**ENHANCE PLACE Pty Limited**

# PINE DALE
# OPEN CUT COAL MINE

# ANNUAL ENVIRONMENTAL MANAGEMENT REPORT 2011

# TITLE

| | |
|---|---|
| **Name of Mine:** | Pine Dale |
| **Titles/Mining Leases:** | ML1569, ML1578, ML1664 |
| **Development Consent Number:** | 10_0041 |
| **MOP Commencement Date** | 24 February 2011 |
| **MOP Completion Date** | 24 February 2014 |
| **AEMR Commencement Date:** | 1 January 2011 |
| **AEMR Completion Date:** | 31 December 2011 |
| **Name of Leaseholder:** | Enhance Place Pty Limited |
| **Reporting Officer:** | Mr Hilton Goldfinch |
| **Title:** | Manager of Mining Engineering |

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# 1 INTRODUCTION AND GENERAL OBJECTIVES

## 1.1 Introduction

Pine Dale Open Cut Coal Mine is located at Blackmans Flat, 16 km north of Lithgow on the Castlereagh Highway in the Western Coalfields of NSW. The site is approximately 3 km by road from the Mt. Piper Power Station and immediately across the Highway from the Springvale Joint Venture Coal Preparation & Handling Facility.

Prior to its current operation, the Pine Dale Mine Site was known as the Wallerawang Colliery. The Wallerawang Collieries Ltd (Wallerawang) requested Enhance Place Pty Ltd. (Enhance) in 2002 to consider undertaking the extensive surface rehabilitation of the derelict site in exchange for the sale of certain land holdings and transfer of coal leases.

Enhance accepted the offer, and on 13 February 2003, Wallerawang signed an agreement providing Enhance with the site management rights, access to the remnant coal reserves on the lease while rehabilitating the site, and, the transfer of most of the former colliery's landholdings and part of its coal lease, CCL770 (Act 1992). The name of the site was changed to "**Pine Dale**" by Enhance.

The company prepared the Wallerawang Colliery Pit Top Rehabilitation Plan (MOP), which was approved by the Department of Primary Industries (Mineral Resources) (DPI-MR). An EPA Licence was granted and site activity commenced towards the end of 2003. Ministerial approval was granted for Enhance to apply for a Mining Lease over an area of coal bearing land from which the now operating Pine Dale Mine draws its resources. Development Application 461/04 was lodged with Lithgow City Council (LCC). Planning direction was given to the project and work commenced on an Environmental Impact Statement (EIS). The EIS was lodged with the LCC, a Public Exhibition followed and Development was consented to in November 2005. Mining Lease 1578 was subsequently granted and the Pine Dale Mine commenced operation in early 2006 after receipt of all licences, approvals and acceptance of the Pine Dale Mining Operations Plan (MOP) by the DPI. All resources were exhausted in December 2010 whereupon an Environmental Assessment was submitted to and subsequently approved by all authorities at both the New South Wales and Federal Government levels. The Project Approval 10_0041 was issued to Enhance on the 20th February 2011 for a period of three years which includes construction, mining and rehabilitation. Coal deliveries under this new approval did not commence until January 2012.

## 1.2 Site History

The Wallerawang Colliery commenced operations in 1910 as an extension to the first mine in the district, which started about 1855. The colliery operated as a bord and pillar mine until mining operations ceased in 1986. The area of surface disturbance was estimated to be 50 Hectares at that time.

Between 1987 and 1990 the surface infrastructure was removed and the shafts and adits sealed. Approximately 10 Hectares of the surface area disturbed by the operation were rehabilitated in 1991. Rehabilitation was performed in accordance with the document "Specification for General Earthworks and Rehabilitation/Revegetation of Washery Reject

Emplacement Area at Wallerawang NSW" as approved by the then Department of Mineral Resources. The mine bathhouse was removed in 1994. Little work was done thereafter, other than improved control of site discharge of surface water, some grassing and seeding and noxious weed control.

The Yarraboldy Pond Fines Removal Operation began operations north of the Angus Place Haul Road in 1999 and ceased on the 9th December 2005. The Yarraboldy Briquette Company had no rehabilitation clause in its contract with The Wallerawang Collieries Ltd. Rehabilitation of the final void is now the responsibility of Enhance Place Pty Ltd.

In early 2006 the Pine Dale Open Cut Mine began producing coal from the first of three planning areas, A, B and C. Area A was mined between 28th March and 31st October 2006, with surface profiling work following in 2007. Rehabilitation of Area A has now been completed, including additional seeding performed in spring 2009. Mining began in Area B on 13th November 2006 lasting two years, and followed by the mining of Area C. Mining in Area C was completed in December 2010. Rehabilitation of Areas B and C follows the mining cycle, (see Section 2.4).

The previous Annual Environment Management Report covered the period from 1st January – 31 December 2010.

## 1.3 Consents, Leases and Licences

| Permit Type | Permit Number | Relevant Dates | Details |
|---|---|---|---|
| Consolidated Coal Lease | CCL770 | Valid until 2025 | CCL770 (renewed in 2003) covered 432 ha of land[1], approximately 40 ha of which is now owned by Enhance. The remainder owned by NSW State Forests, some as freehold and the rest as Crown Land. |
| Environmental Protection Licence | EPL 4911 | Review Due Date: 9 July 2012 | Wallerawang Colliery held Environmental Protection Licence No. 4911 which was transferred to Enhance Place Pty. Limited on 13th February 2003. |
| Development Consent | DA 461/04 | Valid until 14 November 2015 | Granted by Lithgow City Council on 14 November 2005 (under delegated authority from the (then) Minister of Infrastructure, Planning and Natural Resources) and Modified on 17 March 2008. Surrendered 20th February 2011 |
| Project Approval | 10_0041 | Granted 20th February 2012 Valid to 13th August 2013 | Granted by Minister of Planning NSW, Section 75J of the Environmental and planning Assessment Act 1979. |

1 . The original lease covered 1253 ha of land.

| Permit Type | Permit Number | Relevant Dates | Details |
|---|---|---|---|
| Mining Lease | ML1578 (Act 1992) | Dated 15 March 2006 | Mining Lease (ML) 1578 incorporates 69.4ha of land within the boundary of the Pine Dale mine site. |
| Mining Lease | ML 1569 (Act 1992) | Dated 4 July 2007 | Mining Lease 1569 incorporates 161 ha, about one third of the existing CCL770 |
| Mining Lease | ML1664 (Act 1992) | Dated 10th January 2012 | Mining Lease 1664 incorporates 4.1 Hectares of land within the boundary of the Pine dale mine site. |
| Flood Control Works Licence | 10CW801601 | Dated 23 December 2005 | Issued by the Department of Natural Resources (DNR) under Part 8 of the *Water Act 1912* for the construction of noise/flood bunding along the southern boundary of mining Area A and the southern and eastern boundaries of mining Areas B and C. |
| Bore Licence | 10BL165933 | Dated 22 December 2005 | Issued by the Department of Natural Resources (DNR) under Part 5 of the *Water Act 1912* for the use of six piezometers for monitoring groundwater levels and quality. |
| Bore Licence | 10BL604181 | Dated 23 November 2010 | This licence was issued by DECCW – NOW under Part 5 of the *Water Act 1912* for interception and use of up to 200ML of groundwater per year. |

## 1.4 Amendments to these over the Reporting Period

Pine Dale Mine Mining Operations Plan (MOP)

- Granted 24th February 2011
- Issued by NSW Government Department of Industry and Investment, Environmental Sustainability Unit.

Groundwater Licence 10BL604181

- Granted November 23rd 2010.
- Issued by the NSW Office of Water for the interception of Groundwater from the open cut workings.

## 1.5 Mine Contacts

Personnel responsible for managing the operation and its environmental aspects are as follows:

**Table 1: Mine Contacts**

| Contact Person | Position | Telephone | Facsimile |
|---|---|---|---|
| Mr Hilton Goldfinch | Manager of Mining Engineering | (02) 6355 7893 | (02) 6355 7894 |
| Mr John Doherty | Director | 0412 640 493 | (02) 9906 4588 |
| Mr Denis Frew | Director | (02) 4225 9790 | (02) 4225 9539 |

## 1.6 Actions Required from Previous AEMR Review

A Letter of Acceptance for the 2010 AEMR has been issued by Mr. Greg Kininmonth of the NSW department of Industry and Investment on the 6th September 2011. This letter indicated that there were no actions required from the 2010 AEMR.

**Table 2: Actions Required from Previous AEMR Review**

| Action Required | Where dealt with in this AEMR |
|---|---|
| None identified | Not Applicable |

# 2 SUMMARY OF OPERATIONS

## 2.1 Exploration

There was no exploration carried out on the site during the reporting period.

## 2.2 Land Preparation

2011 saw the operation complete all of the rehabilitation works in Area C. Topsoil was replaced upon the subsoil, which is above the previous working strips. This material came from the stockpiles which were utilised as supplemental sound bunds.

## 2.3 Construction

There was no construction carried out during the reporting period of the 2011 AEMR. For the next reporting period, the amenity bund of the Yarraboldy area shall be constructed as described in the MOPS.

## 2.4 Mining

Mining Lease 1578 was issued on 15 March 2006, following Development Consent from Lithgow City Council.

There was no mining during the reporting period.

**Table 3: Production and Waste Summary**

| | Cumulative Production | | |
|---|---|---|---|
| | **Start of Reporting Period** | **End of Reporting Period** | **End of Next Reporting Period (estimated)** |
| **Topsoil Stripped** | 16,262 $m^3$ | 16,262 $m^3$ | 22,000 $m^3$ |
| **Topsoil used/spread** | 24,126 $m^3$ | 24,126 $m^3$ | 0 $m^3$ |
| **Waste Rock** | 9,721,736 tonnes | 9,721,736 tonnes | 13,186,736 tonnes |
| **Ore** | N/A | N/A | N/A |
| **Processing Waste** | N/A | N/A | N/A |
| **Product** | 953,674 tonnes | 953,674 tonnes | 1,303,674 tonnes |

Waste rock and overburden is progressively used to fill the previous mining area. Waste rock from Area A was used to create the noise/flood bunds. Waste rock from Area B has been used to backfill Area A, waste rock from Area C was utilised to backfill Area B and finally, the out of pit dump and the flood/noise bunds were deconstructed and filled the remaining void in Area C.

The 8,000 $m^3$ of topsoil stripped during the 2006 reporting period was used for the creation of noise bunds. The 10,000 $m^3$ of topsoil stripped during the 2009 reporting period was stockpiled to the north of Area C. Once mining was completed in Area C, the 7,000 $m^3$ of topsoil was used for final rehabilitation of Area C.

Pine Dale Mine continues to utilise mining software, Minex, to assist in improving production and overburden estimates. Minex is a comprehensive geological modelling and mine planning tool for coal and other stratified deposits.

## 2.5 Production

Development Consent for coal production in 2011 was 350,000 tonnes. There was no coal production during the reporting period. The current Project Approval (2012) for production of coal is and continues to be limited to 350,000 tonnes per annum.

## 2.6 Estimated Mine Life

The open cut mining of the reserves to the north of the coal haulage road did not produce any coal within the reporting period of 2011.

The estimated mine life for the area is currently two years. This being compiled of two years of coal production at 350,000 tonnes per annum.

## 2.7 Mineral Processing

Extracted coal is to be carried directly to the onsite crushing plant where it is sized and screened to ≤50 mm. The screened coal is to be either temporarily stockpiled or transported in covered trucks to Mt Piper Power Station by way of the Coal>Link private haul road.

Coal is not washed on site.

## 2.8 Waste Management

General waste from the offices and amenities is removed by SITA, Lithgow, the 2011 Principal Waste Contractor for the company.

Waste oil and oil drums are removed from site by the Open Cut Mining Contractor, Dukes Mining Pty Ltd.

## 2.9 Ore and Product Stockpiles

The capacity of the Run-of-Mine (ROM) stockpile is 20,000 tonnes.

During the reporting year, there was no production.

## 2.10 Water Management

Water management (groundwater, floodplain and surface water) is described in the MOP (Incorporating Rehabilitation and Environmental Management) and specifically outlined in Sections 11.4 and 11.5. As there was no coal production during the reporting time, there were no ground water activities undertaken excepting for monitoring. Surface water interactions were limited to that of the rehabilitation of the Area C.

## Table 4: Surface water Monitoring Locations and Frequency

| Monitoring Location* | Type of Monitoring Point | Frequency | Sampling Method |
|---|---|---|---|
| Point 2 | Baseline and discharge monitoring | *Quarterly during discharge*<br>*Daily during discharge for pH, EC and turbidity* | Grab sample for oil & grease, TSS, turbidity, iron and sulfate concentrations.<br><br>Probe for pH and electrical conductivity measurements. |
| Point 3 | Baseline and discharge monitoring | *Quarterly during discharge*<br>*Daily during discharge for pH, EC and Turbidity* | |
| LDP 4 | Discharge monitoring (to underground) | *Quarterly during discharge* | |
| LDP 13 | Discharge monitoring (to surface waters) | *Quarterly during discharge*<br>*Daily during discharge for pH and EC* | |
| Point 14 | Baseline and discharge Monitoring | *Quarterly*<br>*Daily during discharge for pH, EC and Turbidity* | |

**Table 5: Ground Water Monitoring Locations and Frequency**

| identification[#] | Strata Targeted | Type of Monitoring Point | Parameters* | Frequency |
|---|---|---|---|---|
| EP PDH8/GW | Wallerawang Underground Workings | Standpipe | Standing Water Level | Monthly |
| | | | Physical Parameters, Major Cations / Anions and Dissolved Metals | Quarterly |
| Old Ventilation Shaft | Wallerawang Underground workings | Well | Standing Water Level | Monthly |
| P2 | Disturbed strata associated with Commonwealth Open Cut and Extended Open Cut | Standpipe | Standing Water Level, pH and EC (probe) | Monthly |
| | | | Physical Parameters, Major Cations / Anions and Dissolved Iron | Quarterly |
| P3 | | Standpipe | Standing Water Level, pH and EC (probe) | Monthly |
| | | | Physical Parameters, Major Cations / Anions and Dissolved Iron | Quarterly |
| P4 | | Standpipe | Standing Water Level, pH and EC (probe) | Monthly |
| | | | Physical Parameters, Major Cations / Anions and Dissolved Iron | Quarterly |
| P6 | Wallerawang Underground workings | Standpipe | Standing Water Level, pH and EC (probe) | Monthly |
| | | | Physical Parameters, Major Cations / Anions and | Quarterly |

| identification[#] | Strata Targeted | Type of Monitoring Point | Parameters* | Frequency |
|---|---|---|---|---|
| | | | Dissolved Iron | |
| P7 | Lithgow Seam | Standpipe | Standing Water Level, pH and EC (probe) | Monthly |
| | | | Physical Parameters, Major Cations / Anions and Dissolved Iron | Quarterly |
| P7a | Lithgow Seam | Standpipe | Standing Water Level, pH and EC (probe) | Monthly |
| | | | Physical Parameters, Major Cations / Anions and Dissolved Iron | Quarterly |
| Sump Pump | NA | In-pit Sump | Volume pumped, pH and EC | Monthly |
| | | | Major Cations / Anions & Dissolved Metals | Six Monthly |
| EP DDH5/GW | Sandstone, Irondale, Lidsdale & Lithgow Seams | Vibrating Wire | Standing Water Level (download) | Monthly (Continuous) |
| EP DDH6/GW | , Irondale, & Lithgow Seams | Vibrating Wire | Standing Water Level (download) | Monthly (Continuous) |
| EP PDH1/GW | Lithgow Seam | Standpipe | Standing Water Level | Monthly |
| | | | Physical Parameters, Major Cations / Anions and Dissolved Metals | Quarterly |

| identification[#] | Strata Targeted | Type of Monitoring Point | Parameters* | Frequency |
|---|---|---|---|---|
| EP DDH3/GW | Irondale, Lidsdale & Lithgow Seams & Marrangaroo Formation | Vibrating Wire | Standing Water Level (download) | Monthly (Continuous) |
| EP DDH4/GW | Middle River Seam | Standpipe | Standing Water Level | Monthly |
| | | | Physical Parameters, Major Cations / Anions and Dissolved Metals | Quarterly |
| EP PDH7GW | Middle River Seam | Standpipe | Standing Water Level | Monthly |
| | | | Physical Parameters, Major Cations / Anions and Dissolved Metals | Quarterly |
| EP DDH7GW | Middle River Seam | Standpipe | Standing Water Level, | Monthly |
| | | | Physical Parameters, Major Cations / Anions and Dissolved Metals | Quarterly |

Water for use in the offices and amenities is sourced from town water.

There are no permanent water storages on the current site.

**Table 6: Stored Water**

| | Volumes Held ($m^3$) | | |
|---|---|---|---|
| | Start of Reporting Period | End of reporting Period | Permanent Storage Capacity |
| **Clean Water** | 0 | 0 | 0 |
| **Dirty Water** | 0 | 0 | 0 |
| **Controlled Discharge Water** (salinity trading schemes) | N/A | N/A | N/A |
| **Contaminated Water** | 0 | 0 | 0 |

Note: There are no permanent surface water storages on the site.

## 2.11 Hazardous Materials Management

Hazardous materials stored on site are limited to bulk storage of diesel fuel and small quantities of miscellaneous chemicals for vehicle maintenance (i.e. oils and lubricants).

The diesel storage capacity at the Pine Dale Open Cut Coal Mine is 47,000 L and is stored in a tank located within a bunded steel container with lockable doors. It is located together with the associated bowser in the fuel bay in the northern corner of the maintenance area. Diesel fuel was delivered to site by a mobile diesel tanker as required.

There are no bulk oils stored on site. Oils are brought onto site as required by the Mining Contractor. Waste oil and oil drums are removed from site by the Mining Contractor for disposal.

Material Safety Data Sheets (MSDS) accompany the materials on site and are kept in a folder with the Hazardous Materials Register, located in the office.

## 2.12 Other Infrastructure Management

There is no other infrastructure at the Pine Dale Open Cut Coal Mine.

# 3 ENVIRONMENTAL MANAGEMENT

Enhance Place Pty Ltd is a small, domestically focussed Australian coal miner. The company regards sound environmental performance and community liaison as integral components of its business.

The company seeks to:

- minimise the impact of its operations on the environment through effective environmental management;
- communicate with the community, consider its concerns and expectations and move to a solution;
- ensure that employees and contractors recognise they are accountable for their actions;

and always:

- comply with applicable environmental laws and other obligations;
- use effective environmental management, adopting the principles of ISO 14001, to comply with all environmental laws and minimise adverse environmental impacts;
- provide awareness training for employees and;
- monitor, audit, and review performance;
- communicate with key stakeholders including shareholders, the community and government;
- promote active employee participation to continuously improve environmental management and performance;
- reduce and reuse waste where practicable; and
- undertake appropriate decommissioning and rehabilitation.

