.5	94.7	97.4	18.4	0	0.9	5.5
14/07/2012	12.4	-	14.4	-	-	-	0.2	-	-	-
15/07/2012	5.1	-	15	-	-	-	0.2	-	-	-
16/07/2012	1.8	-	15.6	-	-	-	0	-	-	-
17/07/2012	2.3	-	19.6	-	-	-	0	-	-	-
18/07/2012	11.3	14.9	19.1	42.4	65.2	87.9	2.2	0	0.6	3.7
19/07/2012	9.1	12.1	17.3	64.9	87.6	97.1	10.8	0	0.8	3.9
20/07/2012	3.9	9.6	15	30.2	64.7	95	0.2	0	2.7	6.6
21/07/2012	1.9	7.9	15.5	34.2	68.9	89.4	0	0.2	2.7	5.2
22/07/2012	3.2	9.5	17	56.1	74.7	88.1	0	0.5	3.8	7.9
23/07/2012	3.5	9.4	16.4	51	76.1	91	0	1.1	4	7.8
24/07/2012	5.8	10.5	16.9	40.6	74.1	92.7	0	0.2	3.7	7.1
25/07/2012	4.7	10.4	17.5	44.4	73.9	95.3	0.2	1	3	4.9
26/07/2012	5.7	10.8	19	38.8	69.7	88.2	0.2	0.2	0.8	6.5
27/07/2012	7.3	12.4	18.4	53.1	74	92.1	2.8	0	2.8	9.6
28/07/2012	2.9	9.7	15.5	40	73.2	97.1	1	0	1.9	5.4
29/07/2012	4.5	8.9	14.1	49.2	76.9	94.9	0	0	2.2	4.6
30/07/2012	2.4	9.3	16.6	41	69.2	94.5	0	0	1.9	4.4
31/07/2012	0.5	7.7	15.2	35.4	66.2	94.6	0	0	2.2	5.8
Average	**5.0**	**10.4**	**16.7**	**44.4**	**70.9**	**91.6**		**0.3**	**2.5**	**6.1**
Maximum	**12.4**	**14.9**	**21.0**	**88.5**	**94.7**	**97.4**	**20.6**	**1.6**	**4.4**	**9.6**
Minimum	**0.1**	**6.4**	**13.3**	**27.8**	**55.4**	**78.5**	**0.0**	**0.0**	**0.6**	**3.7**
Total							**77.0**			

Daily Summary **August 2012** **Narrabri Mine Weather Station**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
1/08/2012	1.3	7.4	14.6	43.8	65.9	85.2	0	0.9	2.7	5.9
2/08/2012	1.4	8.5	16.2	27.2	61.7	90.4	0	0.5	1.8	4.7
3/08/2012	-1.3	7.2	16	30.4	64	94.3	0	0	0.3	3.6
4/08/2012	1.9	8.6	17.2	29.6	61.9	87.8	0	0	1.8	5.3
5/08/2012	-0.7	8.9	19.3	22.9	58.2	92.3	0	0	1.4	5.6
6/08/2012	1.1	10	19.6	25.2	54.3	84.6	0	0	2.2	6.9
7/08/2012	5.6	11.5	18.8	26.5	49.9	69.4	0	0.2	2.3	7
8/08/2012	-0.2	8.1	17.4	27.6	59.4	87.9	0	0	1	3.9
9/08/2012	-0.9	8	18.8	23.7	60.1	91	0	0	0.9	4.7
10/08/2012	1.6	8.8	16.7	38.5	61.4	82.5	0	0	1.4	5.4
11/08/2012	1.6	8.7	15.2	31.7	55.3	82.2	0	0.4	3.3	8.2
12/08/2012	-0.1	9.5	16.7	38.7	58.8	90.3	0	0	2.5	7.8
13/08/2012	5.3	10.5	16.8	40	60.6	78.1	0	0.8	4.1	8.1
14/08/2012	3.3	10	18.7	34.9	65.3	89.8	0	0	1.8	4.8
15/08/2012	0.8	9.6	19.2	28.5	62.8	95.2	0	0	1.6	5.4
16/08/2012	2.9	12.8	21.7	22.2	47.5	82.4	0	0	2.9	7.6
17/08/2012	3.4	13	19.7	28.6	43.7	80.2	0	0.1	2.8	6.9
18/08/2012	2.1	12	20.1	22.9	47.1	86	0	0	4.7	11.7
19/08/2012	1.8	9.4	15.4	30.7	52.8	73.5	0	0.8	2.7	8
20/08/2012	3.1	10.6	18.1	30.1	57.2	90.3	0	0	0.9	4.5
21/08/2012	2.3	9.1	17.9	22.9	55.6	81.3	0	0	0.6	4.5
22/08/2012	4.8	12.8	21.5	39.3	57.1	74.5	0.6	0	0.7	8.6
23/08/2012	10.8	18.2	23.7	44.6	60.4	88.6	2	0	4.8	10.1
24/08/2012	16	20.1	26	39	61	92.9	5.4	1.9	6.3	12.5
25/08/2012	5	13.1	18.8	26.8	58.5	90.1	0.2	0	2.2	6.8
26/08/2012	3.5	12.3	19.9	29	53.8	83.8	0	0.1	1.7	6.2
27/08/2012	3.3	9.9	16.6	38.5	63.5	87.2	0	0	1.3	4.7
28/08/2012	2.1	10.3	20.3	29.5	60.5	88	0	0	1.2	4.9
29/08/2012	5	11.6	20.1	36.6	61	82.5	0	0	0.6	6.2
30/08/2012	5.1	15.6	23.5	36.3	58.8	86.7	0	0	3.2	8.7
31/08/2012	8.6	17.4	22.4	26.4	47.4	62.4	0	1.6	3.4	10.2
Average	**3.2**	**11.1**	**18.9**	**31.4**	**57.6**	**84.9**		**0.2**	**2.2**	**6.8**
Maximum	**16.0**	**20.1**	**26.0**	**44.6**	**65.9**	**95.2**	**5.4**	**1.9**	**6.3**	**12.5**
Minimum	**-1.3**	**7.2**	**14.6**	**22.2**	**43.7**	**62.4**	**0.0**	**0.0**	**0.3**	**3.6**
Total							**8.2**			

