BASELINE WATER MONITORING PLAN

Enhance Place Pty Limited

ABN: 31 077 105 867

Baseline Water Monitoring Plan

for the

Pine Dale Coal Mine

(Including the Yarraboldy Extension)

Prepared by:

RPS Aquaterra

In conjunction with:

R.W. Corkery & Co. Pty Limited

July 2011

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1. INTRODUCTION

This Baseline Water Monitoring Plan (BWMP) has been prepared for the Pine Dale Coal Mine, incorporating the Yarraboldy Extension, ("the mine") in accordance with *Schedule 3 Condition 26* of Project Approval 10_0041 which requires that the BWMP:

a) be prepared in consultation with Department of Environment, Climate Change and Water, now Office of Environment and Heritage, and NSW Office of Water (NOW) by suitably qualified and experienced persons whose appointment has been approved by the Director-General;

b) be submitted to the Director-General for approval by the end of February 2011; and

c) include programs for:

- consultation with other industries in the vicinity of the mine to gather existing surface water data (see Section 3);
- intensive baseline monitoring to be conducted for the first 6 months of site establishment to provide detailed data on surface water flows / levels and quality in creeks and other waterbodies that could be affected by the project (including the Neubecks Creek, the Blue Lake and the Coxs River) (see Section 4).

It is noted that an extension of the required date for submission of the BWMP to the end of March 2011 was provided by the, then, Department of Planning.

The focus of the BWMP is to provide an outline of the short-term (6 month) intensive water monitoring program to collect detailed water quality and quantity data within Neubecks Creek and the Coxs River. In addition to the BWMP, a Water Management Plan will be prepared in accordance with *Schedule 3 Condition 27* and will include details of water management measures and the long-term monitoring program.

2. APPROVAL REQUIREMENTS

Conditional requirements within Project Approval 10_0041 relevant to water quality and monitoring include the following.

Water Discharges

Schedule 3 Condition 23

The Proponent shall ensure that all surface water discharges from the site comply with the discharge limits (both volume and quality) set for the project in any EPL.

Baseflow Offsets

Schedule 3 Condition 24

The Proponent shall offset the loss of any baseflow to the surrounding watercourses and/or associated creeks caused by the project to the satisfaction of the Director-General.

Notes: This condition does not apply if the baseflow losses are negligible. Offsets should be provided via the retirement of adequate water entitlements to account for the loss attributable to the project.

Compensatory Water Supply

Schedule 3 Condition 25

The Proponent shall provide a compensatory water supply to any owner of privately-owned land whose water entitlements are adversely impacted (other than an impact that is negligible) as a result of the project, in consultation with NOW, and to the satisfaction of the Director-General.

The compensatory water supply measures must provide an alternative long-term supply of water that is equivalent to the loss attributed to the project. Equivalent water supply must be provided (at least on an interim basis) within 24 hours of the loss being identified.

If the Proponent and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.

If the Proponent is unable to provide an alternative long-term supply of water, then the Proponent shall provide alternative compensation to the satisfaction of the Director-General.

Water Management Plan

Schedule 3 Condition 27

The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Director-General. This plan must be prepared in consultation with DECCW and NOW by suitably qualified and experienced persons whose appointment has been approved by the Director-General, and submitted to the Director-General for approval by the end of April 2011.

In addition to the standard requirements for management plans (see Condition 2 of Schedule 5), this plan must include:

(a) *a Site Water Balance that:*

- *includes details of:*
  - *sources and security of water supply;*
  - *water use on site; and*
  - *reporting procedures; and*
- *describes what measures would be implemented to minimise potable water use on site.*

(b) *a Surface Water Management Plan, that includes:*

- *a detailed description of the water management system on site, including the:*
  - *clean water diversion systems;*

