BAAL BONE COLLIERY
OPERATED BY THE WALLERAWANG COLLIERIES LIMITED

BAAL BONE COLLIERY
LW29-31 SMP Area

Subsidence Management Status Report No. 8

for the period
8th April 2010 to 7th August 2010

and

End of Panel Report – Longwall 29

October 2010

TABLE OF CONTENTS

1 INTRODUCTION

This Subsidence Management Report fulfils the requirements of Condition 19 of the Baal Bone Subsidence Management Plan (SMP) Longwalls 29 to 31 Approval Conditions. This is the eighth, four monthly status report and covers the period 8 April 2010 to 7 August 2010.

This report also includes Longwall 29 End of Panel Report which fulfils the requirements of Condition 20 of the Baal Bone Subsidence Management Plan (Longwalls 29 to 31) Approval Conditions.

Extraction of Longwall 29 (LW29) commenced on 6 July 2009 and was completed on 25 April 2010. Extraction of Longwall 30 commenced on 11 June 2010 and as at 7 August 2010 had retreated 401m to chainage 1,217m.

A summary of monitoring results for LW 29 are presented in this report. Subsidence surveys, photographic monitoring and visual inspections were conducted over the LW 29 surface area in accordance with the approved Subsidence Monitoring Programs with environmental monitoring conducted in accordance with the approved Environmental Monitoring Programs.

2 PURPOSE AND SCOPE

The purpose of this document is to report the progress of mining, provide a summary of subsidence impacts, the implemented management processes and consultation with relevant stakeholders. It also provides the opportunity for relevant stakeholders to provide feedback as required under Condition 19.

The purpose of this document is also to comply with the relevant approval condition (20) which states:

"Within 6 months of the completion of each longwall panel, an end of panel report must be prepared to the satisfaction of the Director Environmental Sustainability. The end of panel report must:

(a) include a summary of the subsidence and environmental monitoring results for the applicable longwall panel;

(b) include an analysis of these monitoring results against the relevant;

- *impact assessment criteria;*
- *monitoring results from previous panels; and*
- *predictions in the SMP.*

(c) identify any trends in the monitoring results over the life of the activity; and

(d) describe what actions were taken to ensure adequate management of any potential subsidence impacts due to longwall mining.

(e) be provided to all relevant agencies."

3 SUBSIDENCE AND ENVIRONMENTAL MONITORING PROGRAMS AND MANAGEMENT PLANS

The approved Subsidence Monitoring Program consisting of a combination of subsidence surveys, stress change and temperature monitoring have been developed in consultation with and approved by the Principal Subsidence Engineer, DPI – Mineral Resources for all panels extracted to date. All required subsidence monitoring lines have been installed, subsidence surveys and surface inspections have been completed in accordance with the Subsidence Monitoring Program.

As required under the SMP Approval conditions, an Environmental Monitoring Program was also developed in consultation with and approved by the Director of Environmental Sustainability, DPI – Mineral Resources. Routine seasonal monitoring of flora and fauna, scientific monitoring of impacts on

surface and groundwater regimes, rock features and escarpments have been undertaken in accordance with the Environmental Monitoring Program.

4 SUMMARY OF SUBSIDENCE IMPACTS

Mining operations for LW29 have been completed. Mining height was nominally 2.5m while seam thickness varies between 2.1m to 2.3m. Overburden ranges in thickness from 190m to 220m, this is shown in **Figure 1**. The full extraction void is 250m wide (which includes the 5m width of development drivage both sides of the longwall block). Longwall mining commenced in July 2009 and was completed in April 2010. The progression of LW29 extraction is shown in **Figure 2**.

The only visible impacts associated with LW29 observed was some tension cracking (<100mm) parallel to the gate roads and across the centre of the panel. Several minor cracks across the center of the panel were filled manually in the interests of public safety due to their close proximity of an informal motorcycle track through the forest. Barrier tape and additional signage was installed at numerous points in these areas and at all entry points off the main access roads, as per the Public Safety Management Plan.