Daily Summary **September 2012** **Narrabri Mine Weather Station**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
1/09/2012	4.2	10.4	17.9	24.8	48	72.6	0	0.9	2.3	6.4
2/09/2012	2.1	9.4	16.5	20.4	50.8	90.8	0	0	2.3	5.4
3/09/2012	0.8	9.9	20.1	23.6	50.9	79.5	0	0	1.1	3.6
4/09/2012	1	11.2	21.6	22	48.9	79.3	0	0	0.2	2.8
5/09/2012	2.7	12.4	23.1	18.8	46	75.4	0	0	0.6	5.5
6/09/2012	3.9	15.7	23.8	25.1	43.3	70.3	0	0	5.1	11.1
7/09/2012	13.1	19.4	25.3	27.6	44	57.3	0	2	6.6	10.7
8/09/2012	4.4	15.9	22.9	20.5	37.3	62.1	0	0.3	3.8	8.7
9/09/2012	2.1	11.5	19.8	27.5	49.3	76.6	0	0.2	2.3	6.6
10/09/2012	2.4	12.2	20.7	28.6	55	87.9	0	0	1.8	6.7
11/09/2012	5.6	14.5	23.5	34.5	57.7	80.3	0	0	1.2	7
12/09/2012	9.6	16.6	25	30.8	56.5	79	0	0	1.3	6.1
13/09/2012	8.7	17.4	26	24.6	52.6	81.6	0	0	2.7	8.7
14/09/2012	4	17.2	27.1	18.1	49	85.8	0	0	4.6	12.4
15/09/2012	1.6	11	19.1	19.6	47.7	87.3	0	0	2.4	5.6
16/09/2012	2.8	12.9	22.7	22.2	44.9	71.3	0	0	0.9	3.4
17/09/2012	7.9	14.6	22.4	32.9	56.9	75.5	0	0	0.9	7.9
18/09/2012	8.3	15.1	22.3	34.4	58.9	80.7	0	0	1.5	7.6
19/09/2012	8.8	15.2	23.8	29.4	66.1	94	2	0.1	0.3	7.2
20/09/2012	6.4	14.5	24.2	19.7	62	98	0.4	0	1.1	5.8
21/09/2012	8	18	28.6	18.8	44.7	75.6	0	0	0.3	5.1
22/09/2012	14.4	20.1	28	29.3	50.9	74.9	0	0.2	1.2	6
23/09/2012	6.5	16.5	24.8	17.9	44.5	79.5	0	0	1.8	5.4
24/09/2012	5.9	17.8	28.7	15.3	39	71.9	0	0	1.3	5.4
25/09/2012	10.1	18.2	25.2	19.1	33.4	56.9	0	0.2	2.9	7.4
26/09/2012	4.9	15.6	25.9	11.5	39.5	72.1	0	0.1	2.6	5.9
27/09/2012	10.1	17.5	26	22.8	52.4	82.2	0	0	0.8	6.6
28/09/2012	10.3	18.7	27	34	54.7	75.4	0	0	2	7.3
29/09/2012	12.5	23.3	29.5	28.9	42.8	76.3	0	0.8	6.3	10.3
30/09/2012	11.2	17.4	23.5	38	70.8	97.2	24.4	1.7	3.6	7.5
Average	**6.5**	**15.3**	**23.8**	**24.7**	**50.0**	**78.2**		**0.2**	**2.2**	**6.9**
Maximum	**14.4**	**23.3**	**29.5**	**38.0**	**70.8**	**98.0**	**24.4**	**2.0**	**6.6**	**12.4**
Minimum	**0.8**	**9.4**	**16.5**	**11.5**	**33.4**	**56.9**	**0.0**	**0.0**	**0.2**	**2.8**
Total							**26.8**			