## Environmental Management

Environmental management is reflected in operating procedures outlined in the MOP. Also included in the MOP are specific management plans for:

- Blast Management
- Flora and Fauna Management
- Bushfire Management
- Soil and Erosion Management
- Complaints Management

## Environmental Monitoring

The monitoring program in the MOP provides a reference for all the environmental monitoring procedures and timing for monitoring to be undertaken during the construction and operation of the Pine Dale Coal Mine. More detailed information can be found in the following monitoring sections of the MOP:

- Noise Monitoring Program
- Air Quality Monitoring Program
- Groundwater Monitoring Program
- Surface Water Monitoring Program

Locations of monitoring sites are shown in the Site Plan (Attachment 1 to this document).

## Risk Assessment

Risks of mining activities were assessed as required for the EIS. An Environmental and Rehabilitation Risk Matrix is included of the MOP (shown below).

**Table 7: Environmental and Rehabilitation Risk Matrix**

| Issue | | Land preparation, vegetation and topsoil stripping. | All construction activities including earth moving. | Mine development and mining, surface and underground. | Use/maintenance of roads, tracks and equipment. | Waste rock emplacement management. | Mineral processing facilities and infrastructure. | Ore/product stockpiling and handling. | Water management including term event contingencies. | Hazardous materials and fuel, handling/spills management. | Sewerage. | Rubbish disposal. | Rehabilitation activities. | Rehabilitated land and remaining features. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Air Quality** | Air pollution – dust/other | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | |
| **Water** | Erosion / sediment minimisation | ✓ | ✓ | | ✓ | | ✓ | ✓ | | | | | ✓ | |
| | Surface water pollution[1] | ✓ | ✓ | | ✓ | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | |
| | Ground water pollution | | | ✓ | | | | | ✓ | | | | | |
| **Soil** | Contaminated or polluted land | ✓ | ✓ | ✓ | ✓ | | | | | | | | ✓ | |
| **Flora** | Threatened flora protection | ✓ | ✓ | | | | | | | | | | | |

| | Issue | Land preparation, vegetation and topsoil stripping. | All construction activities including earth moving. | Mine development and mining, surface and underground. | Use/maintenance of roads, tracks and equipment. | Waste rock emplacement management. | Mineral processing facilities and infrastructure. | Ore/product stockpiling and handling. | Water management including term event contingencies. | Hazardous materials and fuel, handling/spills management. | Sewerage. | Rubbish disposal. | Rehabilitation activities. | Rehabilitated land and remaining features. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Fauna** | Threatened fauna protection | ✓ | ✓ | | | | | | | | | | | |
| **Flora** | Weed control and management | ✓ | ✓ | | ✓ | | | | | | | | ✓ | ✓ |
| **Noise** | Operational noise | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | | | ✓ | |
| | Vibration / air blast | | | | ✓ | | | | | | | | | |
| **Visual Amenity** | Visual amenity, stray light[2] | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | | ✓ | ✓ | |
| **Heritage** | Aboriginal heritage[3] | | | | | | | | | | | | | |
| | Natural heritage conservation[4] | | | | | | | | | | | | | |
| **Fire Manage-ment** | Spontaneous combustion | | | ✓ | | | | ✓ | | | | | | |
| | Bushfire | ✓ | | | ✓ | | | | | | | | ✓ | |
| | Mine subsidence | | | | | | | | | | | | | |
| **Soil and Water** | Hydrocarbon contamination | | | | | | ✓ | | | ✓ | | | | |
| | Methane drainage / venting | | | | | | | | | | | | | |
| **Public Safety** | Public safety[5] | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | |

1 - Off site pollution only
2 - Construction and production activities will occur between 7:00am and 6:00pm and hence stray light is not likely to affect visual amenity. Transport and maintenance activities are permitted at later times each day.
3 - No items of Aboriginal heritage significance have been identified within the site.
4 - The site is highly disturbed and does not contain items / areas of natural heritage significance
5 - All activities carry some form of risk to public safety, however, there will be no public access to areas where these activities are undertaken.

These risks were not reassessed during the reporting period.

## 3.1 Air Pollution

Dust creation is a major air pollution concern at the Pine Dale Mine. Onsite dust suppression is to be performed using a 50,000 Litre tanker from water accumulated in the in-pit sumps. The tanker will typically make 7-8 trips on dry days and only if necessary on wet days.

Dust is monitored through six depositional dust gauges (DDG) and one high volume air sampler (HVAS) for total suspended particulates. Continual monitoring is performed by Metford Laboratories, Newcastle and a Summary Report (refer to Attachment 2) on data collected throughout the reporting period was compiled by Karen Tripp (Environmental Scientist, Metford Laboratories).

Depositional Dust results for the period January – December 2011 show an average insoluble solids range of 0.3 g/m2 per month to 0.9 g/m2 per month for dust gauges D1, D2, D3, D4, D5 and D6 for the 12-month period. These results fall well below the nominated assessment criteria of an annual average of 4.0 g/m2 per month, as stipulated in the *Air Quality Monitoring Program*.

HVAS Total Suspended Particulate (TSP) results for the period January – December 2011 show an average result of 20.1µg/m3, which is well below the nominated annual average TSP assessment criteria of 90µg/m3. Similarly, the HVAS particulate matter results <10µm (PM10) also show results within the required *Air Quality Monitoring Program* assessment criteria. The average PM10 result was 10.7µg/m3, which is below the annual average PM10 assessment criteria of 30µg/m3. The highest PM10 result recorded during a single 24hour run day was 33µg/m3 on 1 February 2011, which is also below the 24hour-maximum assessment criteria of 50µg/m3.

## 3.2 Erosion and Sediment

Drainage control was monitored and maintained on the haul roads. This was achieved by maintaining the engineered fall of the roads to the north, away from the Neubecks Creek. Windrows and sediment fencing were also maintained to continue the prevention of surface water and sediment entering Neubecks Creek.

To control erosion and sedimentation in the rehabilitation areas, the surfaces were generally ripped and designed in compliance with the NSW Blue Book.

Sediment fences have continued to be installed and maintained in drainage lines where required.

Vegetation that has been planted has contributed to the control of erosion and sediment transportation from in and around the rehabilitation site.

## 3.3 Surface Water Pollution

EPL 4911 requires monitoring at four locations:

**Table 8: Locations of EPL Monitoring Points**

| EPL Monitoring Point | Location |
|---|---|
| 2 | Upstream of Delta Electricity flow gauge |
| 3 | 100m from discontinued discharge point |
| 4 | Wallerawang Colliery No. 1A Mine Entry |
| 5 | Wallerawang Colliery Punch Mine Entry |

The locations of the monitoring points are indicated on the Site Plan in Attachment 1.

Samples were analysed by Metford Laboratories (NATA Scope of Registration No. 16748). Water flowing through Neubecks Creek, was generally neutral, with an average pH of 7.075, a similar result on the average pH (7.075) recorded during the last reporting period.

Surface water samples collected during the January – December 2011 period show water quality results that comply with the Concentration Limits of EPL 4911.

All monitoring performed was undertaken in accordance with the EPL. Monitoring at Point 2, Point 3 and Point 14 was undertaken on a quarterly basis with no exceedances of the Concentration Limits recorded to date.

No samples were collected from the EPL Point 4 sampling location (Wallerawang Colliery No.1A Mine Entry) or the EPL Point 5 sampling location (Wallerawang Colliery Coal Punch Mine Entry) during the 2011 period, as water discharge from the mine at these locations was not occurring during the scheduled sampling visit.

## Summary of Monitoring Results

**EPL Monitoring Point 2**

**Location:** Upstream of Delta Electricity flow gauge

**Number of Samples Collected:** 4

**Number of Occasions without Flow:** 0

| Tested Element | Units | Lowest Value | Highest Value | Mean |
|---|---|---|---|---|
| pH | - | 7.2 | 7.6 | 7.375 |
| Conductivity | µS/cm | 473 | 651 | 549.5 |
| Total Suspended Solids | mg/L | <5 | 7.0 | <5 |
| Sulfate | mg/L | 117 | 212 | 169.25 |
| Filterable Iron | mg/L | 0.13 | 0.27 | 0.025 |

**EPL Monitoring Point 3**

**Location:** 100 m from discontinued discharge point

**Number of Samples Collected:** 4

**Number of Occasions without Flow:** 0

| Tested Element | Units | Lowest Value | Highest Value | Mean |
|---|---|---|---|---|
| pH | - | 6.6 | 7.6 | 7.075 |
| Conductivity | µS/cm | 817 | 1517 | 1141 |
| Total Suspended Solids | mg/L | <5 | 9 | <5 |
| Sulfate | mg/L | 320 | 708 | 503.5 |
| Filterable Iron | mg/L | <0.05 | 0.96 | 0.375 |

**EPL Monitoring Point 4**

**Location:** Wallerawang Colliery No. 1A Mine Entry

**Number of Samples Collected:** 0

**Number of Occasions without Flow:** 12

| Tested Element | Units | Lowest Value | Highest Value | Mean |
|---|---|---|---|---|
| pH | - | - | - | - |
| Conductivity | µS/cm | | | |
| Total Suspended Solids | mg/L | | | |
| Sulfate | mg/L | | | |
| Filterable Iron | mg/L | | | |
| Total Oil and Grease | mg/L | | | |

**EPL Monitoring Point 5**

**Location:** Wallerawang Colliery Punch Mine Entry

**Number of Samples Collected:** 0

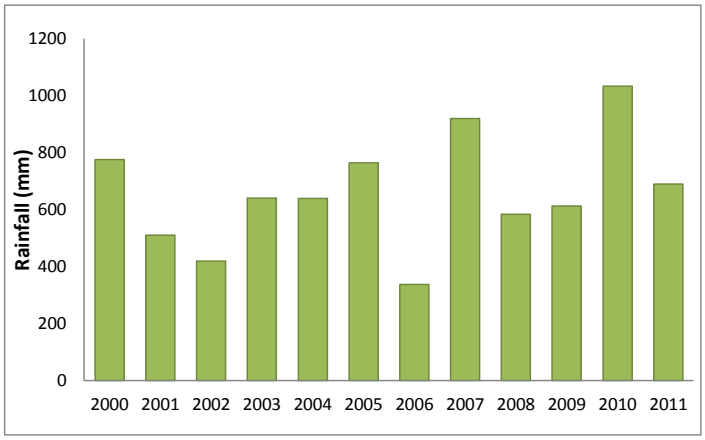
**Number of Occasions without Flow:** 12

| Tested Element | Units | Lowest Value | Highest Value | Mean |
|---|---|---|---|---|
| pH | - | - | - | - |
| Conductivity | µS/cm | | | |
| Total Suspended Solids | mg/L | | | |
| Sulfate | mg/L | | | |
| Filterable Iron | mg/L | | | |
| Total Oil and Grease | mg/L | | | |

## Meteorological Monitoring Relating to Water

An automatic weather station was set up on site for the Pine Dale Mine in 2006. The data is downloaded by Metford Labs from Newcastle, NSW.

Figure 1 - Annual Rainfall Figures Since 2000




The average rainfall for the area is 860 mm. It can be seen from this Figure that 2007 is the first time rainfall has exceeded the average since recording began at Pine Dale Mine. Total rainfall recorded during the 2011 period was 690 mm. This is 170 mm below the average annual rainfall; however, this figure was reached with some significant single rain events rather than being evenly distributed throughout the 2011 period.

### Interpretation and Review of Water Management Results

Surface water samples collected during the January – December 2011 period generally show water quality results that comply with the Concentration Limits of EPL 4911.

All monitoring performed was undertaken in accordance with the EPL. Licence variations approved in May 2009 allowed for the cessation of monthly monitoring of the EPL Points 4 and 5, which are now required to be monitored on a quarterly basis, as per the remainder of the monitoring locations. Two additional monitoring locations were also included in the new EPL issued in May 2009, those being EPL Points 13 and 14. Monitoring at these sites is on a quarterly basis, with no exceedences of the Concentration Limits recorded to date.

## 3.4 Ground Water Pollution

Groundwater data is collected by Metford Laboratories, Newcastle NSW, who forward groundwater samples for chemical analysis at a NATA registered laboratory.

Samples are collected from six monitoring bores, covered under Bore Licence No. 10BL165933, issued in December 2005 by the (then) NSW Department of Natural Resources. A detailed report is provided in Attachment 2.

Groundwater samples collected during the January – December 2011 period generally show that water quality results comply with the Action Trigger Levels for contingency action implementation as stated in the Groundwater Management Program. The exceptions were bores P2, P3 and P6 which showed variations in the relative Standing Water Levels throughout the year. Bores P2 and P6 exhibited standing water levels which were outside of the Action Trigger Levels during every monitoring event during 2011. These two bores were found to have higher water levels (contain more water) than the depths listed in their respective Action Thresholds. Bore P3 was found to have higher water levels greater than the Action Threshold during every monitoring event excluding August 2011.

Action thresholds for Filtered Iron are based on an increase of >50% from the baseline iron concentrations for Bores P2, P3, P4 and P6; and an increase of >30% for bores P7 and P7a.
As groundwater monitoring was not undertaken until the commencement of construction and mining operations, a true baseline level is not available. In the absence of baseline values, average Filtered Iron values have been calculated based on results from monitoring undertaken on the 15/10/05, 25/1/06, 13/4/06, 17/8/06, 1/11/06 and 1/12/06 as per the recommendations outlined in the Groundwater Monitoring Programme Results for Pine Dale Coal Mine (RCA ref 3761A-001/0, Sept 06). Although monitoring of the groundwater bores commenced in December 2005, it has taken some time for the Filtered Iron concentrations to become consistent.
Average Filtered Iron concentration has been calculated for each bore based on sampling undertaken between October 2005 and December 2006. Action thresholds are calculated in the Table , below.

***Groundwater Monitoring Bore Average Filtered Iron Levels***

| **Samples Collected** | **Bore P2** | **Bore P3** | **Bore P4** | **Bore P6** | **Bore P7** | **Bore P7a** |
|---|---|---|---|---|---|---|
| **Oct 05 to Dec 06** | Filtered Iron (mg/L) | Filtered Iron (mg/L) | Filtered Iron (mg/L) | Filtered Iron (mg/L) | Filtered Iron (mg/L) | Filtered Iron (mg/L) |
| *Baseline Average* | *7.6* | *4.7* | *12.0* | *20.3* | *0.8* | *7.3* |
| ***Calculated Action Threshold*** | ***11.5*** | ***7.0*** | ***18.0*** | ***30.4*** | ***1.1*** | ***9.5*** |

The Groundwater monitoring action thresholds state the Standing Water Level of each borehole should not increase or decrease by more than 15% of the baseline pre-mining levels. The action thresholds for filtered iron were not exceeded on any boreholes sampled during the January to December 2011 period.
The relative Standing Water Level of Bore P2 shows a slight decrease in the amount of water present within the bore during March and November 2011, whilst an increase in the amount of water in the bore is evident in the December 2011 sampling period. Sampling throughout the remainder of the year indicates the water within the bore remained at a steady level. The standing water level within the bore remained outside the action threshold level of <6.0m for the entire 2011 monitoring period.
A similar trending is shown in Bore P3. There is a slight decrease in water within the bore during the March and October 2011 sampling period, whilst an increase in the amount of water is evident in December. Sampling throughout the remainder of the year indicates the water within the bore fluctuates slightly though remains relatively steady. Again, with the exception of the lower water level in August 2011, for the remainder of the year the standing water level within the bore was outside the action threshold of <6.2m.

The Standing Water Level of Bore P6 shows a steady decrease in water levels during the period January to April 2011, after which the water level increases slightly for the remainder of the year. Throughout the entire 2011 sampling period the standing water level within the bore was outside the action threshold of <29.2m.
Water level in bore P7 is shown to decrease slightly during the period January to August 2011, with a steady increase in the water level within the bore for the remainder of the year. The water level in bore P7a is shown to remain at a consistent depth during January to August 2011, with a slight increase in water levels for the remainder of the year.
The increase in water within bore holes P2 and P3 December 2011 is shown to correlate with total monthly rainfall received during November and December 2011. Rainfall in these months is shown to be considerably higher than the remainder of the year. The decrease then subsequent increase in water levels within bore P7 is shown to correlate with the decreasing then increasing rainfall levels throughout 2011. Similarly the increase in water levels within bore P7a from September to December 2011 correlates with the increase in rainfall experienced in during these months.

When the pH and Electrical Conductivity of the groundwater bores is examined, all sites are shown to fall within the required action threshold limits.

## 3.5 Contaminated Polluted Land

No land was identified as contamination polluted within the reporting period.

## 3.6 Threatened Flora

A Flora and Fauna Management Plan is included as an Appendix of the MOP and outlines operating procedures to minimise impacts on flora and fauna.

No discoveries of threatened flora were made on the active mining site during the reporting period.

## 3.7 Threatened Fauna

A Flora and Fauna Management Plan is included as an Appendix of the MOP and outlines operating procedures to minimise impacts on flora and fauna.

No sightings of threatened fauna were made on the active mining site during the reporting period.

## 3.8 Weeds

Weed inspections were performed quarterly. All weed problems on the mine's property were satisfactorily addressed by spraying or chipping during the reporting period.

During the reporting period, Safe and Proper Use of Chemicals were utilised for seasonal spraying of blackberry.

## 3.9 Blasting

Blasting was introduced in 2008 and continued throughout the reporting period of 2011. During the reporting period, there were two blasts carried out on site.

Blasting Results Table 1:

| Date | Shot | Noon Street Overpressure | Noon Street Vibration | Park Overpressure | Park Vibration |
|---|---|---|---|---|---|
| 20/01/11 | 1 | 108.8 | 1.33 | 105.1 | 1.63 |
| 14/12/11 | 2 | 109.2 | 1.23 | 109.8 | 2.79 |

Blasting Results Table 2:

| Date | Shot | Noon Street Overpressure | Noon Street Vibration | Park Overpressure | Park Vibration |
|---|---|---|---|---|---|
| Average | 2 | 109.0 | 1.28 | 107.45 | 2.21 |

In the above Blasting Result tables, the Site 1 and Site 2 monitoring points are as described in the Mining Operational Plan (MOPS) as being the nearest effected residence.

All blasts carried out on site are carried out by the Blasting Contractor for the Pine Dale Open Cut Coal Mine being;

Downer EDI Mining – Blasting Services Pty Ltd.

Enhance Place Pty Ltd enlisted the assistance of Mr. Thomas Lewandowski from Enviro Strata Consulting for blast pattern engineering to ensure minimal unwanted impacts.