- *erosion and sediment controls; and*
- *water storages;*

- *a plan for identifying, extracting, handling, and the long-term storage of potentially acid forming materials on site;*
- *detailed plans, including design objectives and performance criteria, for:*
  - *reinstatement of drainage lines on the rehabilitated areas of the site; and*
  - *control of any potential water pollution from rehabilitated areas of the site;*
- *performance criteria for the following, including trigger levels for investigating any potentially adverse impacts on:*
  - *the water management system;*
  - *surface water quality in creeks and other water bodies that could potentially affected by the project (including Neubecks Creek, the Blue Lake and Coxs River);*
  - *the stream health, vegetation health and channel stability of water bodies that could potentially affected by the project*
- *a program to monitor:*
  - *the effectiveness of the water management system;*
  - *surface water flows and quality in creeks and other water bodies that could potentially affected by the project;*
  - *the stream health, riparian vegetation health and channel stability of creeks and other water bodies that could potentially affected by the project;*
- *a plan to respond to any exceedances of the performance criteria, and mitigate and/or offset any adverse surface water impacts of the project; and*

(c) *a Groundwater Management Plan, which includes:*

- *groundwater assessment criteria, including trigger levels for investigating and potentially adverse groundwater impacts;*
- *a program to monitor:*
  - *groundwater inflows to the open cut mining operation*
  - *the impacts of the project on;*
    - *baseflows to Neubecks Creek;*
    - *any groundwater bores on privately owned land; and*
- *a program to validate the groundwater model for the project, and calibrate it to site specific conditions; and*
- *a plan to respond to any exceedances of the performance criteria, and offset the loss of any baseflow to Neubecks Creek caused by the project.*

3. CONSULTATION WITH OTHER INDUSTRIES

Surrounding mine operators and Delta Electricity, the operator of the Mount Piper and Wallerawang Power Stations, have been consulted in relation to available water quality and flow data within the Neubecks Creek and Coxs River and their tributaries. As a result a data sharing arrangement is in place with Centennial Coal and Delta Electricity.

The agreement requires that each of the parties provides the groundwater and surface water information on as needs basis.

The data provided by Centennial Coal includes the following.

- Three surface water monitoring points, one being the Lamberts Gully discharge point (LPD006), located on the tributary prior to confluence with Neubecks Creek, and two in the Neubecks Creek one upstream of the discharge point and one downstream of the discharge point.
- Groundwater monitoring and bore information at Centennial Project - Neubecks Creek.

The data provided by Delta Electricity includes surface water flow and quality data from a monitoring point in Neubecks Creek downstream of the power station. The surface water monitoring point (WX22) is located approximately 400m upstream of Lamberts Gully and provides continuous flow records and quarterly measurements of water quality.

Surface water flow information for Neubecks Creek is also publicly available on the NSW Office of Water website.

The monitored parameters and the frequency of monitoring for the data sharing points are summarised in **Table BW1.**

Table BW1
Surface and Groundwater Data Sharing

Page 1 of 2

Site No.	Owner	Site Description	Parameters	Monitoring frequency
WX22	Delta Electricity	Neubecks creek stream gauge	pH, EC, major ions, metals (As, Ag, Ba, B, Cd, Cr, Cu, Fe, Hg, Mn, Pb, Se, Zn, Mo, Ni)	Monthly (when flowing)
			Flow	Continuous
LPD006	Centennial	Lamberts Gully (surface water)	Flow, EC, Temp, Rain & pH	Daily
			pH, EC, TSS, TOG,TDS, alkalinity, major ions, NO_3, P, metals (Al, B, Cd, Fe, Mn, Ni, Se & Zn)	Monthly
			pH, EC, TSS, TOG	Fortnightly
			NPI Parameters Daily during discharge	Quarterly
Neubecks Creek Upstream - Station No. 212055	NSW Office of Water	Neubecks Creek u/s of Lamberts Gully(surface water)	Flow , EC, temperature	Continuous

Table BW1 (Cont'd)
Surface and Groundwater Data Sharing

Page 2 of 2

Site No.	Owner	Site Description	Parameters	Monitoring frequency
Neubecks Creek Upstream	Centennial	Lamberts Gully (surface water)	pH, EC, TSS, TOG,TDS, Alkalinity, major ions, NO_3, P, metals (Al, B, Cd, Fe, Mn, Ni, Se & Zn)	Monthly
			pH, EC, TSS, TOG	Fortnightly
Neubecks Creek Downstream	Centennial	Lamberts Gully (surface water)	H, EC, TSS, TOG,TDS, , Alkalinity, major ions, NO_3, P, metals (Al, B, Cd, Fe, Mn, Ni, Se & Zn)	Monthly
			pH, EC, TSS, TOG	Fortnightly
Groundwater bores (as shown on **Figure BW1**)	Centennial	Neubecks Creek project (groundwater)	Water level, EC, temp, pH, major ions, metals (As, Cd, Cr, Cu, Ni, Pb, Zn and Fe)	Quarterly
			Water level	Monthly