Daily Summary **October 2012** **Narrabri Mine Weather Station**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
1/10/2012	4.3	12.9	19.8	24	47.7	88.4	0	1.3	0.1	4.4
2/10/2012	5	14	22.9	20.8	50	83.6	0	2.1	0.2	4.7
3/10/2012	9.1	15.9	23	26.9	52.9	82.6	0	3.7	1.8	6
4/10/2012	9.2	17.1	26.2	25.2	51.8	75.1	0	1	0	4.2
5/10/2012	7.8	18.8	28.7	18.9	46.4	82.8	0	1.8	0	6.4
6/10/2012	10.2	22.8	32.5	15.5	34.9	71.4	0	3	0	7.4
7/10/2012	20	26.3	33.5	13	23.3	31.1	0	5	2.9	8.6
8/10/2012	11.4	19.5	25.6	12.8	32	66.1	0	3.1	0	6.2
9/10/2012	7.8	16.5	25.3	17.4	41.3	77.6	0	1.9	0.3	5.9
10/10/2012	6.3	17.5	26.2	18.3	34.9	66.1	0	1.9	0	7.4
11/10/2012	10.2	19.5	29.6	15.7	35.3	59.3	0	1.3	0.1	8.7
12/10/2012	7.8	14.6	21	28.6	55.3	87.3	1.8	2.5	0	7.9
13/10/2012	5.5	10.5	16.4	39.1	63.7	94.9	2	3.7	0.1	9.9
14/10/2012	4.5	14	21.8	19.9	48.7	85.3	0	2.6	0.2	6.8
15/10/2012	4.3	14.7	22.6	23.1	45.5	79.9	0	2.4	0	6.1
16/10/2012	9.2	17.3	26.4	16.5	42.4	72.7	0	1.6	0.2	4.4
17/10/2012	7.3	19.3	29	20.6	43.1	69.8	0	3	0	8.2
18/10/2012	16.6	25.3	33.8	11.2	28.8	49.4	0	4	1.1	9.5
19/10/2012	11.5	22.4	33.6	12.5	32.1	71.1	0	2.2	0.6	6.4
20/10/2012	13.5	23.4	32	18.5	37.1	58.6	0	1.6	0	7
21/10/2012	18.5	28.2	35.5	6.8	21.7	49.2	0	3.7	2	9.8
22/10/2012	15.9	20.6	29.2	22.2	44.3	85.5	1	1.4	0	12.3
23/10/2012	11.4	19.3	27.8	8.7	47	96.4	0	2.8	0	11.6
24/10/2012	9.1	16.6	24	19.4	38.5	60.8	0	5.7	2.3	10.1
25/10/2012	9.1	18.6	29.4	12	35.3	65.7	0	2.6	0	5.8
26/10/2012	8.7	21.6	31.5	16.7	33.9	57.4	0	3.4	0	8.7
27/10/2012	15.9	23.7	33.3	16.1	32.6	78.6	0	1.9	0.1	7.6
28/10/2012	12.6	18.6	25.7	14.4	34	77.7	0	3	0.5	7.4
29/10/2012	12.1	19.8	26.7	23	41.6	70	0	4.2	1.1	7
30/10/2012	12.6	19.2	24.6	31.8	46.5	66.8	0	1.8	0.3	4.4
31/10/2012	9.1	18.6	23.8	33.6	58.3	77.1	0.4	0	1.6	6.2
Average	**10.2**	**18.9**	**27.1**	**19.5**	**41.3**	**72.2**		**2.6**	**0.5**	**7.3**
Maximum	**20.0**	**28.2**	**35.5**	**39.1**	**63.7**	**96.4**	**2.0**	**5.7**	**2.9**	**12.3**
Minimum	**4.3**	**10.5**	**16.4**	**6.8**	**21.7**	**31.1**	**0.0**	**0.0**	**0.0**	**4.2**
Total							**5.2**			

Daily Summary **November 2012** **Narrabri Mine Weather Station**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
1/11/2012	9.6	21.5	31.9	19.8	48.3	87.8	0	0	0.5	4.7
2/11/2012	14.2	25.7	35	14.1	32.9	60.7	0	1.1	3.2	9.4
3/11/2012	13.8	21.2	28.6	12.4	30.1	51.3	0	0.2	3.9	7.8
4/11/2012	13.4	20.1	27.1	30.5	46.8	65.9	0	0.2	3.3	7
5/11/2012	15.5	22.6	30.5	24.3	44.7	64.3	0	0	0.5	6.9
6/11/2012	17.7	24.8	32.8	24.1	43	63.7	0	0	2.7	8.2
7/11/2012	16.9	26.6	34	19.5	37.1	60	0	0.5	3.7	9
8/11/2012	21.3	26	32.2	20.9	39.4	68.2	0	0	4	10
9/11/2012	19.1	23.6	29.9	35.1	61.6	88.4	0.2	0.1	2.7	9.8
10/11/2012	19	22.8	30.4	27.4	68.1	95.5	1.2	0	0.9	6.1
11/11/2012	15.5	20.5	25.7	30.7	45.3	66.1	0.4	0.1	3.8	9.2
12/11/2012	11.4	19.7	27.4	21.6	44.5	75.4	0	1.9	4.9	7.9
13/11/2012	11.9	21.6	30.2	19.6	37.4	64.4	0	0.2	0.2	5.2
14/11/2012	14.6	24.7	33	17.2	34.1	50	0	0	3.5	9.6
15/11/2012	17.7	26.6	35	15.1	35.1	66.8	0	0.1	2.1	8.9
16/11/2012	15.8	26.7	36.1	11.4	32.4	74.5	0	0.4	2	7
17/11/2012	16.9	22.9	28.6	18.7	37.7	88.2	0.4	0.2	3.1	9.8
18/11/2012	14.3	22.6	32.6	22	57.4	91.7	0.2	0.2	3.2	8.8
19/11/2012	15.7	23.4	32.2	12.5	44.2	86.6	0	0.8	2.9	6.3
20/11/2012	10.8	21.9	30	8.7	24.6	47.7	0	0.3	3.8	10.1
21/11/2012	12.6	20.8	28.9	25.1	43	68.9	0	3.8	6.3	9.7
22/11/2012	13.4	23.1	32.7	19.5	39.3	65.6	0	0.3	0.7	6.3
23/11/2012	16	26.7	36.8	10.5	32.2	55.9	0	0	1.8	9.4
24/11/2012	15.1	25.1	34.5	21.6	48	75.6	0	0.1	3.7	8.7
25/11/2012	18.7	26.4	34.4	21.9	44.6	70.7	0	0	1.1	7.7
26/11/2012	20.7	27.8	35.6	22	43.4	60.9	0	0	2	6.7
27/11/2012	21.1	28.2	35.4	27.4	45	78.9	0	0	1.1	12.2
28/11/2012	19.4	25	31.5	33.6	62	93.5	4.2	0.2	0.9	8.2
29/11/2012	19.1	25.6	34.8	30.7	60.5	93.9	8.6	0	1.7	11.1
30/11/2012	18.6	27.6	36.6	25.4	56.9	91.9	0.2	0	1	7.1
Average	**16.0**	**24.1**	**32.1**	**21.4**	**44.0**	**72.4**		**0.4**	**2.5**	**8.3**
Maximum	**21.3**	**28.2**	**36.8**	**35.1**	**68.1**	**95.5**	**8.6**	**3.8**	**6.3**	**12.2**
Minimum	**9.6**	**19.7**	**25.7**	**8.7**	**24.6**	**47.7**	**0.0**	**0.0**	**0.2**	**4.7**
Total							**15.4**			