The blast results shown in Blasting Table 2 show that on average, the blasting results for all the blasts carried out on site during the reporting period were below the prescribed limits. These limits are shown in the Mining Operation plan (MOPS) in the Blast Management Section.

## 3.10 Operational Noise

EPL 4911 requires noise monitoring which is conducted quarterly by Metford Laboratories from Newcastle NSW. A detailed report is located in Attachment 3.

Pine Dale Mine has six noise monitoring locations (see Figure NM1, Noise Monitoring Summary Report – Appendix #):

- NM1 – the Green residence, Blackman's Flat.
- NM2 – the Cherry residence, Blackman's Flat.
- NM3 – Castlereagh Highway, east of Blackman's Flat.
- NM4 – the Rensen residence, north of View Street, Blackman's Flat.
- NM5 – the Fraser residence, Lidsdale
- NM6 – the Turek residence, Wolgan Road, Lidsdale.

The operational stage noise assessment criteria is 42 dB $L_{Aeq\ (15\ minute)}$ for all 6 monitoring stations. It should be noted that during some of the attended sessions, no audible noise was heard from the mine however noise exceedences were recorded. It was determined that other noise contributors such as neighbouring mines, traffic and wildlife were the source of the exceedences.

There were no complaints regarding noise received during the reporting period:

## 3.11 Visual, Stray Light

There were no issues associated with stray light or visual disturbance during the reporting period.

## 3.12 Aboriginal Heritage

There have been no artefacts of cultural significance found on the operating mine site.

## 3.13 Natural Heritage

No natural heritage sites have been identified within the mining lease.

## 3.14 Spontaneous Combustion

Spontaneous combustion is identified as a negligible risk associated with mine development and mining (surface and underground) and with product stockpiling and handling in the MOP risk matrix.

Due to a high turnover of material and that screened stockpile capacity is limited to 5,000 tonnes, the risk of spontaneous combustion is negligible.

There have been no incidents of spontaneous combustion during the reporting period.

## 3.15 Bushfire

Bushfire management is performed via reduction of fuel load and maintenance of roads and fire trails within the mine property. Since the majority of land space is disturbed or in the process of rehabilitation, fuel reduction is achieved through the continuing rehabilitation process.

## 3.16 Mine Subsidence

There are no issues regarding mine subsidence as underground mining no longer occurs within the lease.

## 3.17 Hydrocarbon Contamination

There were no reported incidents of hydrocarbon contamination at Pine Dale Mine over the reporting period. Refer to Section 2.9 for details on hydrocarbon storage.

## 3.18 Methane Drainage/Ventilation

The underground workings at this site were closed in 1986 and decommissioned over the period from 1987 to 1990. Methane has never been recorded at this site. There are two remaining entries to the underground workings, being the 1A mine entry and the Punch Mine Entry. These are used for discharge of surface water.

## 3.19 Public Safety

No issues of public safety occurred during the reporting period. The site is regularly monitored by mine personnel. The entire perimeter of the Pine Dale Mine property is fenced, with “No Trespassing” signs displayed at various intervals. “Do Not Enter” and “Danger” signs are also displayed along the fence of the private sealed haul road.

There has been a continuation of the elimination of trespassing, as continual fencing monitoring, upgrades and repairs have continued to occur during the reporting period.

## 3.20 Other Issues and Risks

There are no other known issues or identified hazards at the operating Pine Dale Mine.

# 4 COMMUNITY RELATIONS

## 4.1 Environmental Complaints

There were no noise complaints received during the reporting period.

## 4.2 Community Liaison

**Employment Status and Demography**

There were no significant changes made to the employed personnel by Enhance Place Pty Ltd during the reporting period:

All other work on site such as mining, rehabilitation, haulage, and facilities maintenance is performed by contractors. The number of contractors had significantly changed over the reporting period as there was no coal production during the reporting period.

**Social/Economic Contributions & Achievements**

The company has contributed to the economy of the district and State by providing direct employment, indirect employment and through the purchase of services and materials from regional suppliers. Enhance Place Pty Ltd's coal supplies to Delta Electricity are very competitively priced energy for the economic benefit of the local power station, to help it retain competitiveness in the NSW electricity supply industry.

**Community Liaison**

A community liaison committee (the Community Consultative Committee – CCC) was initiated before the reporting period, as required by development consent DA 461-04 and the Project Approval 10_0041. The CCC consists of several community members plus one from each of LCC (Chairman of CCC) and the company. The company provides all secretarial and reporting paperwork for the CCC, and continues that service in the reporting period.

Three community members resigned in 2007. No further meetings were held. The Company has advertised for new community nominations and a new CCC was convened for 2012.

The Manager of Mining Engineering (Hilton Goldfinch) was appointed as an alternate company member of the CCC on 5 November 2007. Visits have been made to some of the nearby residents to discuss aspects of the mine and its impact.

# 5 REHABILITATION

## 5.1 Rehabilitation History

- Prior to 1991 – Surface infrastructure was removed.
- 1991 – Rehabilitation of 10 ha was completed. This rehabilitation is currently failing due to the shallow cap depth (10 cm). Thus there is a need for a more adequate final rehabilitation plan.
- 1994 – The bathhouse was removed.
- 1997 – The stockpile coal base was removed as well as the truck wash and contractors sheds.
- 1998 – Three old workshops buildings were removed along with coal bins and 1km of rail line and sleepers.
- 1999 – The briquetting operation was set up as a trial. Windrowing of soil on the site started in the north-west and was completed in 2000.
- 2000 – The briquetting plant had been operational for a full year. Characterisation of site waste and a literature review was completed. The remainder of the north-west of the site was windrowed and limestone drains were erected.
- 2001 – Drilling of the area to determine open cut mining opportunities for the construction of a deep void to bury problematic reject was completed, along with the planning of the final rehabilitation project and open cut. A Planning Focus Meeting was held to discuss the rehabilitation proposal and to seek feedback from government departments.
- 2002 - An alternate coal company for rehabilitation and further site development was sought.
- 2003 - An agreement of giving Enhance Place Pty Ltd rehabilitation responsibilities, management rights, EPA Licence and future coal titles was signed between Enhance and The Wallerawang Collieries Ltd. (Effective 13/02/03) No additional rehabilitation actions were undertaken during the 2003 reporting period.
- 2004 – Rehabilitation of Area 1 commenced.
- 2005 – Minimal rehabilitation was conducted. The pipeline within the overland drain was replaced by a limestone ballast causeway. Topsoil and clay was stockpiled on site. The concrete sumps adjacent to LD001 were backfilled with clay.
- 2006 – Seeding of bund wall undertaken. No rehabilitation of mined areas was conducted due to the commencement of mining operations. Once the profiling of Area A was complete in early- to mid- 2007, rehabilitation of that area commenced.
- 2007 – Profiling and sloping of Area A was completed. Topsoil stripped from Area B during the reporting period was stockpiled and used on Area A.
- 2008 – Seeding of Areas A and 8 were achieved after final landform created. 1500 trees have been planted on the area along with suitable fauna habitat materials, such as tree logs. Shaping and final slope establishment with dams are in the construction phase.

- 2009 – Continued rehabilitation of Area B to completion.
    - As per 2008 AEMR Letter of Acceptance, dated 6th October 2009 and referenced 09/4046 and 06/4313, construction of rock lined drains in Area A to eliminate the hazard of erosion.
    - Completion of stock and water management dams.
- 2010 – Completion of Area B
    - Continued rehabilitation of Area C until completion.
    - Planting of Area A with 400 trees was completed by and with the assistance of the Gundungurra Tribal Aboriginal Council.
- 2011 – Completion of Area C
    - Shaped entire area into a stable landform
    - Planted area with appropriate vegetation
    - Commenced fencing of area

## 5.2 Buildings

No buildings were removed nor constructed during the reporting period.

## 5.3 Rehabilitation of Disturbed Land

Topsoiling of Area C was completed within the reporting period.

Seeding of all disturbed land was also performed.

**Table 9: Rehabilitation Summary**

| | Area Affected/Rehabilitated (ha) | | |
|---|---|---|---|
| | **To date** | **Last report** | **Next Report (estimated)** |
| A: MINE LEASE AREA | | | |
| A1 Mine Lease Area | 110.00 | | |
| B: DISTURBED AREAS | | | |
| B1 Infrastructure Area | 2.25 | 2.25 | 2.25 |
| B2 Active Mining Area | 2.1 | 0.00 | 5.00 |
| B3 Waste emplacements | 0 | 2.15 | 5.00 |
| B4 Tailings emplacements | N/A | N/A | N/A |
| B5 Shaped Waste Placement | 10.00 | 8.13 | 5.00 |

| | Area Affected/Rehabilitated (ha) | | |
|---|---|---|---|
| | **To date** | **Last report** | **Next Report (estimated)** |
| ALL DISTURBED AREAS | 20.78 | 8.75 | 5.00 |

C: REHABILITATION PROGRESS

| | | | |
|---|---|---|---|
| C1 Total Rehabilitated Area (except for maintenance) | 20.0 | 10 | 5.00 |

D: REHABILITATION ON SLOPES

| | | | |
|---|---|---|---|
| D1 10 to 18 degrees | 0 | 0 | 0 |
| D2 Greater than 18 degrees | 0 | 0 | 0 |

E: SURFACE OF REHABILITATED LAND

| | | | |
|---|---|---|---|
| E1 Pasture and grasses | 24.5 | 14.5 | 5.00 |
| E2 Native forest/ecosystems | 7.5 | 7.5 | 0 |
| E3 Plantations and crops | 0 | 0 | 0 |
| E4 Other (include non-vegetative outcomes) | 0 | 0 | 0 |

## Table 10: Maintenance Activities on Rehabilitated Land

| | Area Treated (ha) | | |
|---|---|---|---|
| | **Report Period** | **Next Period** | **Comment/control strategies/treatment detail** |
| **Additional erosion control works** | 1.0 | 0.50 | Additional sedimentation fencing was installed along internal haul road and other areas as required and maintained. |
| **Recovering** | 10 | 0 | There was seeding and reseeding of areas C and 8 |
| **Soil treatment** | 0 | 0 | There is wood ash stockpiled ready for neutralisation of acidic material. Chicken manure/lime was spread throughout the rehabilitation areas. |
| **Treatment/Management** | 0 | 0 | Not applicable at this stage of operations. |
| **Re-seeding/Replanting** | 10 | 5 | Contingency for any seeding failure. |
| **Adversely affected by weeds** | 0 | 0 | A weed spraying program has removed the weed problem at the site. |
| **Feral animal control** | 0 | 0 | Feral animal control may be performed in future if required. |

## 5.4 Other Infrastructure

There was no rehabilitation of other infrastructure during the reporting period.

## 5.5 Rehabilitation Trials and Research

Neither rehabilitation trials were carried out in the reporting period.

Research is being undertaken on the Bathurst Copper Butterfly under the direction and advice of the Sydney University and the Australian Museum. As this study is still being undertaken, results shall not be reported until complete.

Trials for the Astral Toadflax are being developed and results shall be reported upon completion of the trials.

## 5.6 Further Development of the Final Rehabilitation Plan

The final rehabilitation plan is outlined in the MOP. Approval of the MOP was granted in February 2011 and any further development of the rehabilitation plan was not considered necessary during the reporting period.

# 6 ACTIVITIES PROPOSED IN THE NEXT AEMR PERIOD

Inclusive of the Yarraboldy Mining Area

Area C, in 2010 was fully mined. As planned, all voids were filled, over –burden dumps shaped, final land surface contoured, topsoiled and then planted. This being consistent with the Mining Operations Plan for the final rehabilitation of the current Pine Dale mining operation in and about the areas of A, B and C.

Fencing of the area is occurring as planned, in compliance and consistent with the original land use and owner's requirements.

Regular monitoring of the areas throughout the near term future shall be ongoing to ascertain the success of the rehabilitation in and around the mining area.

The principal construction activities that are planned during the next term of the AEMR reporting period include the following:

- Construction of amenity bund.
- Construction of Private Haul Road Intersection.
- Construction of water management structures.
- Relocation of the Crushing, Stockpiling and Maintenance area.

Mining will be undertaken using conventional open cut mining methods. The recovery of ROM coal from the Yarraboldy Extension area will generally be undertaken in a sequence of adjoining mining areas. Mining will commence north of the Private Coal Haul Road in the western section of the Yarraboldy Extension area, progressing to the east for the first 6 months. Mining will then progress in a northerly direction for approximately 2 years.
The overburden and interburden will be removed using a combination of rip and push and blasting methods. Blasted / ripped rock will then be loaded by an excavator into a haul truck and transported to previously mined areas waiting to be backfilled.

# 7 PHOTOGRAPHS

**Photo 1 – Rehabilitation on Area C**

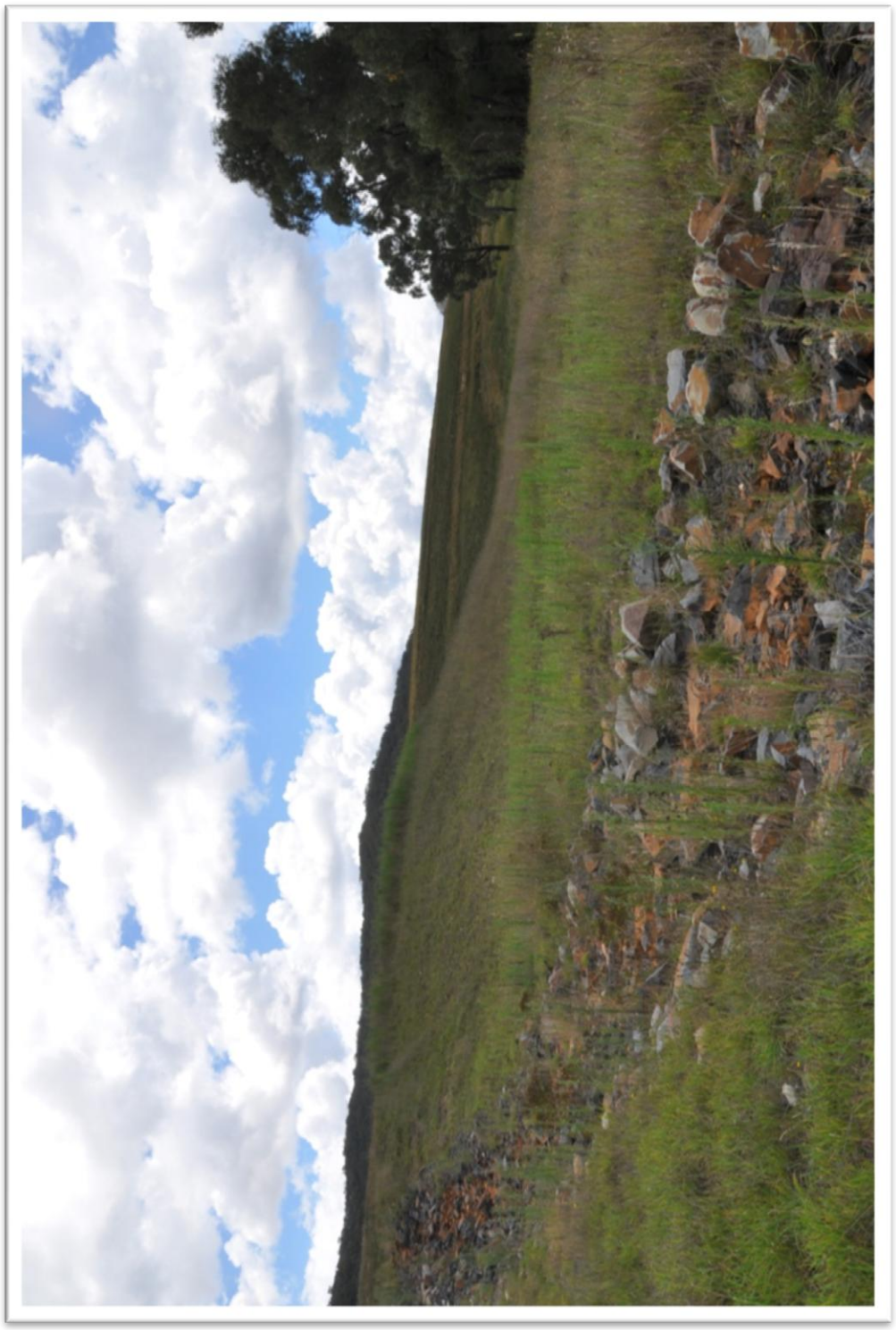


**Photo 2 – Rehabilitation on Area A**

# ATTACHMENT 1

SITE PLAN 2011

# ATTACHMENT 2

DUST MONITORING AND GROUNDWATER SUMMARY REPORT

RCA - ENV Laboratories ref: 6880-785

3 February 2012

Enhance Place Pty Ltd
Pine Dale Mine
PO Box 202
Wallerawang NSW 2845

Attention: Mr Hilton Goldfinch

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**AEMR SUMMARY REPORT COMPILED FOR**

**ENHANCE PLACE PTY LTD – PINE DALE MINE**

**DETAILING**

**AIR QUALITY, GROUNDWATER, SURFACE WATER & METEOROLOGICAL MONITORING**

**JANUARY – DECEMBER 2011**



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Robert Carr & Associates Pty Ltd
T/A RCA Laboratories ABN 53 063 515 711

92 Hill St Carrington Newcastle NSW 2294
**Ph** 02 **4902 9200 Fax** 02 **4902 9299**

**Email** administrator@rca.com.au
**Web** www.rca.com.au

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# TABLES AND FIGURES

# 1 INTRODUCTION

The following report provides a summary of monthly environmental monitoring data for Pine Dale Mine for the year 2011. Summary data is comprised of High Volume Air Samples (TSP & PM10), Depositional Dust, Surface Water and Groundwater monitoring.

A compliance assessment of both depositional dust results and High Volume Air Sampler (HVAS) results is made in accordance with the criteria presented in the Pine Dale Mine *Air Quality Monitoring Program*.

Similarly, a compliance assessment of the routine Surface water and Groundwater monitoring results was undertaken in accordance with the criteria presented in the Pine Dale Mine *Groundwater Monitoring Program*.

# 2 ASSESSMENT CRITERIA

## 2.1 Depositional Dust and HVAS Particulate Matter Assessment Criteria

The Air Quality Monitoring Program stipulates that dust emissions generated by the project must not cause additional exceedances of the long term impact assessment criteria listed in **Table 1, 2** and **3** (below).