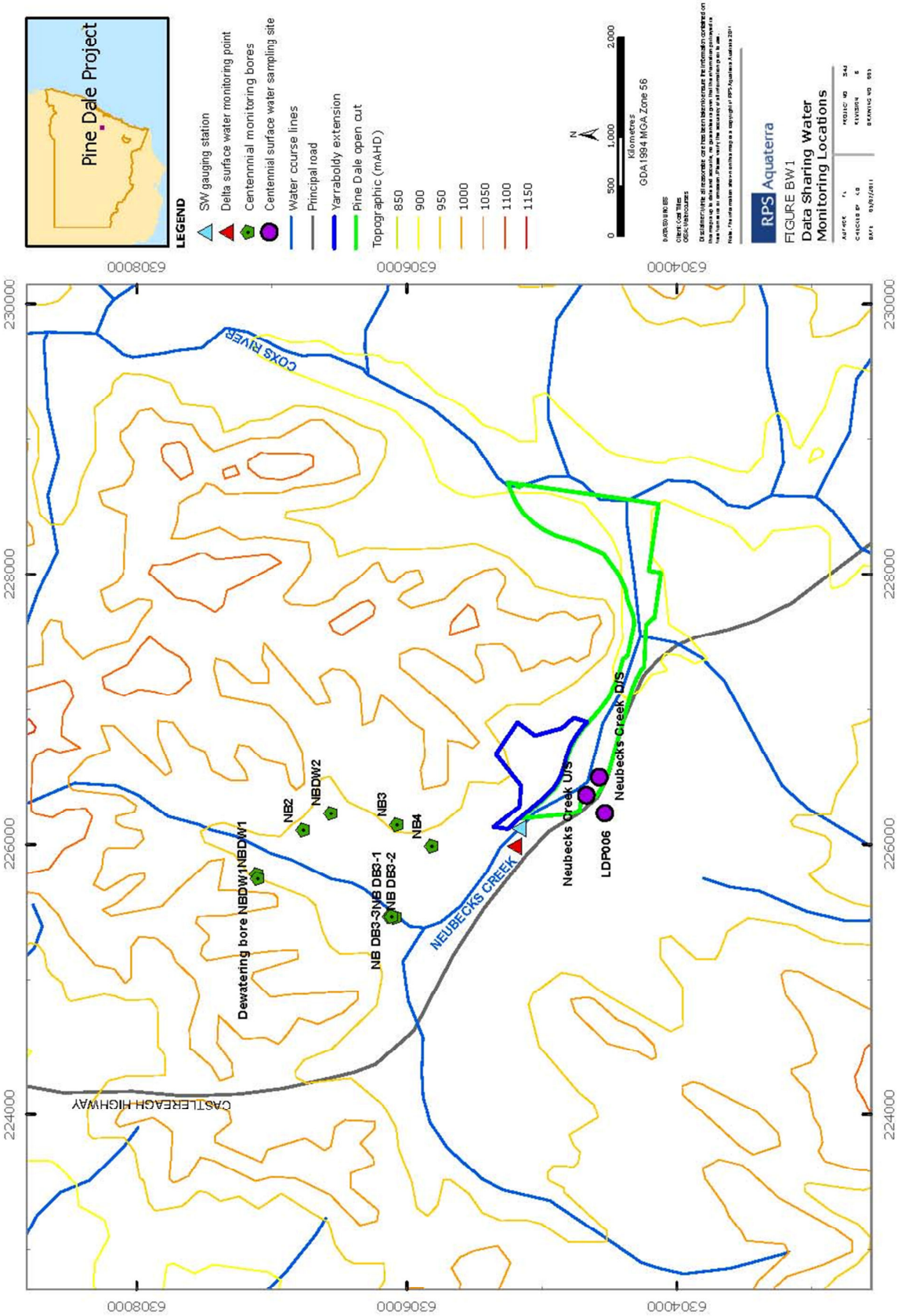
Figure BW1 displays the applicable Centennial Coal and Delta Electricity water monitoring locations included within the data sharing arrangement.