All required pre-mining, during-mining and post-mining subsidence surveys were completed in accordance with the Subsidence Monitoring Program. Survey results for subsidence, tilt and strain were below predicted levels.

No subsidence impacts were observed outside the nominated angle of draw on LW29.

Visual inspections and photographic monitoring of various surface features, including cliffs, roads, tracks and swamp vegetation were also completed, with no adverse or unpredicted impacts observed.

During July 2009, it was observed that monitoring piezometer BBP1 was showing anomalous groundwater behaviour. The levels had declined independent of the response normally attributed to the effect of climatic conditions. A written notification was subsequently made in accordance with Condition 18 of Baal Bone's SMP Approval.

Fortnightly monitoring was continued during late August and September, and an investigation report into the anomalous groundwater behaviour was prepared by Ian Forster of Aurecon Australia Pty Ltd and lodged with the Principal Subsidence Engineer.

During 2010 all of the bores continued to show a stabilising trend and BBP2 was also showing a rising groundwater level following the rain in February. BBP1 upstream of the swamp is now stable again after rising rapidly during the rainfall. The continuing response of the groundwater levels is as expected.

5 SUBSIDENCE SURVEY SUMMARY AND MONITORING

A record of all completed subsidence surveys is shown in **Table 1**. All subsidence, tilt and strain results were within the predicted range. A summary of subsidence, strain and tilt results are detailed in **Table 2** with comparison to the SMP predictions.

All results are within the levels predicted in the SMP; with maximum subsidence of 1400mm recorded at E79 on the E-E line, maximum tensile strain of 11.7mm/m at F18 on the F-F Line, maximum tilt of 25.6mm/m at F20 on the F-F line and maximum horizontal movement of 407mm also at F20 on the F-F Line. The maximum horizontal movement was recorded on a relatively steep section of F Line and when adjusted for slope gradient, equates to systematic horizontal movement of less than 400mm.

As there were no monitoring results available for previous panels in this area, a comparison cannot be made.

Table 1 - Subsidence Monitoring Survey Dates for Longwall 29

Survey / Monitoring Line	Survey / Monitoring Description	Pre Mining Survey	Mining Period (Extraction)	Post Mining Surveys	Monitoring Program Surveys
LW 29 – 31 cross line (E Line)	Subsidence movement in 3 dimensions, tilt and strain	27/05/2009	N/A LW29	13/05/2010	• Pre and post mining LW 29
LW 29 start line (Line F)	Subsidence movement in 3 dimensions, tilt and strain	27/05/2009	03/08/2009 11/08/2009 18/08/2009	27/05/2010	• Pre and post mining LW 29 • After mining 100m LW29 • After mining 140m LW29 • After mining 200m LW29
LW 29 Finish line (Line G)	Subsidence movement in 3 dimensions, tilt and strain	02/10/2009	09/03/2010 24/03/2010	27/05/2010	• Pre and post mining LW 29 • 50m prior to LW29 finish • 20m prior to LW29 finish
Wolgan Escarpment Southern line (Line H)	Subsidence movement in 3 dimensions, tilt and strain	04/12/2009	N/A LW29	13/05/2010	• Pre mining • Post LW29
Wolgan Escarpment Southern line (Line I)	Subsidence movement in 3 dimensions, tilt and strain	04/12/2009	N/A LW29	13/05/2010	• Pre mining • Post LW29
Wolgan Escarpment Southern pinch point array	Subsidence movement in 3 dimensions	22/06/2010	N/A LW29	22/07/2010	• Pre mining • Post LW29
Wolgan Escarpment Northern line (Line J)	Subsidence movement in 3 dimensions, tilt and strain	04/12/2009	N/A LW29	13/05/2010	• Pre mining • Post LW29
Wolgan Escarpment Northern pinch point array	Subsidence movement in 3 dimensions	22/06/2010.	N/A LW29	22/07/2010	• Pre mining • Post LW29