Daily Summary **December 2012** **Narrabri Mine Weather Station**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
1/12/2012	27.9	35.1	39.6	20.1	29.7	48.4	0	0.1	2.7	7.4
2/12/2012	-	-	-	-	-	-	10	-	-	-
3/12/2012	29.6	34.8	39.8	21	29.2	40.4	0	0.9	2.6	7.5
4/12/2012	22.2	26.9	32.3	36.3	60.6	87.5	4.4	0.4	3.7	8.6
5/12/2012	16.7	24.6	29.8	14.1	27	57.2	0	1.2	3.8	7.8
6/12/2012	18.5	23.6	27.4	15.7	22.3	33.7	0	1.9	4.4	8.4
7/12/2012	10.1	22.6	31.5	14.9	28.6	64	0	0.3	2	5.6
8/12/2012	15.6	25	32.7	19.7	35.5	60.9	0	0	0.5	5.8
9/12/2012	19.2	26.9	33.6	24.1	39.8	65.1	0	0.5	3.2	9.1
10/12/2012	20.1	27.5	35.9	22.7	44.7	73.5	2.8	0.6	3.1	12
11/12/2012	16	23.3	31.6	32.2	58.7	85.6	0	3.7	6.7	11.7
12/12/2012	16	23.1	30.9	28.3	53.8	78.4	0	2.2	5.9	10.7
13/12/2012	16.4	24.1	31.4	19.2	43	74	0	1.8	4.2	8.1
14/12/2012	16	24.9	32.6	15.4	36.4	71.2	0	0.4	3	6.3
15/12/2012	15.7	26.4	35	13.5	31.3	55.7	0	0	0.7	5.1
16/12/2012	22.3	27.9	34.3	18.3	29.5	41.9	0	0	2.7	9.2
17/12/2012	21.1	29.5	38.1	15.7	32.4	54.7	0	0.4	1.6	7.7
18/12/2012	22.1	30.2	38.2	12.6	28.2	48.8	0	0.9	2.4	7.3
19/12/2012	-	-	-	-	-	-	0	-	-	-
20/12/2012	20.9	27.4	31.1	35.1	53.5	89.1	2.6	0.1	2.8	17.2
21/12/2012	22.9	28.8	31.9	39.5	52.1	92.3	3.2	0.3	3.6	8
22/12/2012	21.1	25.3	34.7	34.7	65.9	88.1	1.2	0.4	1.3	8.5
23/12/2012	18.7	24.7	33.4	34	66.7	91.5	1.4	0.6	1.1	8.2
24/12/2012	19.7	27.2	34	27.5	53.8	88.1	0.2	0.1	1.1	7.5
25/12/2012	20.4	28.9	35.7	26.5	45.8	71.7	0	0	3.2	7.5
26/12/2012	19.3	25.6	34.3	33	64.6	93.6	12.2	0.7	2.5	13.4
27/12/2012	17.1	21.7	28.8	40.2	67.4	92.6	0.2	1	5.6	10
28/12/2012	15.4	23.5	31.4	27	51	77.8	0	0.2	3.1	7.7
29/12/2012	20.6	24.6	30	44.2	60.9	81.2	0	0	4.4	9.3
30/12/2012	16.8	25.6	34.1	23.1	54.9	94.5	0	0	1.6	5.3
31/12/2012	19.4	27	34.8	24	43.3	69.3	0	0.3	1.7	6.1
Average	**19.2**	**26.4**	**33.4**	**25.3**	**45.2**	**71.4**		**0.7**	**2.9**	**8.5**
Maximum	**29.6**	**35.1**	**39.8**	**44.2**	**67.4**	**94.5**	**12.2**	**3.7**	**6.7**	**17.2**
Minimum	**10.1**	**21.7**	**27.4**	**12.6**	**22.3**	**33.7**	**0.0**	**0.0**	**0.5**	**5.1**
Total							**38.2**			