**Table 1 –** *Depositional Dust: Long Term Impact Assessment Criteria*

| Pollutant | Average 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 2 –** *HVAS Particulate Matter: Long Term Impact Assessment Criteria*

| Pollutant | Average Period | Criterion |
|---|---|---|
| Total suspended particulate (TSP) matter | Annual | 90µg/$m^3$ |
| Particulate matter < 10µm ($PM_{10}$) | Annual | 30µg/$m^3$ |

**Table 3 –** *HVAS Particulate Matter: Short Term Impact Assessment Criteria*

| Pollutant | Average Period | Pollutant |
|---|---|---|
| Particulate matter < 10µm ($PM_{10}$) | 24 hours | 50µg/$m^3$ |

## 2.2 Groundwater Assessment Criteria

The purpose of groundwater monitoring is to ensure that any impact of the mining operations on the local groundwater can be identified, and to prove compliance with relevant legislative requirements. The Action Trigger Levels for contingency action implementation as stated in the Groundwater Management Program are shown in **Table 4**.

**Table 4 –** *Groundwater Action Trigger Levels*

| Trigger | Measurement / Identification | Daily Management of Potential Impact | Action (if triggered) |
|---|---|---|---|
| pH <4.0 or >8.5<br>(Note that a pH value of <4 has been selected given the site specific groundwater conditions encountered prior to the commencement of mining at the site) | pH is to be analysed monthly. Sampling is to take place around the 1st of each month. | NA | Resample the affected bore(s). If the result is still elevated then, install more bores around the area to assess the extent of the impact and conduct a risk assessment to assess the risk to the nearest groundwater user. If this risk is significant then, assess remedial options such as pump and treat or hydraulic isolation. Conduct remediation if necessary. |
| Standing Water Levels (SWLs) increase/decrease by >15% when compared to pre-mining levels. | SWLs are to be gauged monthly. Levels are to be collected around the 1st of each month. | NA | Should standing groundwater levels reduce by more than 15% of the baseline pre-mining levels further assessment of the natural fluctuations occurring within the other monitoring bores will be undertaken. Should the decrease be assessed to be caused by the mining, then the suggested remedial measure is to establish a new bore in the impacted area. The new bore should be installed to greater depth than the original such that the yield of the new bore is at least equal to the current yield. Should newly monitored levels still be varied by >15%, potential remedial actions will be discussed with DPI (MR) and DNR. |

**Table 4 –** *Groundwater Action Trigger Levels (continued)*

| Monitoring Bore | Monitoring Parameters | Monitoring Frequency | Action Threshold |
|---|---|---|---|
| P6 | pH,<br>EC | Monthly | <4.0 or >8.5<br>2000uS/cm |
| | Aquifer water quality parameters (pH, salinity, Major Cations/Anions and Iron) | Four Monthly | >50% increase in baseline[#] iron concentrations |
| | Depth SWL (m AHD) | Monthly | <29.2 (883.2) or >39.5 (888.7) |
| P2, P3 and P4 | pH,<br>EC | Monthly | <4.0 or >8.5<br>2000uS/cm |
| | Aquifer water quality parameters (pH, salinity, Major Cations/Anions and Iron) | Four Monthly | >50% increase in baseline[#] iron concentrations |
| | Depth SWL (m AHD) | Monthly | P2 <6.0 (887.3) or >8.1 (889.4)<br>P3 <6.2 (884.6) or >8.4 (886.8)<br>P4 <5.2 (884.8) or >7.1 (886.6) |
| P7 and P7a | pH,<br>EC | Monthly | <4.0 or >8.5<br>2000uS/cm |
| | Aquifer water quality parameters (pH, salinity, Major Cations/Anions and Iron) | Four Monthly | >30%[@] increase in baseline[#] iron concentrations |
| | Depth (SWL, m AHD) | Monthly | NA* |

* Not applicable during monitoring during mining within Area A, however natural fluctuations of +/- 1.1m may occur.

[@]Due to the undisturbed nature of these strata it is anticipated that iron levels will fluctuate to a lower degree than in the other disturbed strata across the Mine Site.

[#] ie. levels measured prior to commencement of mining.

## 2.3 Surface Water Assessment Criteria

The purpose of groundwater monitoring is to ensure that any impact of the mining operations on the local groundwater can be identified, and to prove compliance with relevant legislative requirements. The Concentration Limits as stated in the Pine Dale Mine Environmental Protection License (EPL 4911) are shown in **Table 5**.

**Table 5 –** *Surface Water Monitoring Sites and Concentration Limits*

| Surface Water Monitoring Sites | Monitoring Parameters | Monitoring Frequency | Concentration Limits |
|---|---|---|---|
| EPL 2<br>Neubeck's Creek upstream of the Delta Electricity flow gauging station. | pH, Conductivity, Filterable Iron, Sulfate, Total Suspended Solids, and Turbidity | Quarterly | NA |
| EPL 3<br>Neubeck's Creek approximately 100 metres downstream of Internal bridge near site offices. | pH, Conductivity, Filterable Iron, Sulfate, Total Suspended Solids, and Turbidity | Quarterly | NA |
| EPL 4<br>Wallerawang Colliery No.1A Mine Entry. | pH, Conductivity, Filterable Iron, Sulfate, Total Suspended Solids, Oil & Grease, and Turbidity | Quarterly during discharge | pH – 6.5 to 8.5<br>O&G – 10mg/L<br>TSS – 50 mg/L |
| EPL 5<br>Wallerawang Colliery Punch Mine entry. | pH, Conductivity, Filterable Iron, Sulfate, Total Suspended Solids, Oil & Grease, and Turbidity | Quarterly during discharge | pH – 6.5 to 8.5<br>O&G – 10mg/L<br>TSS – 50 mg/L |
| EPL 13<br>Discharge to concrete lined section of Neubeck's creek below final settling dam. | pH, Conductivity, Filterable Iron, Sulfate, Total Suspended Solids, Oil & Grease, and Turbidity | Quarterly during discharge | pH – 6.5 to 8.5<br>O&G – 10mg/L<br>TSS – 30 mg/L |
| EPL 14<br>Points in Cox's River downstream of 'Blue Lake'. | pH, Conductivity, Filterable Iron, Sulfate, Total Suspended Solids, and Turbidity | Quarterly | NA |

**Notes**: NA – no concentration limits defined.

# 3 AIR POLLUTION

## 3.1 Meteorological Monitoring relating to Air

Pine Dale Mine records meteorological data continuously via an on-site meteorological monitoring station. Parameters recorded (at 15-minute intervals) include Wind Speed, Wind Direction, Temperature at 10m height, Temperature at 2m height and Rainfall. Details of weather data recorded for the period January to December 2011 are available upon request.

## 3.2 Air Monitoring Results – Depositional Dust Gauge Data Summary

Pine Dale Mine currently has 6 depositional dust gauges. Two of these gauges are located within the township of Blackmans Flat. A third gauge is located to the east of Blackmans Flat along the Castlereagh Highway. The remaining three gauges (D4, D5 & D6) were installed in November 2006 to coincide with the commencement of mining in Areas B & C. The fourth gauge is located to the north of View St, Blackmans Flat. Two more gauges are located to the east of Mining Areas B & C, along Wolgan Road, Lidsdale (refer **Appendix 1**).

Depositional Dust summary results for the period January – December 2011 are shown in **Tables 6** to **11**. Graphical presentations are shown in **Figure 1**.

**Table 6**– *Depositional Dust Data Summary Gauge D1 Jan – Dec 2011*

| Month | Gauge No. | Insoluble Solids (g/m2.month) | Ash (g/m2.month) | Combustible Matter (g/m2.month) |
|---|---|---|---|---|
| Jan-11 | D1 | 0.6 | 0.3 | 0.3 |
| Feb-11 | D1 | 1.3 | 0.9 | 0.4 |
| Mar-11 | D1 | 0.5 | 0.3 | 0.2 |
| Apr-11 | D1 | 0.6 | 0.4 | 0.2 |
| May-11 | D1 | 0.5 | 0.3 | 0.2 |
| Jun-11 | D1 | 0.4 | 0.2 | 0.2 |
| Jul-11 | D1 | 0.6 | 0.3 | 0.3 |
| Aug-11 | D1 | 0.6 | 0.3 | 0.3 |
| Sep-11 | D1 | 1.5 | 0.9 | 0.6 |
| Oct-11 | D1 | 0.5 | 0.4 | 0.1 |
| Nov-11 | D1 | 0.8 | 0.4 | 0.4 |
| Dec-11 | D1 | 0.6 | 0.3 | 0.3 |
| ***AVERAGE*** | | ***0.7*** | ***0.4*** | ***0.3*** |

**Table 7 –** *Depositional Dust Data Summary Gauge D2 Jan – Dec 2011*

| Month | Gauge No. | Insoluble Solids (g/m2.month) | Ash (g/m2.month) | Combustible Matter (g/m2.month) |
|---|---|---|---|---|
| Jan-11 | D2 | 0.5 | 0.2 | 0.3 |
| Feb-11 | D2 | 0.7 | 0.3 | 0.4 |
| Mar-11 | D2 | 0.5 | 0.2 | 0.3 |
| Apr-11 | D2 | 0.5 | 0.3 | 0.2 |
| May-11 | D2 | 0.4 | 0.2 | 0.2 |
| Jun-11 | D2 | 0.3 | 0.1 | 0.2 |
| Jul-11 | D2 | 0.4 | 0.2 | 0.2 |
| Aug-11 | D2 | 0.5 | 0.3 | 0.2 |
| Sep-11 | D2 | 0.4 | 0.1 | 0.3 |
| Oct-11 | D2 | 0.2 | 0.2 | <0.1 |
| Nov-11 | D2 | 0.5 | 0.1 | 0.4 |
| Dec-11 | D2 | 0.5 | 0.2 | 0.3 |
| ***AVERAGE*** | | ***0.4*** | ***0.2*** | ***0.3*** |

**Table 8 –** *Depositional Dust Data Summary Gauge D3 Jan – Dec 2011*

| Month | Gauge No. | Insoluble Solids (g/m2.month) | Ash (g/m2.month) | Combustible Matter (g/m2.month) |
|---|---|---|---|---|
| Jan-11 | D3 | 1 | 0.5 | 0.5 |
| Feb-11 | D3 | 0.7 | 0.5 | 0.2 |
| Mar-11 | D3 | 0.8 | 0.4 | 0.4 |
| Apr-11 | D3 | 0.7 | 0.4 | 0.3 |
| May-11 | D3 | 0.8 | 0.5 | 0.3 |
| Jun-11 | D3 | 0.6 | 0.4 | 0.2 |
| Jul-11 | D3 | 0.9 | 0.6 | 0.3 |
| Aug-11 | D3 | 0.9 | 0.5 | 0.4 |
| Sep-11 | D3 | 0.9 | 0.4 | 0.5 |
| Oct-11 | D3 | 0.9 | 0.7 | 0.2 |
| Nov-11 | D3 | 1.2 | 0.7 | 0.5 |
| Dec-11 | D3 | 0.9 | 0.4 | 0.5 |
| ***AVERAGE*** | | ***0.9*** | ***0.5*** | ***0.4*** |

**Table 9 –** *Depositional Dust Data Summary Gauge D4 Jan – Dec 2011*

| Month | Gauge No. | Insoluble Solids (g/m2.month) | Ash (g/m2.month) | Combustible Matter (g/m2.month) |
|---|---|---|---|---|
| Jan-11 | D4 | 0.5 | 0.2 | 0.3 |
| Feb-11 | D4 | 0.4 | 0.2 | 0.2 |
| Mar-11 | D4 | 0.4 | 0.2 | 0.2 |
| Apr-11 | D4 | 0.3 | <0.1 | 0.3 |
| May-11 | D4 | 0.3 | 0.1 | 0.2 |
| Jun-11 | D4 | 0.2 | 0.1 | 0.1 |
| Jul-11 | D4 | 0.3 | 0.1 | 0.2 |
| Aug-11 | D4 | 0.2 | 0.1 | 0.1 |
| Sep-11 | D4 | 0.4 | 0.2 | 0.2 |
| Oct-11 | D4 | 0.1 | <0.1 | 0.1 |
| Nov-11 | D4 | 0.1 | <0.1 | 0.1 |
| Dec-11 | D4 | 0.4 | 0.2 | 0.2 |
| ***AVERAGE*** | | ***0.3*** | ***0.2*** | ***0.2*** |

**Table 10 –** *Depositional Dust Data Summary Gauge D5 Jan – Dec 2011*

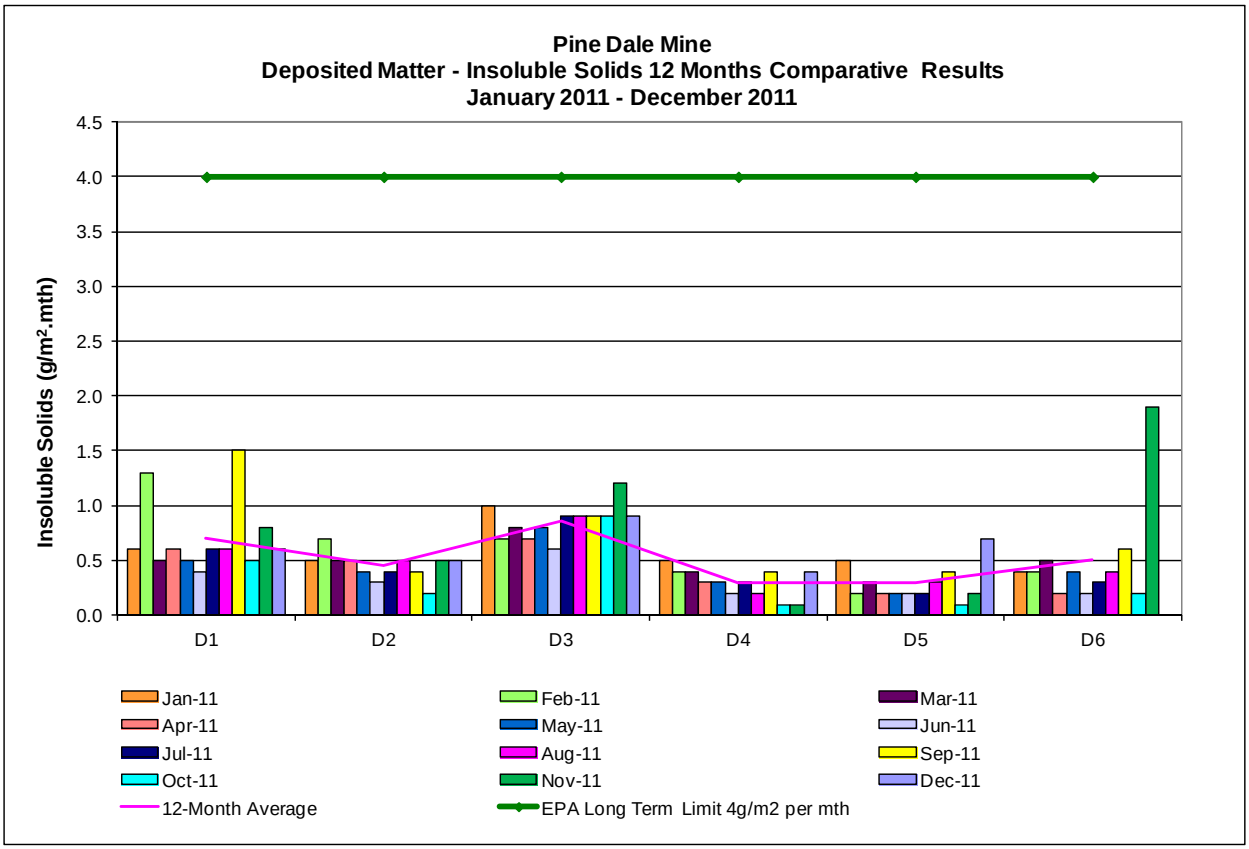
| Month | Gauge No. | Insoluble Solids (g/m2.month) | Ash (g/m2.month) | Combustible Matter (g/m2.month) |
|---|---|---|---|---|
| Jan-11 | D5 | 0.5 | 0.1 | 0.4 |
| Feb-11 | D5 | 0.2 | 0.1 | 0.1 |
| Mar-11 | D5 | 0.3 | <0.1 | 0.3 |
| Apr-11 | D5 | 0.2 | <0.1 | 0.2 |
| May-11 | D5 | 0.2 | 0.1 | 0.1 |
| Jun-11 | D5 | 0.2 | <0.1 | 0.2 |
| Jul-11 | D5 | 0.2 | 0.1 | 0.1 |
| Aug-11 | D5 | 0.3 | 0.1 | 0.2 |
| Sep-11 | D5 | 0.4 | 0.2 | 0.2 |
| Oct-11 | D5 | 0.1 | <0.1 | 0.1 |
| Nov-11 | D5 | 0.2 | <0.1 | 0.2 |
| Dec-11 | D5 | 0.7 | 0.2 | 0.5 |
| ***AVERAGE*** | | ***0.3*** | ***0.1*** | ***0.2*** |

**Table 11 –** *Depositional Dust Data Summary Gauge D6 Jan – Dec 2011*

| Month | Gauge No. | Insoluble Solids (g/m2.month) | Ash (g/m2.month) | Combustible Matter (g/m2.month) |
|---|---|---|---|---|
| Jan-11 | D6 | 0.4 | <0.1 | 0.4 |
| Feb-11 | D6 | 0.4 | 0.1 | 0.3 |
| Mar-11 | D6 | 0.5 | 0.2 | 0.3 |
| Apr-11 | D6 | 0.2 | 0.1 | 0.1 |
| May-11 | D6 | 0.4 | 0.2 | 0.2 |
| Jun-11 | D6 | 0.2 | <0.1 | 0.2 |
| Jul-11 | D6 | 0.3 | 0.2 | 0.1 |
| Aug-11 | D6 | 0.4 | 0.2 | 0.2 |
| Sep-11 | D6 | 0.6 | 0.2 | 0.4 |
| Oct-11 | D6 | 0.2 | 0.2 | <0.1 |
| Nov-11 | D6 | 1.9 | 1.1 | 0.8 |
| Dec-11 | D6 | ND | ND | ND |
| ***AVERAGE*** | | ***0.5*** | ***0.3*** | ***0.3*** |

**Notes:**
ND – No Data. Data rejected due to excess bird droppings.

**Figure 1 –** *Depositional Dust Results Graph*



### 3.3 Air Monitoring Results – HVAS Particulate Matter Data Summary

Pine Dale Coal Mine currently has 1 HVAS TSP unit and 1 HVAS PM10 unit located adjacent to the mine office at Blackmans Flat (refer **Appendix 1**).

HVAS Particulate Matter summary results for the period January – December 2011 are shown in **Table 12**. Graphical presentations are shown in **Figure 2**.