Table 2 – Comparison of Subsidence Monitoring Results to SMP Predictions

Panel	Monitoring Item	SMP Prediction	Max. Survey Measurement
LW 29 cross line (E Line)	Subsidence (mm)	1400-1600	1400
	Tensile strain (mm/m)	9-21	5.7
	Tilt (mm/m)	32-52	22.3
	Horizontal movement (mm)	400	121
LW 29 start line (Line F)	Vertical subsidence (mm)	1400- 1600	1341
	Tensile strain (mm/m)	9-16	12.0
	Tilt (mm/m)	32-52	25.8
	Horizontal movement (mm)	400	407
LW 29 Finish line (Line G)	Subsidence (mm)	1400- 1600	29
	Tensile strain (mm/m)	9-16	1.2
	Tilt (mm/m)	32-52	0.8
	Horizontal movement (mm)	400	44
Wolgan Escarpment Southern line (Line H)	Subsidence (mm)		No measurable subsidence
	Tensile strain (mm/m)		
	Tilt (mm/m)		
	Horizontal movement (mm)		
Wolgan Escarpment Southern line (Line I)	Subsidence (mm)		No measurable subsidence
	Tensile strain (mm/m)		
	Tilt (mm/m)		
	Horizontal movement (mm)		
Wolgan Escarpment Southern pinch point array	Subsidence		No measurable subsidence
Wolgan Escarpment Northern line (Line J)	Subsidence		No measurable subsidence
	Tensile strain (mm/m)		
	Tilt (mm/m)		
	Horizontal movement		
Wolgan Escarpment Northern pinch point array	Subsidence		No measurable subsidence

6 PHOTOGRAPIC MONITORING AND VISUAL INSPECTION SUMMARY AND ANALYSIS

Dates of photographic monitoring and visual inspections are shown in **Table 3.** No impacts or changes have been noted in either photographic monitoring or visual inspections and these results have been detailed in the Subsidence Management Status Reports submitted previously.

Table 3 – Surface Inspection and Photographic Monitoring Dates for LW 29

Monitoring / Inspection	Monitoring / Inspection Description	Pre Mining Inspections / Monitoring	Mining Period Inspections / Monitoring	Post Mining Inspections / Monitoring
Surface Rock Features	Visual inspection	12 May 2009	Weekly	10 May 2010
Roads / tracks	Visual inspection Video	16 July 2009 16 July 2009	Weekly	10 May 2010 25 June 2010
Wolgan Escarpment	Oblique aerial photographic monitoring	17 April 2009	N/A LW29	16 June 2010
Coxs River Swamp	Baseline Photographic monitoring	6 June 2007 5 November 2007 4 March 2008 2 May 2008 12 September 2008 16 December 2008 8 January 2009 25 April 2009 26 May 2009	14 August 2009 7 October 2009 19 March 2010	25 June 2010

7 ENVIRONMENTAL MONITORING SUMMARY AND ANALYSIS

Wolgan Escarpment – Stress Cell Monitoring

As part of condition 15 in the SMP approval, Dr Ken Mills of SCT Operations Pty Ltd was commissioned by Baal Bone to prepare a technical review and assessment (SCT Report BBO3432, dated 9 December 2009) of the mine layout and establish scientific confidence in the finish position of the panels. As a result of this review and in direct consultation of the Principal Subsidence Engineer, the width of Longwall 31 was reduced from 25m to 220m to ensure a high level of confidence in the ability of the mine layout to protect the Wolgan escarpment.