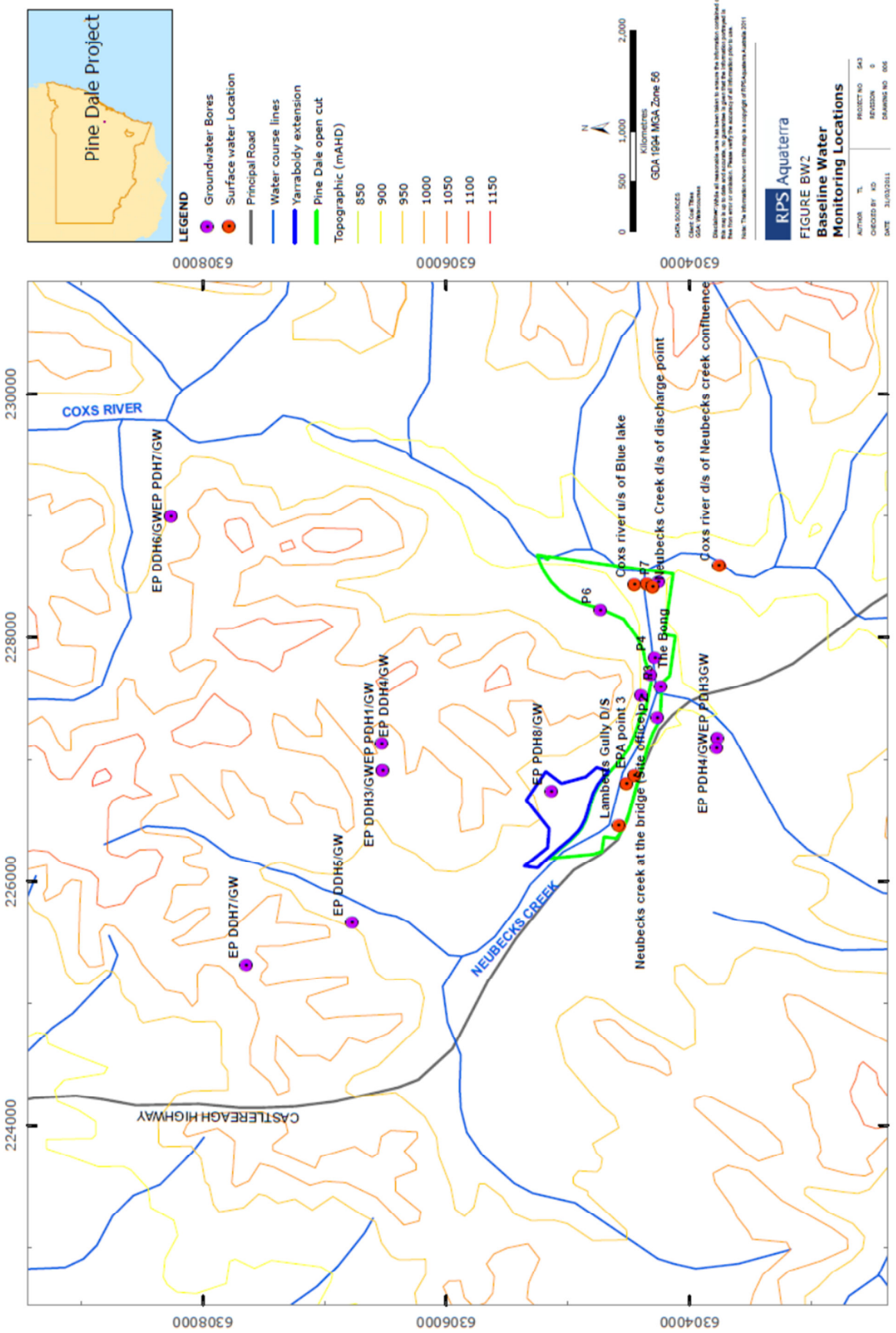
4. BASELINE WATER MONITORING PROGRAM

The locations of the baseline water monitoring locations are depicted in **Figure BW2** whilst **Tables BW2** and **BW3** provide a summary of the monitoring sites, frequency of monitoring and parameters to be monitored.

Table BW2 includes data that needs to be monitored for a six month period only. Following this intensive monitoring program, the monitoring will be reviewed and reduced to monthly water level monitoring and quarterly water quality sampling at selected locations.