Daily Summary **January 2013** **Narrabri Mine Weather Station**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
1/01/2013	19.9	28.2	36	24.7	43.4	70.6	0	0.2	1.5	4.8
2/01/2013	23.3	29.4	36.8	21.8	35.6	52.5	0	1.2	4.3	7
3/01/2013	21	31.3	40.2	10.2	28.1	54	0	0.4	1.6	8
4/01/2013	19.4	28.4	37.4	21.2	45.9	73.7	0	0.2	3.1	9.2
5/01/2013	20.8	29.3	37.4	22.8	44.3	67.8	0	0	0.8	5.2
6/01/2013	23.5	30.1	37.1	23.6	38.5	53.6	0	0	2	7.1
7/01/2013	22.8	31.2	39.3	10.3	33.4	63.3	0	0.1	0.8	7
8/01/2013	20.8	29.4	37.6	15.7	34.5	63	0	0.3	0.6	4.7
9/01/2013	22.6	29.2	35.4	20.7	35.1	57.3	0	3.3	5.8	8.2
10/01/2013	22.3	31.7	39.7	9.9	22.5	33.9	0	1.4	5.2	11.4
11/01/2013	17.3	28.5	39.5	7.9	33.5	76.7	0	0.3	1.7	8.1
12/01/2013	20.9	31.3	40.1	20.9	42.2	70.5	0	0.2	2.3	9.4
13/01/2013	26.9	34.8	42.6	15.7	37	69.4	6.4	0.4	4.8	10.9
14/01/2013	23.3	30.9	42.4	22.9	50.7	76.2	5	0.1	3.1	14.8
15/01/2013	19.9	25.5	32.9	32.2	59.5	84.4	0	2.3	7	11.9
16/01/2013	18.2	25.3	33.5	30.3	45.7	60.8	0	0	1.9	8.5
17/01/2013	21.2	28.5	35	27.5	43.6	66.8	0	0.6	2.9	6.3
18/01/2013	23.9	31.4	38.9	20.5	34.7	51.4	0	1.1	3.5	8.1
19/01/2013	27.2	34.4	41.9	17.7	30.1	66.9	3.2	0.6	4.8	9.6
20/01/2013	24.4	28.4	34.1	36.7	58.5	77.4	0.2	0.7	5.2	10.3
21/01/2013	20.4	25.7	31.5	43.1	61.1	79	0	2	4.7	7.1
22/01/2013	20.1	27.9	36.3	25.6	51.9	79.5	0	0.1	2.3	8
23/01/2013	22.5	26.5	34.4	33.9	59.4	83.6	3.6	0.4	0.3	12.3
24/01/2013	20.6	27.4	36	20.8	48.4	79.6	0.6	0.1	2.4	11.6
25/01/2013	21.2	27.2	35	26.2	50.8	72.2	0	1.1	4.4	10.7
26/01/2013	21.1	28.9	36.2	24.1	45.7	71.8	0	0.3	2.4	6.4
27/01/2013	23.2	27.1	34.5	33.3	59.7	92.2	1.8	0	2.2	6.7
28/01/2013	21.3	23.4	27.4	64.4	83.8	94.1	3.4	1	4.7	8.3
29/01/2013	20	20.8	22.7	79.2	92.1	96.1	100.4	2.5	6.9	12.9
30/01/2013	19.4	25.7	33.5	27.4	65	97.1	0.6	0.7	2.3	6.4
31/01/2013	18.1	27.1	35.2	19.2	42	69.4	0	0	1.4	5.5
Average	**21.5**	**28.5**	**36.1**	**26.1**	**47.0**	**71.1**		**0.7**	**3.1**	**8.6**
Maximum	**27.2**	**34.8**	**42.6**	**79.2**	**92.1**	**97.1**	**100.4**	**3.3**	**7.0**	**14.8**
Minimum	**17.3**	**20.8**	**22.7**	**7.9**	**22.5**	**33.9**	**0.0**	**0.0**	**0.3**	**4.7**
Total							**125.2**			