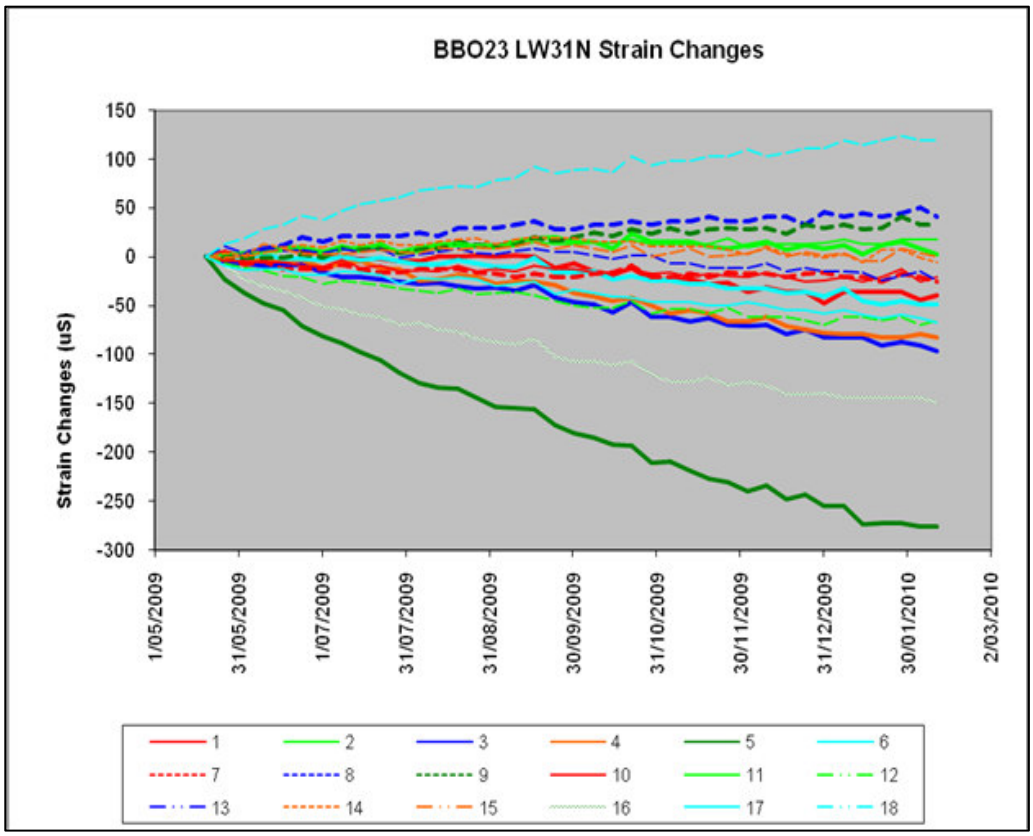
Baseline aerial photographic monitoring of the Wolgan Escarpment was completed in accordance with the requirements of the Land Management Plan.

Stress change monitoring instruments were installed and commissioned in the vicinity of the two pinch points on LW31 to monitor stress changes in the rock strata. These are monitored using a remote logger as Longwalls 29, 30 and 31 are progressively extracted. Stress cells are logged on a twice daily cycle and information downloaded periodically for analysis by SCT Operations. Monitoring results for are shown in **Table 4** respectively.

Table 4 – Stress change monitoring results of the southern and northern pinch points