Note that Neubecks Creek water levels at upstream and downstream locations will be monitored as required by NSW Office of Water as part of this baseline program. This information will allow the assessment of any changes in the flow in the Neubecks creek. In addition, upstream flow measurements in the Neubecks Creek are available from the NSW Office of Water Station Number 212055. Future flows may also be measured through installation of flow measurement points at upstream and downstream locations.


Pine Dale Project
LEGEND
SW gauging station
Delta surface water monitoring point
Centennial monitoring bores
Centennial surface water sampling site
Water ccurse lines
Principal road
Yarraboldy extension
Pine Dale open cut
Topographic (mAHD)
850
900
950
1000
1050
1100
1150
N
0
500
1,000
2,000
Kilometres
GDA 1994 MGA Zone 56
RPS Aquaterra
FIGURE BW1
Data Sharing Water
Monitoring Locations
630800
630600
630400
230000
228000
226000
224000
COXS RIVER
CASTLEREAGH HIGHWAY
NEUBECKS CREEK
Dewatering bore NBDW1
NBDW1
NBDW2
NB2
NB3
NB4
NB DB3-1
NB DB3-2
NB DB3-3
Neubecks Creek U/S
Neubecks Creek D/S
LDP006


Pine Dale Project
LEGEND
Groundwater Bores
Surface water Location
Principal Road
Water course lines
Yarraboldy extension
Pine Dale open cut
Topographic (mAHD)
850
900
950
1000
1050
1100
1150
N
0
500
1,000
2,000
Kilometres
GDA 1994 MGA Zone 56
RPS Aquaterra
FIGURE BW2
Baseline Water
Monitoring Locations
630400
630600
630800
230000
228000
226000
224000
COXS RIVER
EP DDH6/GWEP PDH7/GW
EP DDH7/GW
EP DDH5/GW
EP DDH3/GWEP PDH1/GW
EP DDH4/GW
EP PDH8/GW
Lambecks Gully D/S
EPA point 3
Site office)P2
P3
P4
The Bong
P6
#7
Coxs river u/s of Blue lake
Neubecks Creek d/s of discharge point
Coxs river d/s of Neubecks creek confluence
EP PDH4/GWEP PDH3GW
NEUBECKS CREEK
Neubecks creek at the bridge
CASTLEREAGH HIGHWAY

5. DATA MANAGEMENT AND REPORTING

Interim quarterly monitoring reports will be prepared by the company undertaking the monitoring and will outline the measured water quality and levels. Following the completion of the 6 month intensive monitoring period, a summary report will be prepared incorporating the data collected during the monitoring period and all other data obtained from surrounding industries, namely Centennial Coal and Delta Electricity.

The results of the monitoring will then be used as a basis to discuss with the Department of Planning & Infrastructure and the Office of Environment and Heritage the need to adjust any water quality trigger levels and to set water flow triggers.