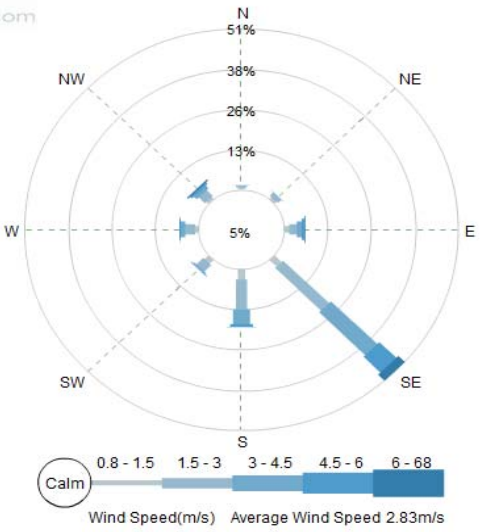
Daily Summary **February 2013** **Narrabri Mine Weather Station**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
1/02/2013	19.4	27	34.7	25.3	56.9	88.4	23.6	0	0.2	6.2
2/02/2013	16.8	24.3	32.1	45.1	73.8	97.9	53	1	2.7	12.1
3/02/2013	15.5	18.8	23.1	51	63.6	91.3	0	0.1	3.4	8.1
4/02/2013	12.9	19	25	34.5	57	81.7	0	2.2	4.8	8.6
5/02/2013	13.9	21.8	29.2	26.9	54.4	84.3	0	1.6	4.8	8.6
6/02/2013	16.1	22.8	29.3	25.9	53.7	79.6	0	1.6	4.2	7
7/02/2013	16.5	23.3	30.1	21.9	51.1	80.9	0	0.6	3.1	5.7
8/02/2013	16.4	23.8	31	25.4	49	78.5	0	0.1	1.8	4.9
9/02/2013	16.2	24.9	32.5	24.1	48.6	83	0	0	0.7	5
10/02/2013	19.4	26.1	33	23.3	47.9	71.2	0	0	1.3	7.2
11/02/2013	20.2	27.1	34.4	31.2	52.1	78.8	0	0.1	2.7	7.1
12/02/2013	18.5	23.2	31	46.1	71.6	94.7	15	0.2	2.3	12.7
13/02/2013	17.9	23.6	30.5	40.8	70.7	95.1	0.2	0.4	3.6	7.7
14/02/2013	17.4	23	28.8	35.6	59.8	86	0	2.4	4.6	6.6
15/02/2013	15.8	22.9	29.5	30	52.3	77.9	0	0.5	3.6	6.9
16/02/2013	18.2	23	29	40	62.6	78.6	1.4	0.2	2.3	6.7
17/02/2013	17.7	23.7	30.3	33.8	56.3	82.7	0	1.4	3.7	8.3
18/02/2013	16.5	23.1	29.3	33.6	53.7	80.2	0	2.9	4.5	7.4
19/02/2013	15.7	23.6	30.1	29.6	51	79.9	0	0.2	2.7	5.1
20/02/2013	17.2	24.4	31.6	28.6	51.4	78.4	0	0.9	4.4	8.3
21/02/2013	17.4	24	30.8	35	54.1	81.6	0	1.4	5.2	9.9
22/02/2013	17.6	24	30.9	30.2	52.9	82.5	0	2.2	6.5	10.1
23/02/2013	16.4	22.4	27.9	38.5	58.4	80.8	0	2	7.9	11.4
24/02/2013	18	20.6	24.9	70.1	84.1	92	7.2	0.6	3.7	9.2
25/02/2013	17.8	25.4	33.7	33.4	64.5	95.8	0	0	1.9	6.9
26/02/2013	20.3	24.4	32	41.9	70.5	91.9	1	0	1.6	6.5
27/02/2013	20.2	24.4	30.5	41.4	71.5	91.7	0.6	0.3	1.9	5.2
28/02/2013	19.8	25.6	31.5	34.1	60	91.2	0.2	0	0.4	4.2
Average	**17.3**	**23.6**	**30.2**	**34.9**	**59.1**	**84.9**		**0.8**	**3.2**	**7.6**
Maximum	**20.3**	**27.1**	**34.7**	**70.1**	**84.1**	**97.9**	**53.0**	**2.9**	**7.9**	**12.7**
Minimum	**12.9**	**18.8**	**23.1**	**21.9**	**47.9**	**71.2**	**0.0**	**0.0**	**0.2**	**4.2**
Total							**102.2**			

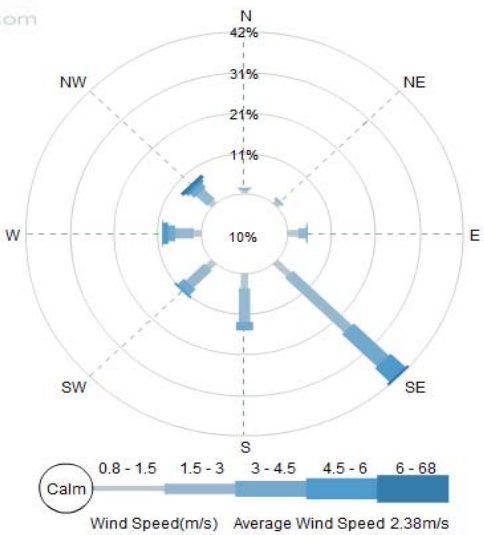
Daily Summary **March 2013** **Narrabri Mine Weather Station**

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
1/03/2013	21.4	25.1	29.9	47.5	63.2	83.1	0	0	3.6	7.7
2/03/2013	17.3	19.7	23.2	84	93.7	97.8	93.6	0	2.5	10.5
3/03/2013	16.6	18.6	21.8	65	76.6	84.8	0.4	5.5	8.7	15.1
4/03/2013	16.7	19.8	24.1	67.4	81.4	93.2	5.6	4.2	6.4	10
5/03/2013	17.7	22.5	28.7	44	67.5	87.4	0	3.3	5.6	8.5
6/03/2013	16.3	22.3	28.4	40.8	62.7	84.5	0	2	5	7
7/03/2013	15.1	22.3	28.7	36.8	58.2	85.8	0	0.4	2.3	4.6
8/03/2013	16.2	22.4	28.3	34.8	58.6	85.1	0	0	2.5	5
9/03/2013	16.6	22.7	28.9	37.3	59.3	81.9	0	0.2	2.5	4.6
10/03/2013	17.3	23	28.7	37.4	60.7	85.3	0	0.1	3	5.6
11/03/2013	17.8	22.6	28.3	39.8	60.3	77.4	0	0	2.1	4.5
12/03/2013	16.7	22.7	28.6	37.7	59.9	84.3	0	0.7	2.6	5.6
13/03/2013	16.2	22.3	29.2	33.2	57	79.3	0	0	1.1	6
14/03/2013	16.4	21.9	28.6	32.5	57.2	80.1	0	0	2.2	5.1
15/03/2013	14.2	23	30.7	34.3	56.1	82.2	0	0	2.4	5.4
16/03/2013	17.8	24.2	30.9	36.3	59.6	83.3	0	0.2	2.9	5.3
17/03/2013	17.5	25.6	33.3	31.7	56	87.7	0	0.1	1.6	7.7
18/03/2013	16.6	21.7	26.2	18.5	36.5	58	0	1	4.5	10.2
19/03/2013	11.8	19.7	27.5	31	51.4	74.1	0	0.2	3.3	6.6
20/03/2013	14.6	21.1	28.5	28.7	54.6	77.7	0	0.6	3	6.1
21/03/2013	14.4	22.2	29	25.6	49.2	77.8	0	0	1.4	4.7
22/03/2013	14.4	22.4	29.3	36.9	55.3	76.9	0	0	2	7.6
23/03/2013	18.6	22.9	28.8	49.9	71.1	96.8	16.6	0.1	4.1	9
24/03/2013	18.1	22.8	29.1	58.8	79.5	93.8	4	0	1.5	8.1
25/03/2013	18.4	24.2	31.9	29.5	65.7	96.5	0.2	0	1.4	4.3
26/03/2013	15.2	23	31.3	26.3	54.2	82.1	0	0	1.9	4.1
27/03/2013	18.1	23.9	30.2	42	61.7	81.6	0	0	1	3.9
28/03/2013	19	24.7	31.2	37.2	60	82.6	0	0	1.3	4.4
29/03/2013	18.3	24.4	30.4	37.9	58.7	76.8	0	0	2.8	7.6
30/03/2013	15.4	21.2	28.4	22.9	57.4	93.6	0.4	0	2.2	5.7
31/03/2013	12.2	19.8	29.5	16.2	55.4	89	0	0.1	1.3	6.4
Average	**16.5**	**22.4**	**28.8**	**38.8**	**61.2**	**83.9**		**0.6**	**2.9**	**6.7**
Maximum	**21.4**	**25.6**	**33.3**	**84.0**	**93.7**	**97.8**	**93.6**	**5.5**	**8.7**	**15.1**
Minimum	**11.8**	**18.6**	**21.8**	**16.2**	**36.5**	**58.0**	**0.0**	**0.0**	**1.0**	**3.9**
Total							**120.8**			