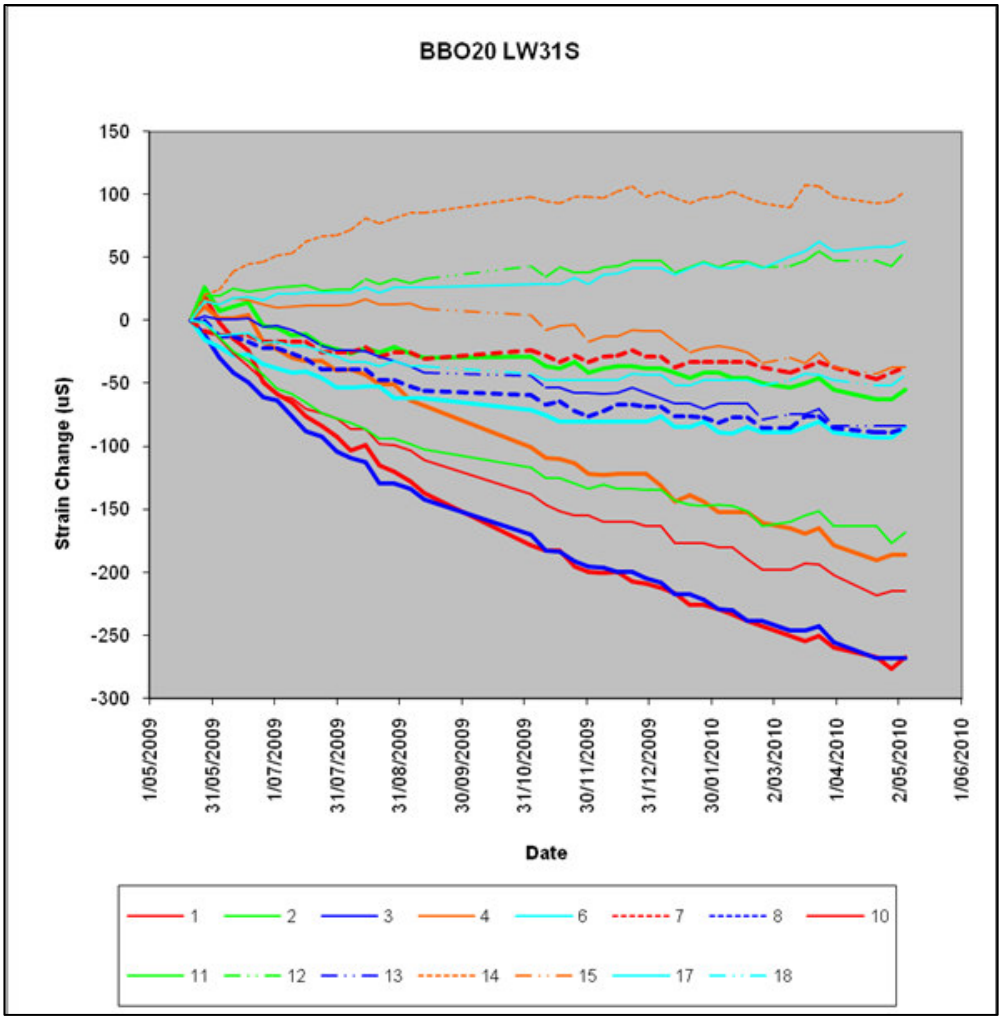
Stress cell	Major horizontal stress magnitude	Major horizontal stress orientation	Minor horizontal stress magnitude	Minor horizontal stress orientation
BBO20 (southern monitoring site)	0.6MPa	30°GN	0.8MPa	
BBO22 (northern monitoring site)	2.4MPa	340°GN	<0.5MPa	Right angle
BBO23 (northern monitoring site)	2.4MPa	330-340°GN	<0.5MPa	Right angle

The alignment of the northern monitoring sites (BBO22, BBO23) is consistent with the general geometry and with the regional joint set, with only low levels of horizontal stress toward the escarpment. The regional stress direction is typically oriented east of north. There appears to have been a rotation of the stress direction from the regional direction at the northern monitoring site, most probably as a result of the presence of the escarpment. Strain change monitoring results for BBO23 are shown below.



Analysis of the strain changes observed at the southern monitoring site (BBO20) indicates stress changes that are generally less than the tolerance of the measurements (based on 95% confidence limits) in compression (increasing by about 1MPa in a 330°GN direction and 0.2MPa in an

orthogonal direction). These changes are interpreted as being associated with rock creep around the borehole under the influence of background stress rather than changes associated with mining activity. There is no correlation with the start of mining or any pauses in mining activity as Longwall 29 retreated. Strain change monitoring results for BBO20 are shown below.