Table BW2
Baseline Groundwater Monitoring Program

Monitoring Site*	Site Type	Easting	Northing	Frequency	Parameters
P2	Standpipe Piezometer	227341	6304267	Monthly	Water levels, pH, EC
				Quarterly	Water levels, pH, EC, major ions, Fe
P3	Standpipe Piezometer	227596	6304231	Monthly	Water levels, pH, EC
				Quarterly	Water levels, pH, EC, major ions, Fe
P4	Standpipe Piezometer	227833	6304287	Monthly	Water levels, pH, EC
				Quarterly	Water levels, pH, EC, major ions, Fe
P6	Standpipe Piezometer	228225	6304734	Fortnightly	water levels, pH, temp, EC, turbidity, DO, TSS, oil and grease, major ions, dissolved metals (Fe, Mn, Ni, Co, Zn)
P7	Standpipe Piezometer	228456	6304253	Monthly	Water levels, pH, EC
				Quarterly	Water levels, pH, EC, major ions, Fe
EP DDH3/GW	Vibrating wire Piezometer	226911	6306523	Monthly	water levels
EP DDH4/GW	Standpipe Piezometer	227132	6306531	Monthly	water levels
				Quarterly	pH, temp, EC, TDS, major ions, metals: As, Cd, Cr, Cu, Ni, Pb, Zn and Fe
EP DDH5/GW	Vibrating wire VW Piezometer	225663	6306772	Monthly	water levels
EP DDH6/GW	Vibrating wire VW Piezometer	228994	6308259	Monthly	water levels
EP DDH7/GW	Standpipe Piezometer	225313	6307639	Monthly	water levels
				Quarterly	pH, temp, EC, TDS, major ions, metals: As, Cd, Cr, Cu, Ni, Pb, Zn and Fe
EP PDH1/GW	Standpipe Piezometer	226911	6306523	Monthly	water levels
				Quarterly	pH, temp, EC, TDS, major ions, metals: As, Cd, Cr, Cu, Ni, Pb, Zn and Fe
EP PDH3GW	Standpipe Piezometer	227176	6303772	Monthly	water levels
EP PDH4/GW	Standpipe Piezometer	227097	6303780	Monthly	water levels
EP PDH7/GW	Standpipe Piezometer	228994	6308259	Monthly	water levels,
				Quarterly	pH, temp, EC, TDS, major ions, metals: As, Cd, Cr, Cu, Ni, Pb, Zn and Fe
EP PDH8/GW	Standpipe Piezometer	226740	6305137	Fortnightly	water levels, pH, temp, EC, turbidity, DO, TSS, oil and grease, major ions, dissolved metals (Fe, Mn, Ni, Co, Zn)
Old ventilation shaft	Standpipe Piezometer	227524	6304399	Fortnightly	water levels, pH, temp, EC, turbidity, DO, TSS, oil and grease, major ions, dissolved metals (Fe, Mn, Ni, Co, Zn)
The Bong	Standpipe Piezometer	227693	6304322	Monthly	water levels

*See **Figure BW2**

Table BW3
Baseline Surface Water Monitoring Program

Monitoring Site*	Easting	Northing	Frequency	Parameters
Lamberts Gully D/S	226458 (approx)	6304579 (approx)	Fortnightly	water levels, pH, temp, EC, turbidity, DO, TSS, oil and grease, major ions, dissolved metals (Fe, Mn, Ni, Co, Zn)
Neubecks creek at the bridge (Site office)	226803	6304519	Fortnightly	water levels
EPA point 3	226870	6304453	Fortnightly	pH, temp, EC, turbidity, DO, TSS, oil and grease, major ions, dissolved metals (Fe, Mn, Ni, Co, Zn)
Coxs river u/s of Blue lake	228432	6304453	Fortnightly	pH, temp, EC, turbidity, DO, TSS, oil and grease, major ions, dissolved metals (Fe, Mn, Ni, Co, Zn)
Blue lake u/s of Neubecks creek confluence	228440	6304347	Fortnightly	pH, temp, EC, turbidity, DO, TSS, oil and grease, major ions, dissolved metals (Fe, Mn, Ni, Co, Zn)
Neubecks Creek d/s of discharge point	228415	6304305	Fortnightly	pH, temp, EC, turbidity, DO, TSS, oil and grease, major ions, dissolved metals (Fe, Mn, Ni, Co, Zn)
Coxs river d/s of Neubecks creek confluence	228592	6303756	Fortnightly	pH, temp, EC, turbidity, DO, TSS, oil and grease, major ions, dissolved metals (Fe, Mn, Ni, Co, Zn)
*See **Figure BW2**				

6. RESPONSIBILITIES AND ACCOUNTABILITES

The information contained within the BWMP is available to all members of the workforce, particularly those responsible for taking samples, handling documentation or organising external party monitoring. The responsible workforce will be made aware of the procedures through training and, where appropriate, at regular toolbox talks / meetings.

The ultimate responsibility for the implementation of the BWMP and reporting of the monitoring results is the Manager Mining Engineering.

Table BW4 outlines the accountable positions and tasks relating to the BWMP for the Pine Dale Coal Mine.

Table BW4
Accountable Positions and Tasks

Position	Accountable Task
Manager Mining Engineering	• Coordinate water quality and flow monitoring in accordance with this monitoring plan. • Coordinate reporting of recorded water quality and flow monitoring.
The Company Conducting Water Monitoring	• Undertake water quality and flow monitoring in accordance with this monitoring plan and relevant Australian Standards. • Prepare quarterly monitoring reports. • Prepare summary report following completion of baseline water monitoring program. • Inform Manager Mining Engineering immediately should any non-compliances against existing water quality criteria be identified.

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