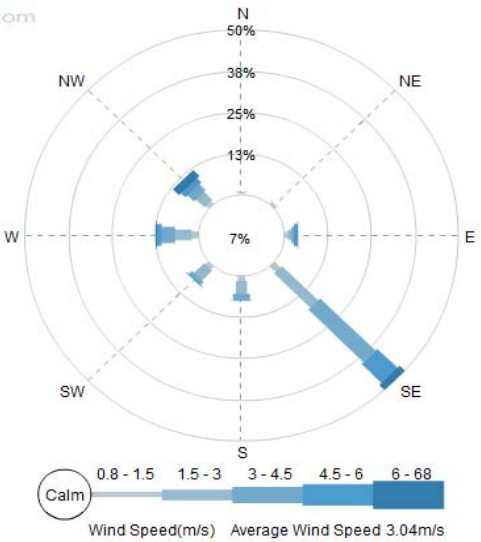
Narrabri Mine Weather Station
April 2012 Wind Rose



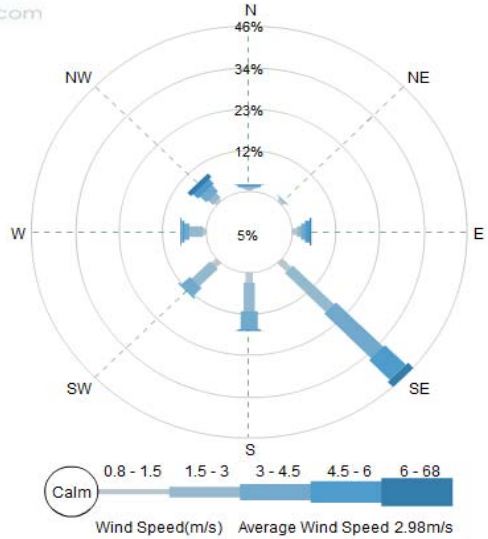
Narrabri Mine Weather Station
May 2012 Wind Rose



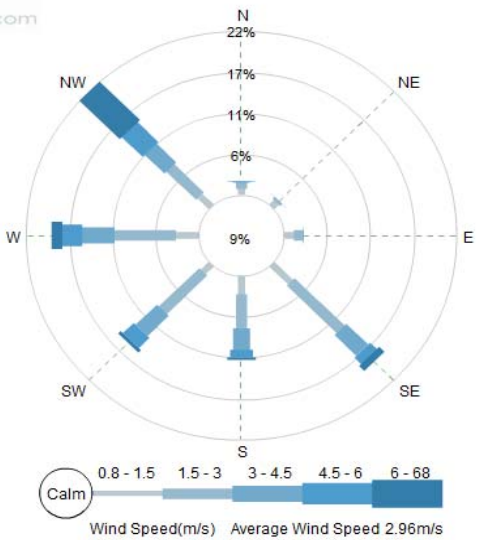
Narrabri Mine Weather Station
June 2012 Wind Rose



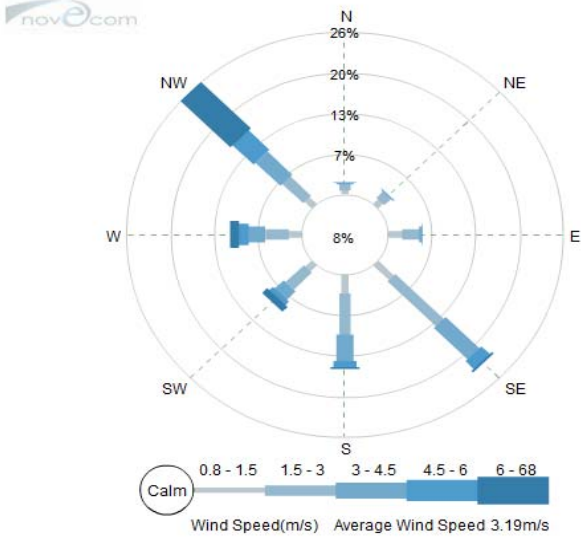
Narrabri Mine Weather Station
July 2012 Wind Rose