Pressure tests and stress change monitoring at BBO20 shows a steady change in strain with time at 41m below the surface. These results are consistent with BBO23 which has indicated a steady change in strain with time at 43m below the surface. The drift toward compression strains is mainly evident in the circumferential gauges and this low level creep appears to be a characteristic of the coarse grained sandstone in which the instrument is installed. There does not appear to be any significant effect from mining LW29 evident in the monitoring results.

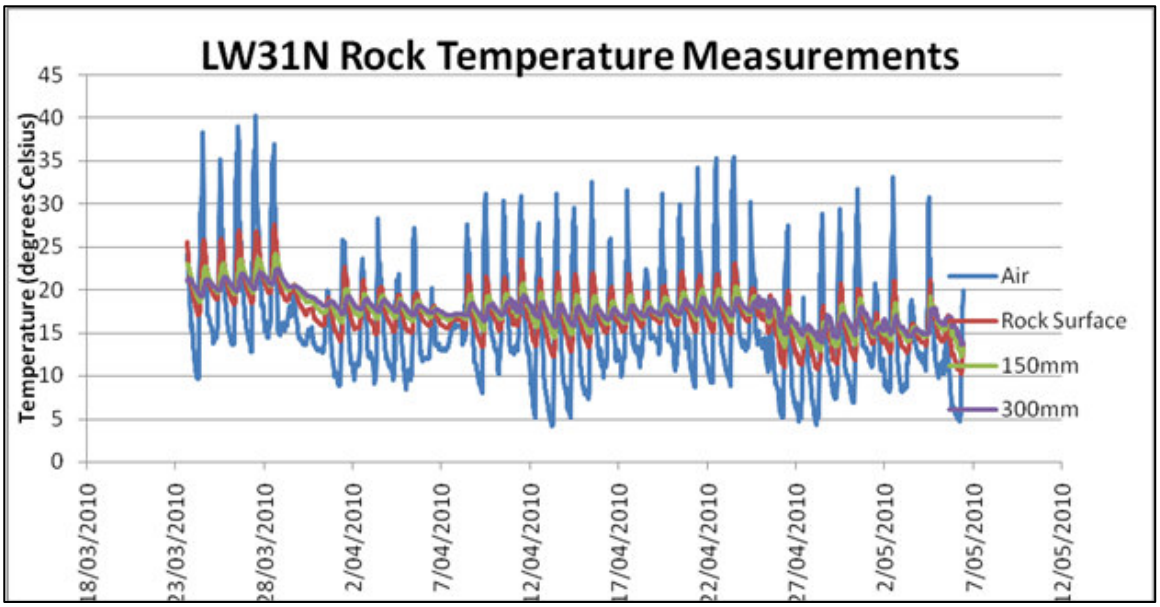
Both instruments have registered some drift. Strains recorded are less than 200uS, which is well below the changes observed previously in LW26 where changes of significance were in the 1200-1400uS range.

Air and rock temperature at the rock surface are measured by a temperature monitoring probe which was installed 150mm and 300mm below the surface. Temperatures were recorded March 2010 to May 2010 at 30 minute intervals.

Air temperature varied between 5℃ and 40℃ over the monitoring period. The rock surface temperature varied daily from 10℃ to 20℃. At 150mm below the surface, the rock temperature variation on a daily basis is about 5℃ with a change over the period of monitoring of about 12℃.

At 300mm below the surface, the rock temperature has varied about 2℃ on a daily basis and 10℃ over the monitoring period.

The thermal expansion coefficient of the sandstone at Baal Bone has not been measured, but sandstone generally has a thermal coefficient of expansion of about 10uS / ℃. This means that for a daily 10℃ change in rock temperature, the surface strains/stresses in the rock are cycling through about 80uS or 0.7MPa. These surface stresses are of a similar magnitude to the stresses measured as creep around the borehole 40+m below the surface. The implication is that the rock that forms the Wolgan Escarpment is currently experiencing 1-3MPa change in surface stress as a result of seasonal temperature changes and 0.7MPa on a daily basis. Accordingly, there is a great deal of cyclic loading occurring near surface rock without any mining influence.