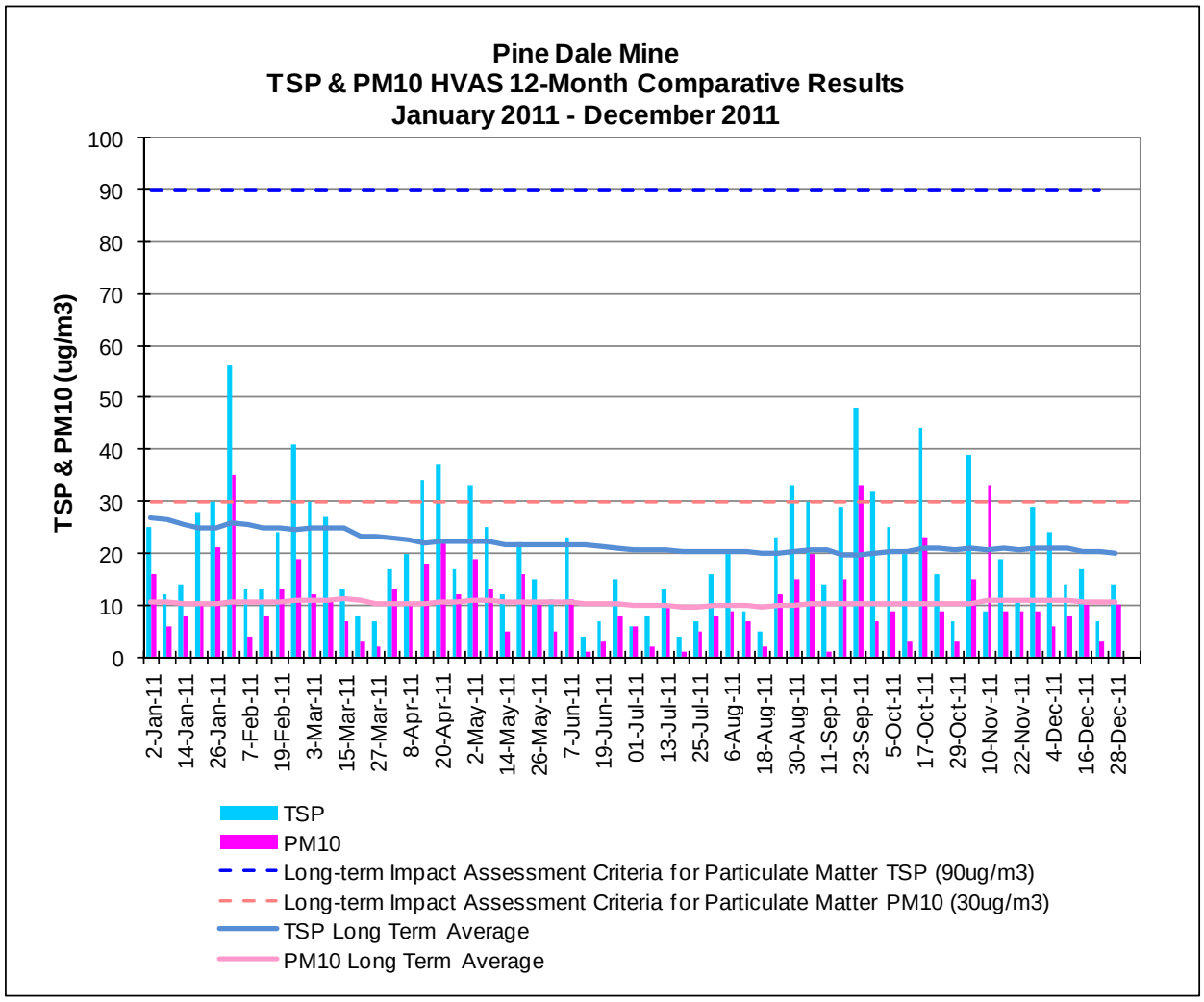
**Table 12 –** *HVAS Particulate Matter Summary Jan – Dec 2011*

| Run Date | HVAS TSP (µg/m$^3$) | HVAS PM10 (µg/m$^3$) |
|---|---|---|
| 2-Jan-11 | 25 | 16 |
| 8-Jan-11 | 12 | 6 |
| 14-Jan-11 | 14 | 8 |
| 20-Jan-11 | 28 | 10 |
| 26-Jan-11 | 30 | 21 |
| 1-Feb-11 | 56 | 35 |
| 7-Feb-11 | 13 | 4 |
| 13-Feb-11 | 13 | 8 |
| 19-Feb-11 | 24 | 13 |
| 25-Feb-11 | 41 | 19 |
| 3-Mar-11 | 30 | 12 |
| 9-Mar-11 | 27 | 11 |
| 15-Mar-11 | 13 | 7 |
| 21-Mar-11 | 8 | 3 |
| 27-Mar-11 | 7 | 2 |
| 2-Apr-11 | 17 | 13 |
| 8-Apr-11 | 20 | 10 |
| 14-Apr-11 | 34 | 18 |
| 20-Apr-11 | 37 | 22 |
| 26-Apr-11 | 17 | 12 |
| 2-May-11 | 33 | 19 |
| 8-May-11 | 25 | 13 |
| 14-May-11 | 12 | 5 |
| 20-May-11 | 22 | 16 |
| 26-May-11 | 15 | 10 |
| 1-Jun-11 | 11 | 5 |
| 7-Jun-11 | 23 | 11 |
| 13-Jun-11 | 4 | 1 |
| 19-Jun-11 | 7 | 3 |
| 25-Jun-11 | 15 | 8 |
| 01-Jul-11 | 6 | 6 |
| 07-Jul-11 | 8 | 2 |
| 13-Jul-11 | 13 | 10 |
| 19-Jul-11 | 4 | 1 |
| 25-Jul-11 | 7 | 5 |
| 31-Jul-11 | 16 | 8 |

**Table 12 –** *HVAS Particulate Matter Summary Jan – Dec 2011 Continued*

| Run Date | HVAS TSP ($\mu g/m^3$) | HVAS PM10 ($\mu g/m^3$) |
|---|---|---|
| 6-Aug-11 | 20 | 9 |
| 12-Aug-11 | 9 | 7 |
| 18-Aug-11 | 5 | 2 |
| 24-Aug-11 | 23 | 12 |
| 30-Aug-11 | 33 | 15 |
| 5-Sep-11 | 30 | 20 |
| 11-Sep-11 | 14 | 1 |
| 17-Sep-11 | 29 | 15 |
| 23-Sep-11 | 48 | 33 |
| 29-Sep-11 | 32 | 7 |
| 5-Oct-11 | 25 | 9 |
| 11-Oct-11 | 20 | 3 |
| 17-Oct-11 | 44 | 23 |
| 23-Oct-11 | 16 | 9 |
| 29-Oct-11 | 7 | 3 |
| 4-Nov-11 | 39 | 15 |
| 10-Nov-11 | 9 | 33 |
| 16-Nov-11 | 19 | 9 |
| 22-Nov-11 | 11 | 9 |
| 28-Nov-11 | 29 | 9 |
| 4-Dec-11 | 24 | 6 |
| 10-Dec-11 | 14 | 8 |
| 16-Dec-11 | 17 | 10 |
| 22-Dec-11 | 7 | 3 |
| 28-Dec-11 | 14 | 10 |
| ***Annual Average*** | ***20*** | ***11*** |

**Figure 2** – *TSP & PM10 Particulate Matter Summary Jan – Dec 2011*




## 4 WATER POLLUTION

### 4.1 Groundwater Monitoring Data Summary

Groundwater monitoring for the Pine Dale Mine is undertaken in accordance with the *Groundwater Monitoring Program* at six locations (refer **Appendix 2**.).

Groundwater summary results for the period January – December 2011 are shown in **Tables 13** to **17**. Graphical presentations are shown in **Figures 3** thru **8**.

No sampling of groundwater bore P4 was undertaken during the 2011 period as had insufficient water to sample.

**Table 13** – *Groundwater Monitoring Bore P2 Results Jan - Dec 2011*

| Location | Bore P2 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Number | 01116880 015 | 02116880 017 | 0311680 042 | 04116880 022 | 05116880 022 | 06116880 021 | 07116880 030 | 08116880 030 | 09116880 021 | 10116880 021 | 11116880 023 | 12116880 021 |
| Sampling Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Date Sampled | 20/01/11 | 21/02/11 | 31/03/11 | 02/05/11 | 01/06/11 | 30/06/11 | 01/08/11 | 01/09/11 | 04/10/11 | 03/11/11 | 05/12/11 | 09/01/12 |
| Time Sampled | 13:20 | 16:30 | 13:25 | 13:25 | 13:10 | 16:30 | 15:23 | 13:10 | 14:28 | 18:25 | 12:15 | 15:57 |
| Standing Water Level (m) | 6.80 | 6.20 | 6.32 | 6.65 | 6.65 | 6.72 | 6.80 | 6.60 | 6.42 | 6.30 | 5.70 | 6.00 |
| Standpipe Height (m) | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Relative Standing Water Level (m) | 5.85 | 5.25 | 5.37 | 5.70 | 5.70 | 5.77 | 5.85 | 5.65 | 5.47 | 5.35 | 4.75 | 5.05 |
| pH (pH units) | 4.7 | 4.8 | 4.9 | 4.9 | 4.8 | 4.5 | 4.6 | 4.5 | 4.9 | 4.4 | 4.3 | 5.2 |
| Conductivity (µS/cm) | 333 | 368 | 438 | 363 | 362 | 334 | 336 | 299 | 360 | 394 | 251 | 277 |
| Total Alkalinity (mg/L $CaCO_3$) | -- | -- | -- | 2 | -- | -- | -- | 2 | -- | -- | -- | 1 |
| Bicarbonate Alkalinity (mg/L $CaCO_3$) | -- | -- | -- | 2 | -- | -- | -- | 2 | -- | -- | -- | 1 |
| Chloride (mg/L) | -- | -- | -- | 11 | -- | -- | -- | 10 | -- | -- | -- | 5 |
| Sulphate (mg/L) | -- | -- | -- | 123 | -- | -- | -- | 110 | -- | -- | -- | 76 |
| Calcium (mg/L) | -- | -- | -- | 18 | -- | -- | -- | 17 | -- | -- | -- | 9 |
| Magnesium (mg/L) | -- | -- | -- | 12 | -- | -- | -- | 11 | -- | -- | -- | 7 |
| Sodium (mg/L) | -- | -- | -- | 18 | -- | -- | -- | 17 | -- | -- | -- | 12 |
| Potassium (mg/L) | -- | -- | -- | 5 | -- | -- | -- | 4 | -- | -- | -- | 4 |
| Filtered Iron (mg/L) | -- | 4.76 | -- | 6.18 | -- | 5.14 | -- | 5.97 | -- | 6.67 | -- | 1.89 |

Indicates results are outside the Action Thresholds Levels. --- Indicates no sampling required during particular period.

**Table 14** – *Groundwater Monitoring Bore P3 Results Jan - Dec 2011*

| Location | Bore P3 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Number | 01116880 016 | 02116880 018 | 03116880 043 | 04116880 023 | 05116880 023 | 06116880 022 | 07116880 031 | 08116880 031 | 09116880 022 | 10116880 022 | 11116880 024 | 12116880 022 |
| Sampling Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Date Sampled | 20/01/11 | 21/02/11 | 31/03/11 | 02/05/11 | 01/06/11 | 30/06/11 | 01/08/11 | 01/09/11 | 04/10/11 | 03/11/11 | 05/12/11 | 09/01/12 |
| Time Sampled | 13:15 | 16:15 | 13:15 | 13:00 | 13:05 | 16:20 | 15:10 | 12:48 | 14:23 | 18:15 | 12:05 | 15:50 |
| Standing Water Level (m) | 6.80 | 6.50 | 6.54 | 6.60 | 6.71 | 6.85 | 7.00 | 6.85 | 6.70 | 6.80 | 5.96 | 6.15 |
| Standpipe Height (m) | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 | 0.66 |
| Relative Standing Water Level (m) | 6.14 | 5.84 | 5.88 | 5.94 | 6.05 | 6.19 | 6.34 | 6.19 | 6.04 | 6.14 | 5.30 | 5.49 |
| pH (pH units) | 4.6 | 5.0 | 5.2 | 4.9 | 4.8 | 4.6 | 4.8 | 4.7 | 5.4 | 4.5 | 4.7 | 5.6 |
| Conductivity (µS/cm) | 448 | 390 | 556 | 484 | 434 | 521 | 467 | 504 | 630 | 463 | 254 | 395 |
| Total Alkalinity (mg/L $CaCO_3$) | -- | -- | -- | <1 | -- | -- | -- | <1 | -- | -- | -- | 1 |
| Bicarbonate Alkalinity (mg/L $CaCO_3$) | -- | -- | -- | <1 | -- | -- | -- | <1 | -- | -- | -- | 1 |
| Chloride (mg/L) | -- | -- | -- | 15 | -- | -- | -- | 12 | -- | -- | -- | 7 |
| Sulphate (mg/L) | -- | -- | -- | 264 | -- | -- | -- | 211 | -- | -- | -- | 115 |
| Calcium (mg/L) | -- | -- | -- | 42 | -- | -- | -- | 34 | -- | -- | -- | 18 |
| Magnesium (mg/L) | -- | -- | -- | 28 | -- | -- | -- | 23 | -- | -- | -- | 13 |
| Sodium (mg/L) | -- | -- | -- | 26 | -- | -- | -- | 20 | -- | -- | -- | 12 |
| Potassium (mg/L) | -- | -- | -- | 7 | -- | -- | -- | 6 | -- | -- | -- | 5 |
| Filtered Iron (mg/L) | -- | -- | -- | 4.34 | -- | 3.71 | -- | 3.62 | -- | 2.37 | -- | 3.22 |

Indicates results are outside the Action Thresholds Levels. --- Indicates no sampling required during particular period.

**Table 15 –** *Groundwater Monitoring Bore P6 Results Jan - Dec 2011*

| Location | Bore P6 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Number | 01116880 007 | 02116880 020 | 03116880 021 | 04116880 012 | 05116880 012 | 06116880 011 | 07116880 033 | 08116880 020 | 09116880 011 | 10116880 011 | 11116880 011 | 12116880 011 |
| Sampling Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Date Sampled | 20/01/11 | 21/02/11 | 31/03/11 | 02/05/11 | 01/06/11 | 30/06/11 | 01/08/11 | 01/09/11 | 04/10/11 | 03/11/11 | 05/12/11 | 09/01/12 |
| Time Sampled | 13:45 | 13:50 | 11:00 | 10:30 | 11:00 | 15:00 | 13:40 | 11:00 | 15:02 | 15:15 | 10:40 | 14:50 |
| Standing Water Level (m) | 28.50 | 28.80 | 29.10 | 29.70 | 29.80 | 29.78 | 29.80 | 29.80 | 29.75 | 29.70 | 29.60 | 29.50 |
| Standpipe Height (m) | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Relative Standing Water Level (m) | 27.55 | 27.85 | 28.15 | 28.75 | 28.85 | 28.83 | 28.85 | 28.85 | 28.80 | 28.75 | 28.65 | 28.55 |
| pH (pH units) | 7.3 | 6.9 | 6.7 | 6.4 | 6.2 | 6.4 | 6.5 | 6.5 | 6.7 | 6.5 | 6.7 | 6.8 |
| Conductivity (µS/cm) | 181 | 320 | 941 | 714 | 720 | 656 | 650 | 724 | 1265 | 670 | 675 | 652 |
| Total Alkalinity (mg/L $CaCO_3$) | -- | -- | -- | 168 | -- | 182 | -- | 180 | -- | -- | -- | 192 |
| Bicarbonate Alkalinity (mg/L $CaCO_3$) | -- | -- | -- | 168 | -- | 182 | -- | 180 | -- | -- | -- | 192 |
| Chloride (mg/L) | -- | -- | -- | 36 | -- | 38 | -- | 39 | -- | -- | -- | 38 |
| Sulphate (mg/L) | -- | -- | -- | 169 | -- | 91 | -- | 95 | -- | -- | -- | 97 |
| Calcium (mg/L) | -- | -- | -- | 75 | -- | 64 | -- | 63 | -- | -- | -- | 65 |
| Magnesium (mg/L) | -- | -- | -- | 32 | -- | 27 | -- | 27 | -- | -- | -- | 28 |
| Sodium (mg/L) | -- | -- | -- | 27 | -- | 20 | -- | 20 | -- | -- | -- | 21 |
| Potassium (mg/L) | -- | -- | -- | 17 | -- | 15 | -- | 17 | -- | -- | -- | 17 |
| Filtered Iron (mg/L) | -- | 0.1 | -- | 4.84 | -- | 5.6 | -- | 5.58 | -- | 4.34 | -- | 4.09 |

Indicates results are outside the Action Thresholds Levels. --- Indicates no sampling required during particular period.

**Table 16 –** *Groundwater Monitoring Bore P7 Results Jan - Dec 2011*

| Location | Bore P7 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Number | 01116880 018 | 02116880 021 | 03116880 045 | 04116880 025 | 05116880 025 | 06116880 024 | 07116880 034 | 08116880 033 | 09116880 024 | 10116880 024 | 11116880 026 | 12116880 024 |
| Sampling Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Date Sampled | 20/01/11 | 21/02/11 | 31/03/11 | 02/05/11 | 01/06/11 | 30/06/11 | 01/08/11 | 01/09/11 | 04/10/11 | 03/11/11 | 05/12/11 | 09/01/12 |
| Time Sampled | 12:56 | 14:30 | 11:20 | 10:55 | 11:15 | 15:20 | 13:55 | 11:15 | 13:30 | 16:00 | 8:55 | 13:25 |
| Standing Water Level (m) | 9.40 | 9.50 | 9.55 | 9.75 | 9.96 | 10.23 | 10.40 | 10.11 | 9.78 | 9.30 | 8.37 | 8.04 |
| Standpipe Height (m) | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Relative Standing Water Level (m) | 8.40 | 8.50 | 8.55 | 8.75 | 8.96 | 9.23 | 9.40 | 9.11 | 8.78 | 8.30 | 7.37 | 7.04 |
| pH (pH units) | 6.3 | 6.4 | 6.4 | 6.4 | 6.2 | 6.0 | 6.2 | 6.3 | 6.5 | 6.0 | 6.6 | 6.8 |
| Conductivity (µS/cm) | 728 | 896 | 669 | 784 | 720 | 634 | 629 | 660 | 650 | 643 | 653 | 658 |
| Total Alkalinity (mg/L $CaCO_3$) | -- | -- | -- | 178 | -- | -- | -- | 148 | -- | -- | -- | 187 |
| Bicarbonate Alkalinity (mg/L $CaCO_3$) | -- | -- | -- | 178 | -- | -- | -- | 148 | -- | -- | -- | 187 |
| Chloride (mg/L) | -- | -- | -- | 78 | -- | -- | -- | 96 | -- | -- | -- | 86 |
| Sulphate (mg/L) | -- | -- | -- | 47 | -- | -- | -- | 31 | -- | -- | -- | 43 |
| Calcium (mg/L) | -- | -- | -- | 37 | -- | -- | -- | 32 | -- | -- | -- | 35 |
| Magnesium (mg/L) | -- | -- | -- | 38 | -- | -- | -- | 33 | -- | -- | -- | 39 |
| Sodium (mg/L) | -- | -- | -- | 38 | -- | -- | -- | 39 | -- | -- | -- | 43 |
| Potassium (mg/L) | -- | -- | -- | 7 | -- | -- | -- | 7 | -- | -- | -- | 8 |
| Filtered Iron (mg/L) | <0.05 | <0.05 | -- | 0.99 | -- | 0.33 | -- | <0.05 | -- | <0.05 | -- | <0.05 |

Indicates results are outside the Action Thresholds Levels. --- Indicates no sampling required during particular period.