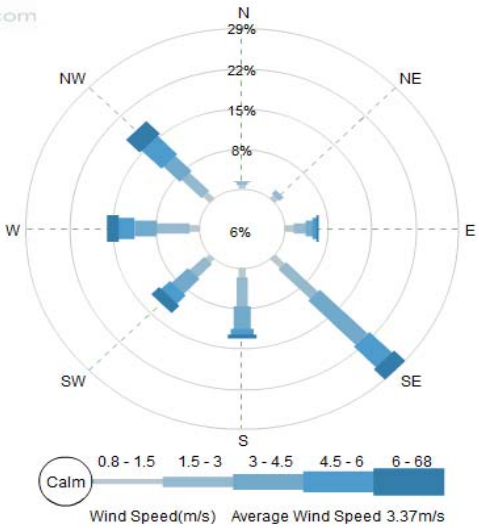
Narrabri Mine Weather Station
August 2012 Wind Rose



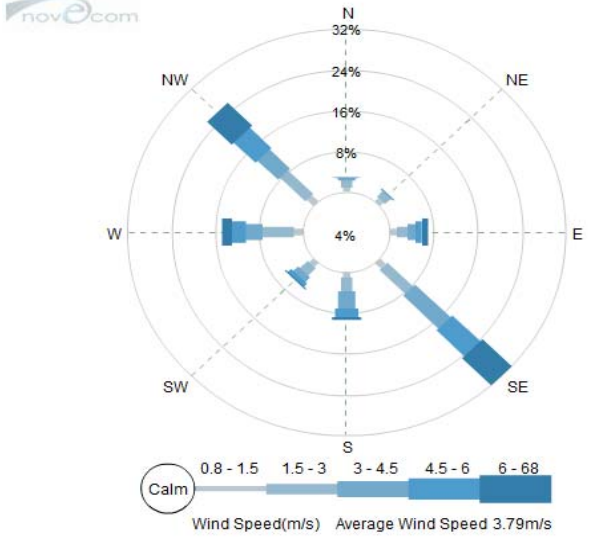
Narrabri Mine Weather Station
September 2012 Wind Rose



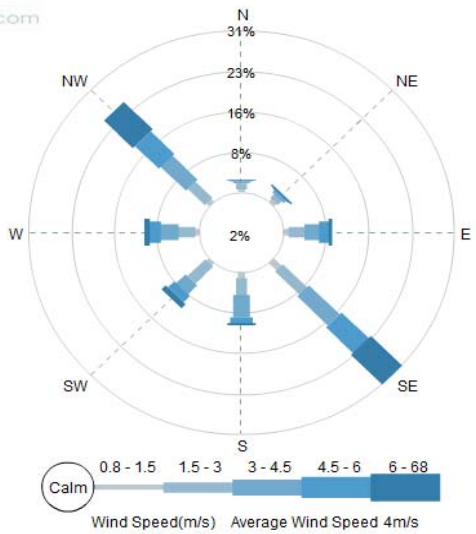
Narrabri Mine Weather Station
October 2012 Wind Rose



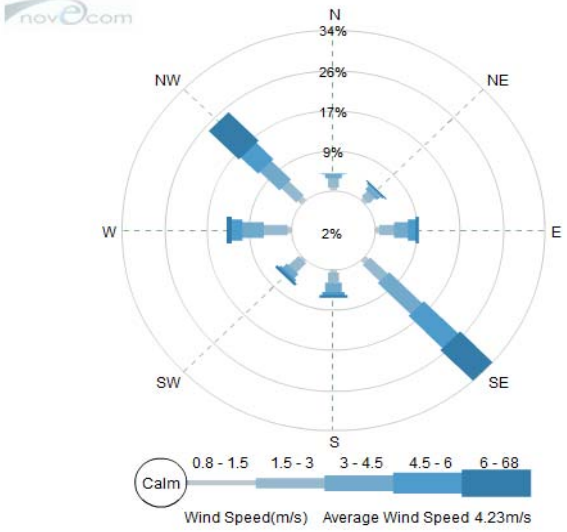
Narrabri Mine Weather Station
November 2012 Wind Rose



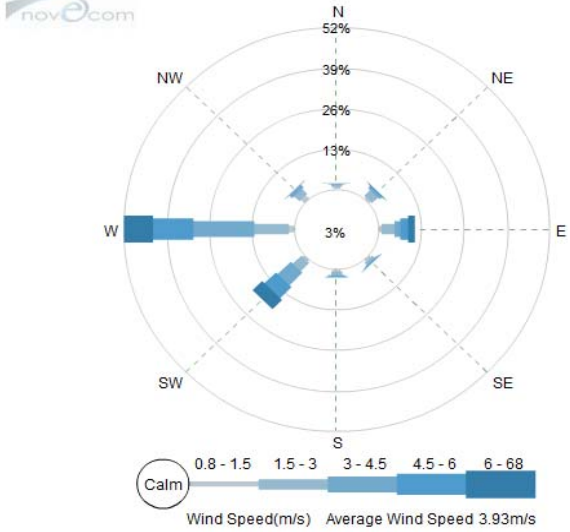
Narrabri Mine Weather Station
December 2012 Wind Rose



Narrabri Mine Weather Station
January 2013 Wind Rose



Narrabri Mine Weather Station
February 2013 Wind Rose



Narrabri Mine Weather Station
March 2013 Wind Rose