**Table 17 –** *Groundwater Monitoring Bore P7a Results Jan - Dec 2011*

| Location | Bore P7a | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Number | 01116880 019 | 02116880 022 | 03116880 046 | 04116880 026 | 05116880 026 | 06116880 025 | 07116880 035 | 08116880 034 | 09116880 025 | 10116880 025 | 11116880 027 | 12116880 025 |
| Sampling Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Date Sampled | 20/01/11 | 21/02/11 | 31/03/11 | 02/05/11 | 01/06/11 | 30/06/11 | 01/08/11 | 01/09/11 | 04/10/11 | 03/11/11 | 05/12/11 | 09/01/12 |
| Time Sampled | 13:10 | 14:40 | 11:30 | 11:05 | 11:25 | 15:35 | 14:00 | 11:20 | 13:35 | 16:15 | 9:05 | 13:27 |
| Standing Water Level (m) | 6.85 | 7.00 | 7.07 | 7.13 | 7.22 | 7.23 | 7.30 | 7.13 | 7.04 | 6.90 | 6.73 | 6.44 |
| Standpipe Height (m) | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 | 0.90 |
| Relative Standing Water Level (m) | 5.95 | 6.10 | 6.17 | 6.23 | 6.32 | 6.33 | 6.40 | 6.23 | 6.14 | 6.00 | 5.83 | 5.54 |
| pH (pH units) | 6.2 | 6.4 | 6.3 | 6.3 | 6.2 | 6.2 | 6.3 | 6.3 | 6.4 | 6.0 | 6.5 | 6.5 |
| Conductivity (µS/cm) | 762 | 1017 | 726 | 816 | 750 | 712 | 712 | 768 | 730 | 729 | 733 | 721 |
| Total Alkalinity (mg/L $CaCO_3$) | -- | -- | -- | 183 | -- | -- | -- | 173 | -- | -- | -- | 190 |
| Bicarbonate Alkalinity (mg/L $CaCO_3$) | -- | -- | -- | 183 | -- | -- | -- | 173 | -- | -- | -- | 190 |
| Chloride (mg/L) | -- | -- | -- | 115 | -- | -- | -- | 122 | -- | -- | -- | 126 |
| Sulphate (mg/L) | -- | -- | -- | 30 | -- | -- | -- | 30 | -- | -- | -- | 30 |
| Calcium (mg/L) | -- | -- | -- | 42 | -- | -- | -- | 41 | -- | -- | -- | 43 |
| Magnesium (mg/L) | -- | -- | -- | 40 | -- | -- | -- | 40 | -- | -- | -- | 40 |
| Sodium (mg/L) | -- | -- | -- | 37 | -- | -- | -- | 40 | -- | -- | -- | 42 |
| Potassium (mg/L) | -- | -- | -- | 9 | -- | -- | -- | 9 | -- | -- | -- | 11 |
| Filtered Iron (mg/L) | -- | 4.01 | -- | 2.42 | -- | 3.92 | -- | 2.66 | -- | 1.6 | -- | 4.81 |

Indicates results are outside the Action Thresholds Levels. --- Indicates no sampling required during particular period.

**Figure 3** – *Groundwater Monitoring Bore P2 Results Jan – Dec 2011*

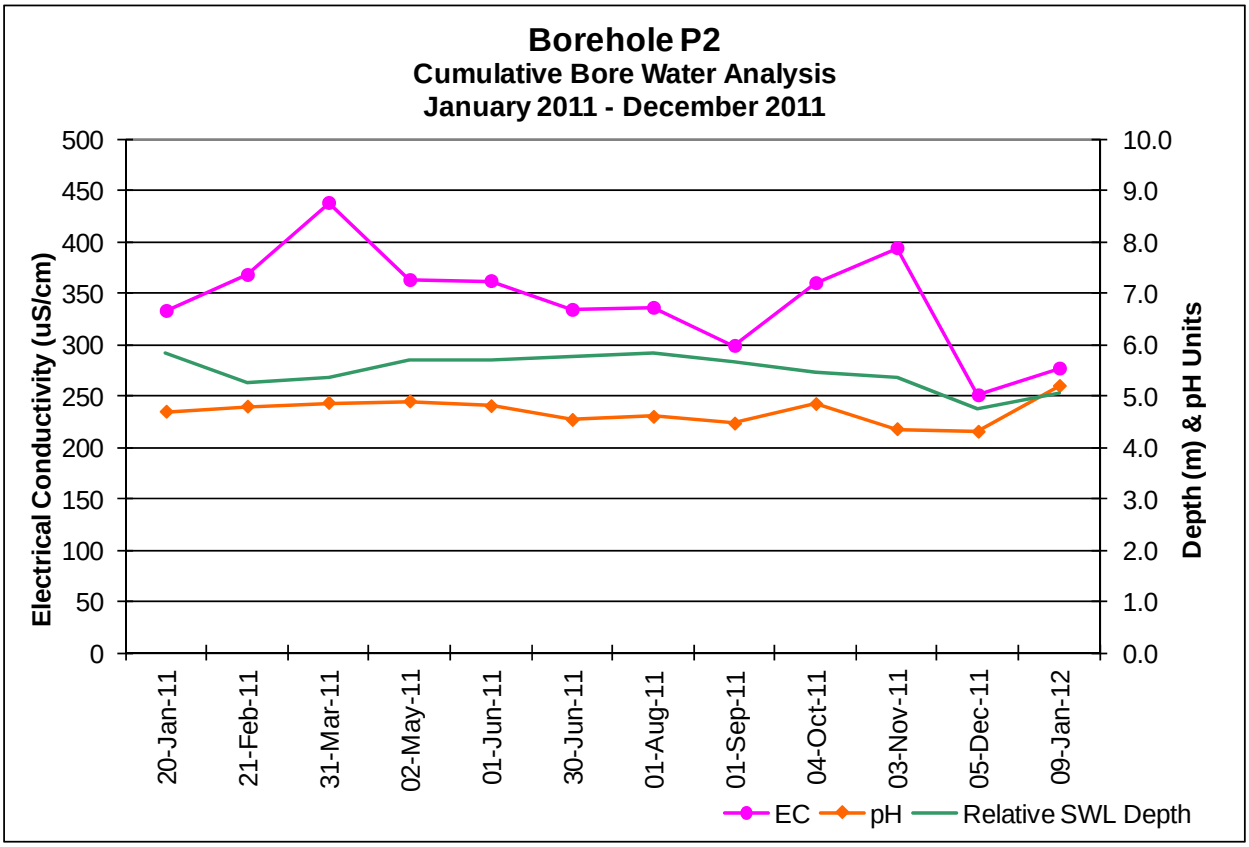



**Figure 4** – *Groundwater Monitoring Bore P3 Results Jan – Dec 2011*

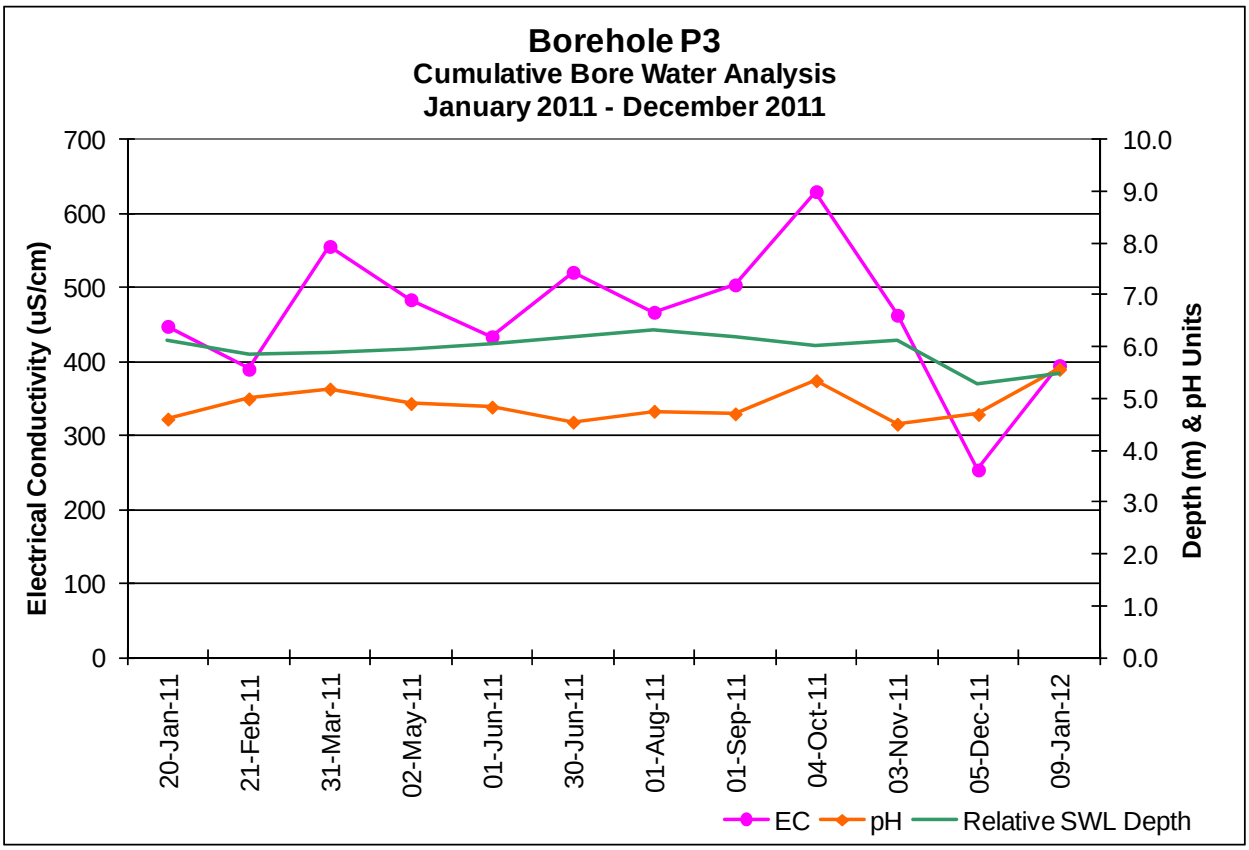


**Figure 5** – *Groundwater Monitoring Bore P4 Results Jan – Dec 2011*

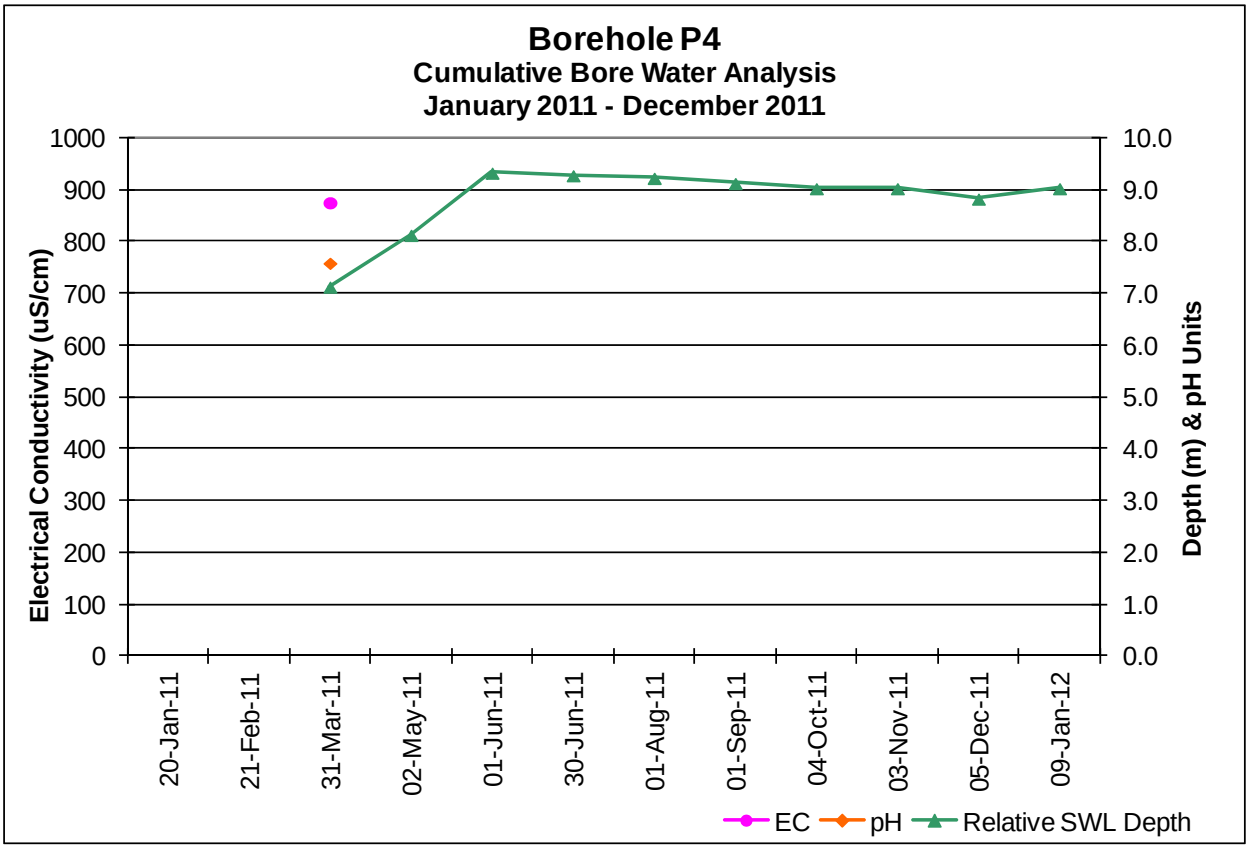



**Figure 6** – *Groundwater Monitoring Bore P6 – pH & EC Results Jan – Dec 2011*

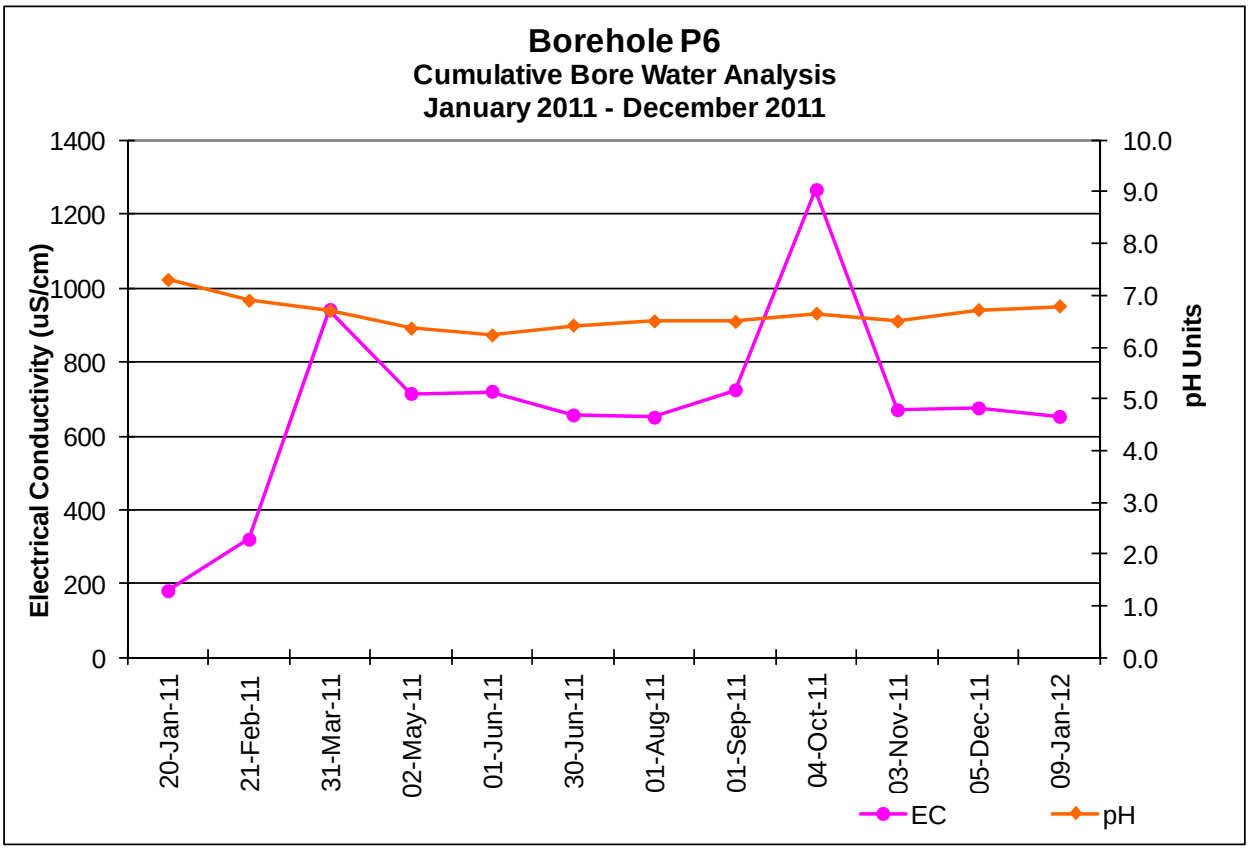


**Figure 7** – *Groundwater Monitoring Bore P6 – Depth Results Jan – Dec 2011*

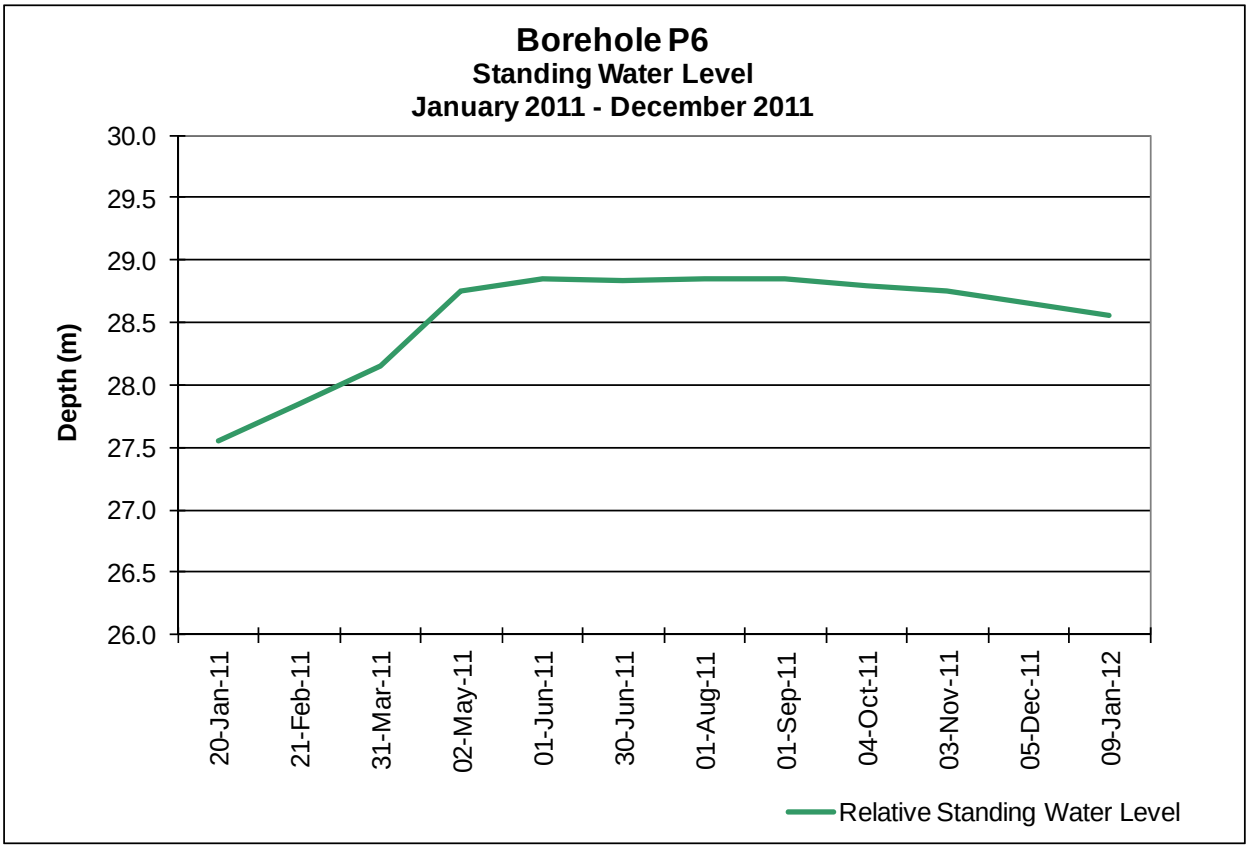



**Figure 8 –** *Groundwater Depth Bore P7 Jan – Dec 2011*

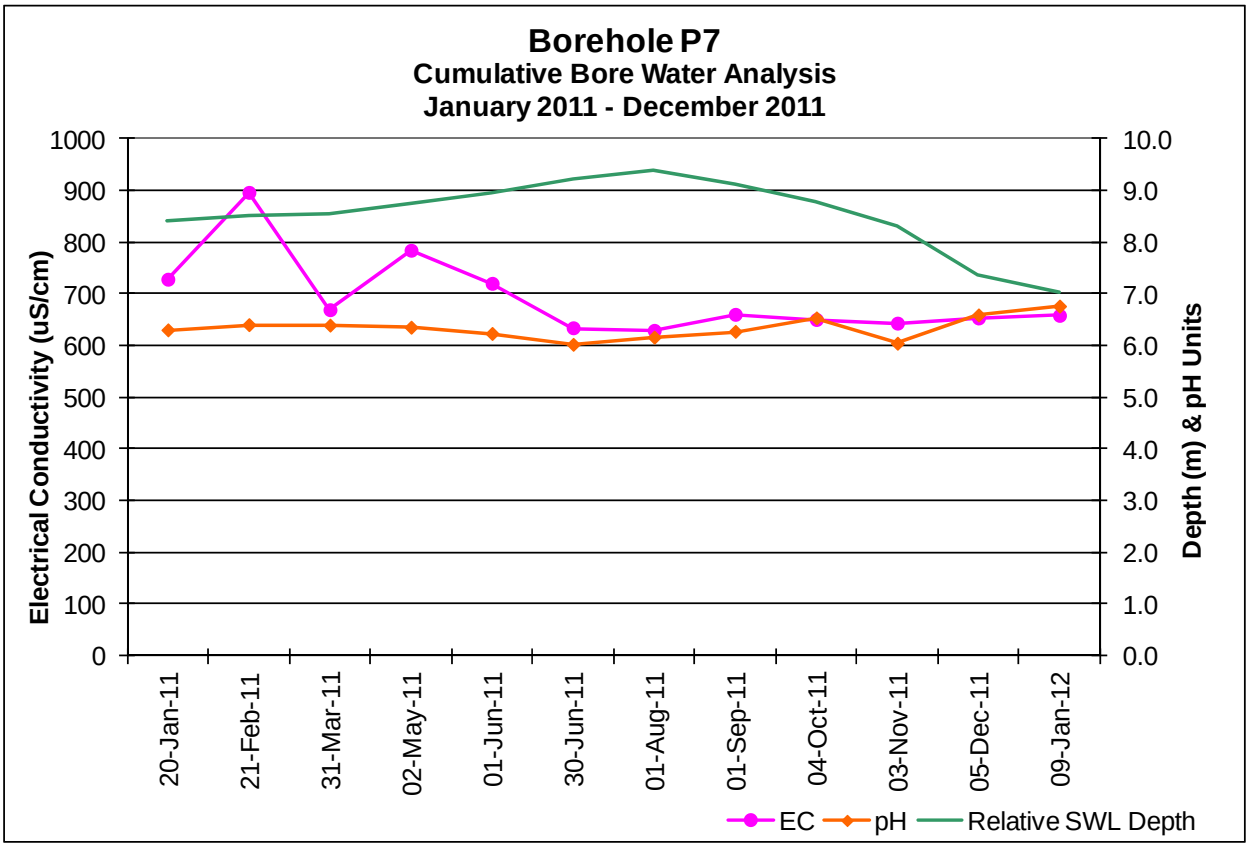
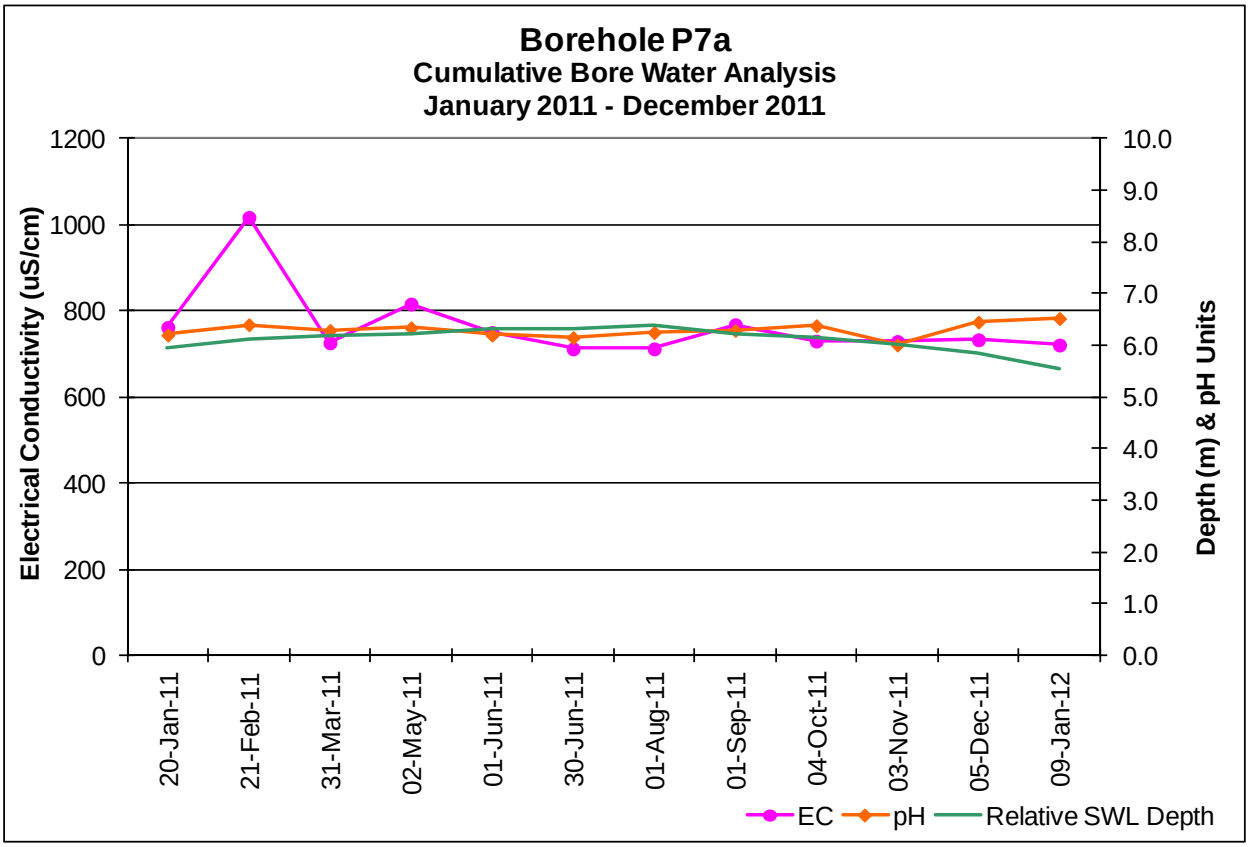


**Figure 9** – *Groundwater Monitoring Bore P7a Results Jan – Dec 2011*




## 4.2 Surface Water Monitoring Data Summary

Surface water monitoring for the Pine Dale Mine is undertaken in accordance with the Pine Dale Mine Environmental Protection License (EPL 4911). During the period January to December 2011, monitoring was undertaken on a quarterly basis (Feb, May, Aug & Nov) at a total of six locations as per the EPL (refer **Appendix 3**).

Surface water summary results for the period January – December 2011 are shown in **Tables 18** to **20**.

No samples were collected from the EPL Point 4 sampling location (Wallerawang Colliery No. 1A Mine Entry) or the EPL Point 5 sampling location (Wallerawang Colliery Coal Punch Mine Entry) during the 2011 period, as water discharge from the mine at these locations was not occurring during the scheduled sampling visit.

**Table 18 –** *Surface Water Monitoring Results EPL Point 2 Jan - Dec 2011*

| Location | **EPL Point 2** | | | |
|---|---|---|---|---|
| Sample No | 02116880023 | 05116880045 | 08116880045 | 11116880021 |
| Sampling Month | Feb | May | Aug | Nov |
| Date Sampled | 21/02/11 | 1/06/11 | 1/09/11 | 5/12/11 |
| Time Sampled | 09:00 | 16:40 | 15:00 | 15:10 |
| pH (pH units) | 7.3 | 7.6 | 7.2 | 7.4 |
| Conductivity (µS/cm) | 651 | 473 | 566 | 508 |
| Sulphate (mg/L) | 166 | 117 | 212 | 182 |
| Iron filterable (mg/L) | 0.2 | 0.22 | 0.13 | 0.27 |
| TSS (mg/L) | <5 | <5 | 7.0 | <5 |
| Turbidity (NTU) | 3.2 | 6.5 | 3.0 | 3.4 |

**Table 19 –** *Surface Water Monitoring Results EPL Point 3 Jan - Dec 2011*

| Location | **EPL Point 3** | | | |
|---|---|---|---|---|
| Sample No | 02116880030 | 05116880017 | 08116880025 | 11116880016 |
| Sampling Month | Feb | May | Aug | Nov |
| Date Sampled | 21/02/11 | 1/06/11 | 1/09/11 | 5/12/11 |
| Time Sampled | 16:50 | 13:15 | 13:30 | 12:15 |
| pH (pH units) | 7.6 | 7.3 | 6.8 | 6.6 |
| Conductivity (µS/cm) | 1517 | 891 | 817 | 1341 |
| Sulphate (mg/L) | 708 | 345 | 320 | 641 |
| Iron filterable (mg/L) | <0.05 | 0.26 | 0.96 | 0.23 |
| TSS (mg/L) | <5 | <5 | 9.0 | 9.0 |
| Turbidity (NTU) | 5.4 | 7.1 | 5.1 | 7.9 |

**Table 20 –** *Surface Water Monitoring Results EPL Point 14 Jan - Dec 2011*

| Location | EPL Point 14 | | | |
|---|---|---|---|---|
| Sample No | 02116880025 | 05116880046 | 08116880046 | 11116880022 |
| Sampling Month | Feb | May | Aug | Nov |
| Date Sampled | 21/02/11 | 1/06/11 | 1/09/11 | 5/12/11 |
| Time Sampled | 18:10 | 13:55 | 15:15 | 16:10 |
| pH (pH units) | 7.8 | 7.5 | 8.0 | 7.8 |
| Conductivity (µS/cm) | 779 | 975 | 825 | 515 |
| Sulphate (mg/L) | 206 | 317 | 188 | 124 |
| Iron filterable (mg/L) | 0.17 | <0.05 | 0.19 | 0.45 |
| TSS (mg/L) | <5 | <5 | 11.0 | <5 |
| Turbidity (NTU) | 2.0 | 6.5 | 5.7 | 14.8 |

# 5 COMPLIANCE ASSESSMENTS

## 5.1 Review & Interpretation of Air Monitoring Results

### *5.1.1 Depositional Dust Results*

Depositional Dust results for the period January – December 2011 show an average insoluble solids range of 0.3 g/m$^2$ per month to 0.9 g/m$^2$ per month for dust gauges D1, D2, D3, D4, D5 and D6 for the 12-month period. These results fall well below the nominated assessment criteria of an annual average of 4.0g/m$^2$ per month, as stipulated in the *Air Quality Monitoring Program*.

### *5.1.2 HVAS Particulate Matter Results*

HVAS Total Suspended Particulate (TSP) results for the period January – December 2011 show an average result of 20.1µg/m$^3$, which is well below the nominated annual average TSP assessment criteria of 90µg/m$^3$.

Similarly, the HVAS particulate matter results <10µm (PM10) also show results within the required *Air Quality Monitoring Program* assessment criteria. The average PM10 result was 10.7µg/m$^3$, which is below the annual average PM10 assessment criteria of 30µg/m$^3$. The highest PM10 result recorded during a single 24hour run day was 33µg/m$^3$ on 1 February 2011, which is also below the 24hour-maximum assessment criteria of 50µg/m$^3$.

## 5.2 Review & Interpretation of Ground Water Monitoring Results

Groundwater samples collected during the January – December 2011 period generally show that water quality results comply with the Action Trigger Levels for contingency action implementation as stated in the Groundwater Management Program. The exceptions were

bores P2, P3 and P6 which showed variations in the relative Standing Water Levels throughout the year. Bores P2 and P6 exhibited standing water levels which were outside of the Action Trigger Levels during every monitoring event during 2011. These two bores were found to have higher water levels (contain more water) than the depths listed in their respective Action Thresholds. Bore P3 was found to have higher water levels greater than the Action Threshold during every monitoring event excluding August 2011.

Action thresholds for Filtered Iron are based on an increase of >50% from the baseline iron concentrations for Bores P2, P3, P4 and P6; and an increase of >30% for bores P7 and P7a. As groundwater monitoring was not undertaken until the commencement of construction and mining operations, a true baseline level is not available. In the absence of baseline values, average Filtered Iron values have been calculated based on results from monitoring undertaken on the 15/10/05, 25/1/06, 13/4/06, 17/8/06, 1/11/06 and 1/12/06 as per the recommendations outlined in the Groundwater Monitoring Programme Results for Pine Dale Coal Mine (RCA ref 3761A-001/0, Sept 06). Although monitoring of the groundwater bores commenced in December 2005, it has taken some time for the Filtered Iron concentrations to become consistent.

Average Filtered Iron concentration has been calculated for each bore based on sampling undertaken between October 2005 and December 2006. Action thresholds are calculated in Table 21, below.

**Table 21 –** *Groundwater Monitoring Bore Average Filtered Iron Levels*

| **Samples Collected Oct 05 to Dec 06** | **Bore P2** | **Bore P3** | **Bore P4** | **Bore P6** | **Bore P7** | **Bore P7a** |
|---|---|---|---|---|---|---|
| | Filtered Iron (mg/L) | Filtered Iron (mg/L) | Filtered Iron (mg/L) | Filtered Iron (mg/L) | Filtered Iron (mg/L) | Filtered Iron (mg/L) |
| *Baseline Average* | *7.6* | *4.7* | *12.0* | *20.3* | *0.8* | *7.3* |
| ***Calculated Action Threshold*** | ***11.5*** | ***7.0*** | ***18.0*** | ***30.4*** | ***1.1*** | ***9.5*** |

The Groundwater monitoring action thresholds state the Standing Water Level of each borehole should not increase or decrease by more than 15% of the baseline pre-mining levels. The action thresholds for filtered iron were not exceeded on any boreholes sampled during the January to December 2011 period.

The relative Standing Water Level of Bore P2 shows a slight decrease in the amount of water present within the bore during March and November 2011, whilst an increase in the amount of water in the bore is evident in the December 2011 sampling period. Sampling throughout the remainder of the year indicates the water within the bore remained at a steady level. The standing water level within the bore remained outside the action threshold level of <6.0m for the entire 2011 monitoring period.

A similar trending is shown in Bore P3. There is a slight decrease in water within the bore during the March and October 2011 sampling period, whilst an increase in the amount of water is evident in December. Sampling throughout the remainder of the year indicates the water within the bore fluctuates slightly though remains relatively steady. Again, with the exception of the lower water level in August 2011, for the remainder of the year the standing water level within the bore was outside the action threshold of <6.2m.

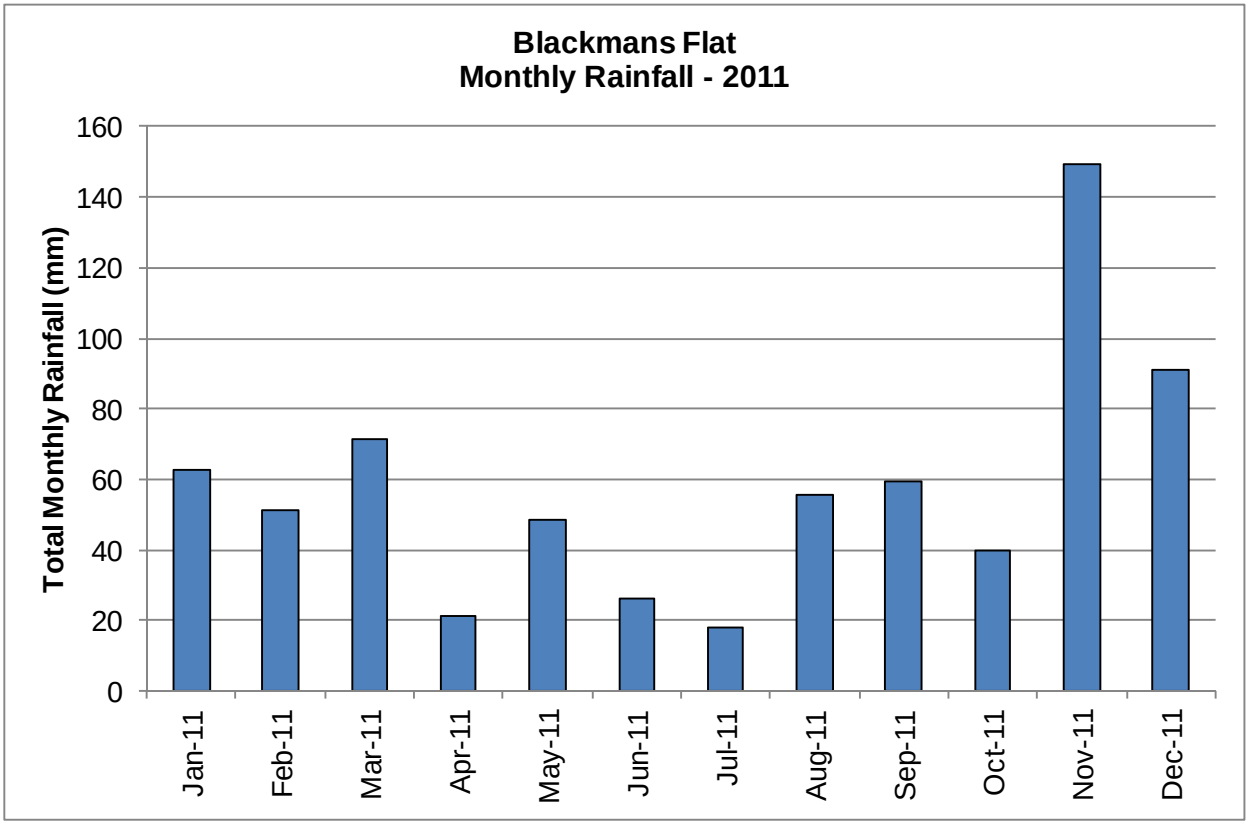
The Standing Water Level of Bore P6 shows a steady decrease in water levels during the period January to April 2011, after which the water level increases slightly for the remainder of the year. Throughout the entire 2011 sampling period the standing water level within the bore was outside the action threshold of <29.2m.

Water level in bore P7 is shown to decrease slightly during the period January to August 2011, with a steady increase in the water level within the bore for the remainder of the year.

The water level in bore P7a is shown to remain at a consistent depth during January to August 2011, with a slight increase in water levels for the remainder of the year.

The increase in water within bore holes P2 and P3 December 2011 is shown to correlate with total monthly rainfall received during November and December 2011. Rainfall in these months is shown to be considerably higher than the remainder of the year. The decrease then subsequent increase in water levels within bore P7 is shown to correlate with the decreasing then increasing rainfall levels throughout 2011. Similarly the increase in water levels within bore P7a from September to December 2011 correlates with the increase in rainfall experienced in during these months.

**Figure 10** – *Blackmans Flat Rainfall Jan – Dec 2011*




When the pH and Electrical Conductivity of the groundwater bores is examined, all sites are shown to fall within the required action threshold limits.

### 5.3 Review & Interpretation of Surface Water Monitoring Results

Surface water samples collected during the January – December 2011 period show water quality results that comply with the Concentration Limits of EPL 4911.

All monitoring performed was undertaken in accordance with the EPL. Monitoring at Point 2, Point 3 and Point 14 was undertaken on a quarterly basis with no exceedances of the Concentration Limits recorded to date.

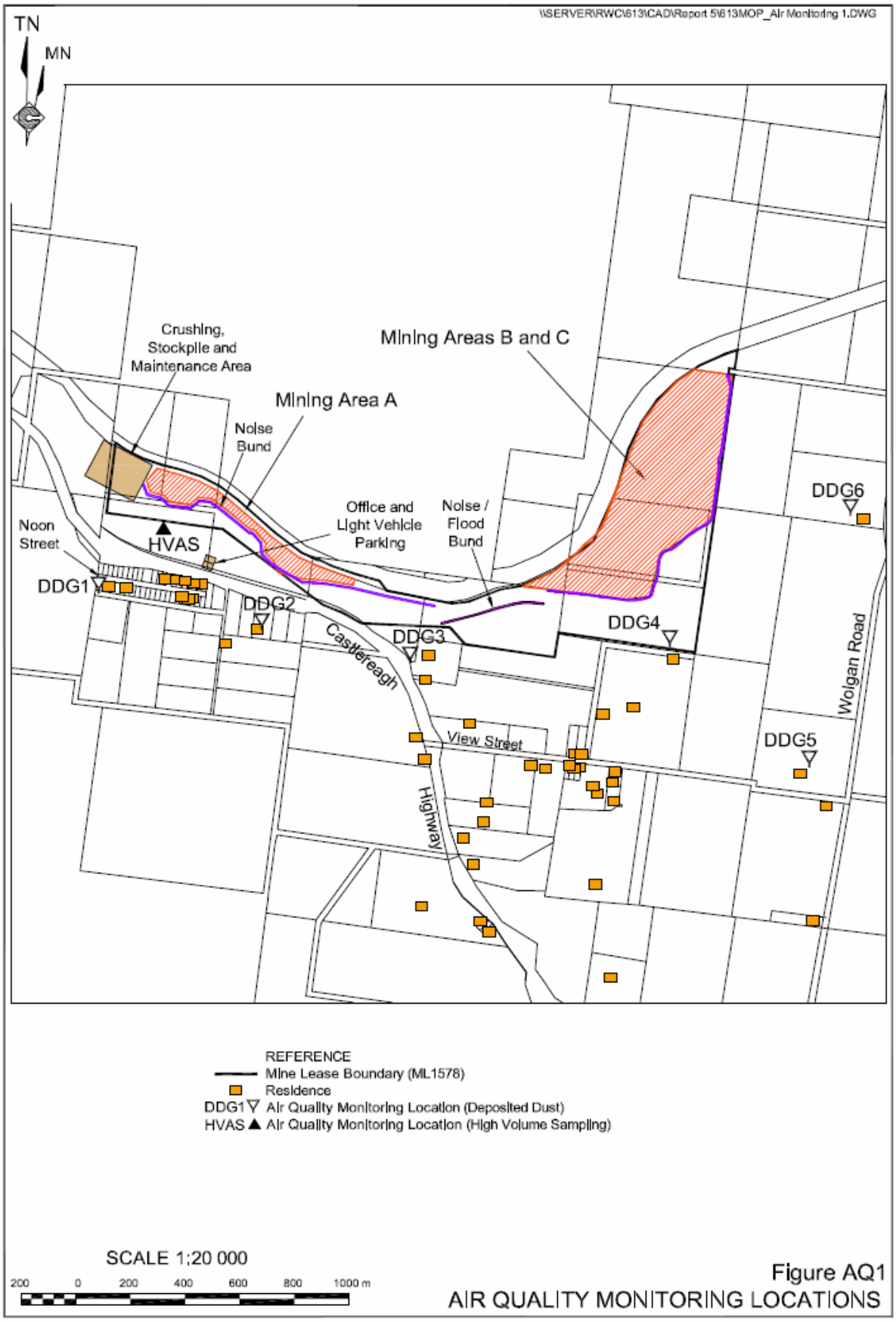
Please contact the undersigned if you have any queries on the above.

Karen Tripp
Senior Environmental Scientist / Hygienist
RCA Australia trading as
RCA Laboratories – Environmental

Geoff Mason
Environmental Services Manager
RCA Australia trading as
RCA Laboratories - Environmental

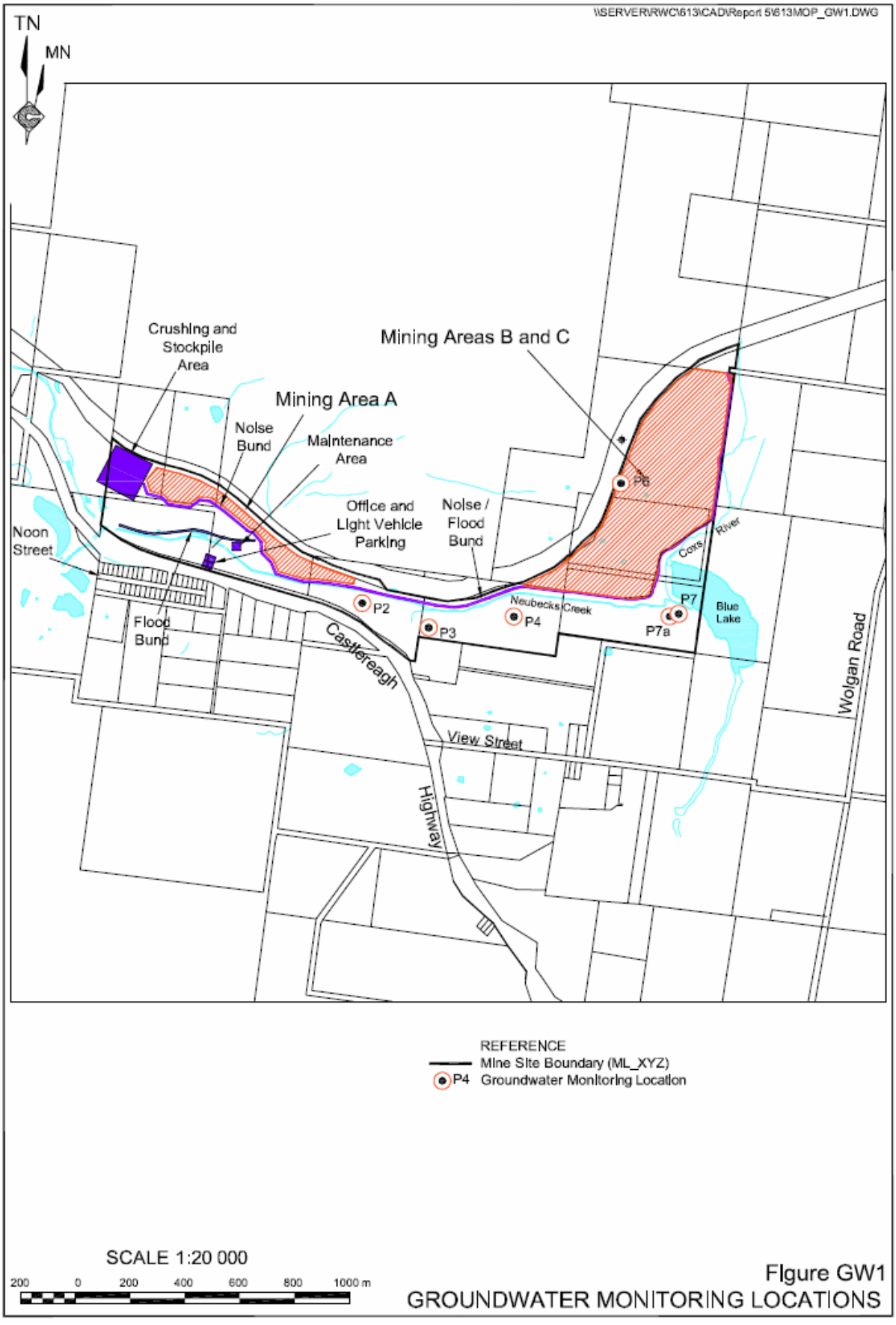
# APPENDIX 1
# Figure AQ1
# Air Quality Monitoring Locations

## AIR QUALITY MONITORING LOCATIONS

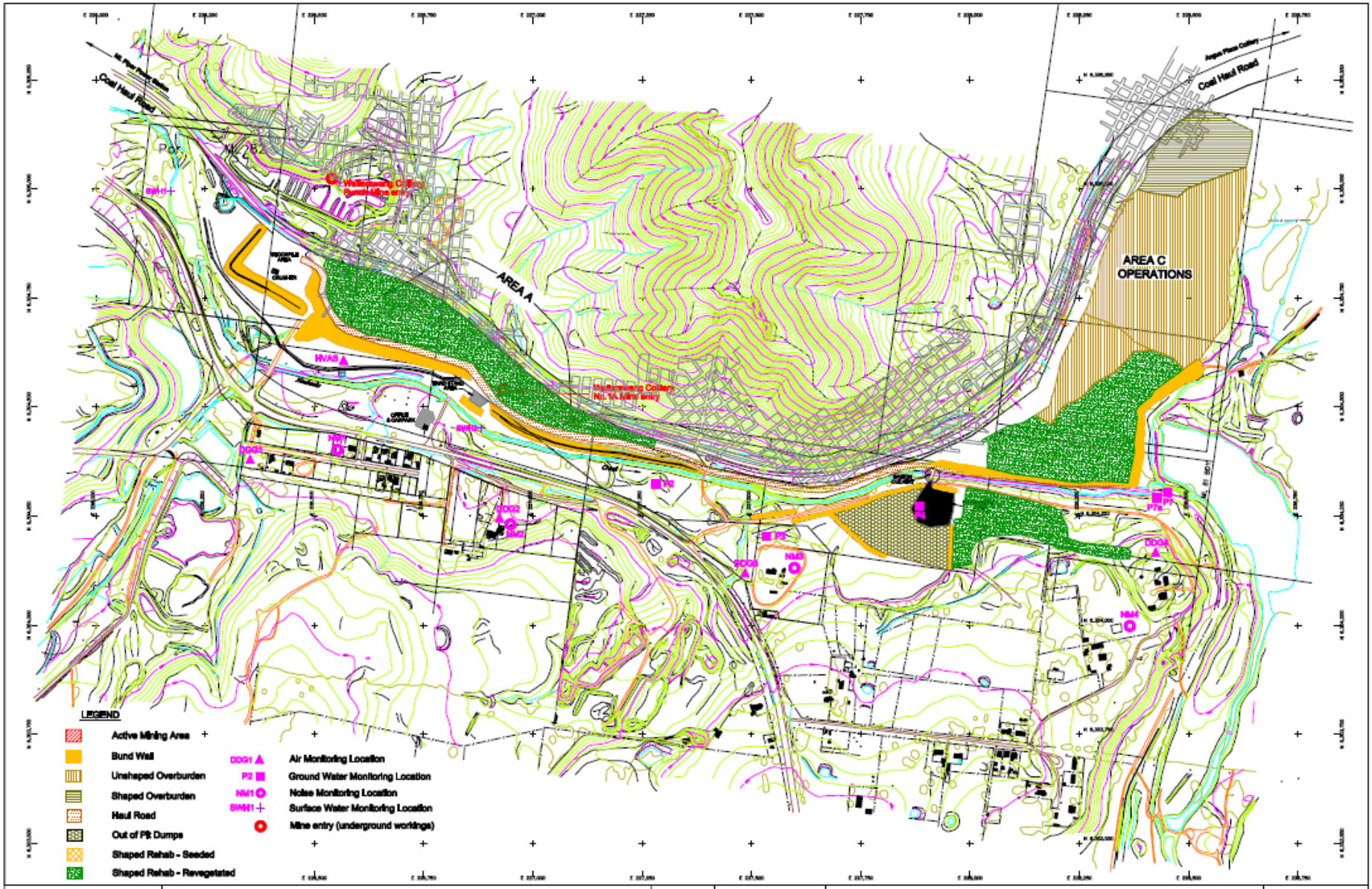


# APPENDIX 2
# Figure GW1
# Groundwater Monitoring Locations

## GROUNDWATER MONITORING LOCATIONS



# APPENDIX 3
# AEMR Plan Dec 10
# Surface Water Monitoring Locations




NOTES:

CRAVEN, ELLISTON & HAYES (LITHGOW) PTY.LTD.
CONSULTING LAND, ENGINEERING AND MINING SURVEYORS
ACN 056 544 551
"ASTROLABE" RUTHERFORD LANE, LITHGOW, 2790 PH: (02) 6351 2281, FAX: (02) 6352 1339
EMAIL : ceh@lisp.com.au

| | |
|---|---|
| DATE | 18-01-11 |
| AMENDED | |
| SURVEYOR | AERIAL PHOTO/TE/TH |
| DRAWN | K.L.F. |
| CHECKED | |

**PINEDALE MINE**
**AEMR PLAN**
**END DECEMBER 2010**
SCALE - 1 : 4000 (A1 Sheet)

DWG No
PINE-AEMR10

Mt. Piper Power Station

Coal Haul Road

Angus Place Colliery

Coal Haul Road

ML 82

ML 81

Wallerawang Colliery
Punch Mine entry

Wallerawang Colliery
No.1A Mine entry

SWH1

SWH2

STOCKPILE AREA

CRUSHER

AREA A

AREA C
OPERATIONS

HVAS

HARD STAND AREA

OFFICE & CARPARK

Newbeck

Creek

GABION CULVERT

DDG1

DDG2

DDG3

DDG4

NM1

NM2

NM3

NM4

P2

P3

P4

P7

P7a

E 226,000 E 226,250 E 226,500 E 226,750 E 227,000 E 227,250 E 227,500 E 227,750 E 228,000 E 228,250 E 228,500 E 228,750

N 6,305,250 N 6,305,000 N 6,304,750 N 6,304,500 N 6,304,250 N 6,304,000 N 6,303,750 N 6,303,500

LEGEND

- Active Mining Area
- Bund Wall
- Unshaped Overburden
- Shaped Overburden
- Road
- Out of Pit Dumps
- Shaped Rehab - Seeded
- Shaped Rehab - Revegetated

- DDG1 ▲ Air Monitoring Location
- P2 ■ Ground Water Monitoring Location
- NM1 ○ Noise Monitoring Location
- SWH1 + Surface Water Monitoring Location
- ○ Mine entry (underground workings)

NOTES:


CRAVEN, ELLISTON & HAYES (LITHGOW) PTY.LTD.
CONSULTING LAND, ENGINEERING AND MINING SURVEYORS
ACN 056 544 551
"ASTROLABE" RUTHERFORD LANE, LITHGOW, 2790 PH: (02) 6351 2281, FAX: (02) 6352 1339
EMAIL : survey@ceh.com.au


| | |
|---|---|
| DATE | 31–12–11 |
| AMENDED | |
| SURVEYOR | AERIAL PHOTO/TE/TH |
| DRAWN | K.L.F. |
| CHECKED | |

# PINEDALE MINE
# AEMR PLAN
# END DECEMBER 2011

SCALE - 1 : 4000 (A1 Sheet)

100 80 60 40 20 0 100 200 300 400

DWG No

PINE-AEMR11