Rock Features

No adverse or unpredicted subsidence impacts occurred on identified rock features in the vicinity of the SMP area. Weekly inspections of the rock features around the LW29 start area continued until the longwall face had retreated at least 250m. Notification of this milestone was made to both DII and Forests NSW as required by the SMP Land Management Plan.

Surface Watercourses / Drainage structures

No unpredicted subsidence impacts were observed on surface watercourses or drainage structures in the SMP area. Minor fractures, within predicted ranges and below Trigger Action Response Plan (TARP) trigger values as identified in the SMP Environmental Monitoring Program, were identified during longwall mining. As per SMP, inspections of this area continued during and post longwall mining. There has been no confirmed observable change to pre-mining flow characteristics and stream morphology. Weekly inspections of the surface watercourses and drainage structures within the LW29 area continued until the longwall face had retreated at least 250m past the watercourse.

Fire Trails and Tracks

To date there has been no subsidence impacts on any fire trails or tracks in the SMP area; ongoing weekly inspections continued until the longwall face had retreated at least 250m past the track.

Swamp

Baseline seasonal photographic monitoring of the Coxs River Swamp was undertaken pre, during and post LW29 mining. Dates of the baseline seasonal photographic monitoring are detailed in **Table 3, Section 6**.

Seasonal variations in swamp appearance are consistent with those observed during pre-mining assessments, particularly when antecedent ground moisture levels are taken into consideration. These observations are confirmed by the results of the seasonal flora and fauna monitoring programs.

Fauna

Fauna baseline seasonal surveys were undertaken by Biodiversity Monitoring Services. Surveys were undertaken pre, during and post LW29 extraction. Results from the fauna surveys have indicated that there has been an increase in diversity of birds, terrestrial and arboreal mammals over time. The species richness values during 2009 to 2010, together with the 2005 to 2008 values are shown in the following table.

Table 5 – Species Richness of the three main faunal groups.

Species Richness	Autumn 2010	Autumn 2009	Spring 2009	Summer 2009	Overall 2009	Overall 2008	Overall 2007	Overall 2006	Overall 2005
Birds	41	30	51	16	55	48	41	41	37
Native Mammals	19	9	19	3	22	14	7 (no bats)	11	9
Reptiles	3	0	7	2	9	6	2	5	4

Measurements of habitat characteristics have increased overtime in both woodland and creek line habitats. This indicates that the habitat values have improved in the past four years. In addition, high habitat complexity scores were obtained during monitoring, which indicates better habitat for small ground mammals and woodland birds.

The 2010 autumn survey was successful, in terms of the number of individuals and diversity of species within the two main fauna groups surveyed. Six threatened bird species were located during the autumn survey (Gang-gang Cockatoo, Brown Treecreeper, Hooded Robin, Scarlet Robin, Flame Robin and Varied Sittella). In addition, four threatened bat species were located (Large-eared Pied Bat, Eastern False Pipistrelle, Eastern Bent-wing Bat and Greater Broad-nosed Bat). Also, there were sufficient numbers and diversities of these fauna groups to be able to calculate a set of diversity indices that form part of the baseline monitoring database. There is now sufficient data accumulated to provide annual population estimates for all groups of fauna.

It was possible to assess any differences in biodiversity and habitat condition as sampling was undertaken in an area that will be subject to underground mining in the future. This comparison showed that there are no significant differences in the biodiversity and habitat complexity over the years. Consequently, the data obtained so far can be used to provide a baseline for monitoring any changes due to mining in the future.

It will be possible to better track further changes to the terrestrial vertebrate fauna within the LW29-31 SMP Application Area as data continues to accumulate from the on-going baseline seasonal

surveys. At present however, there appears to be no evidence of any significant effects from subsidence upon the fauna diversity in the LW29-31 SMP Application Area at Baal Bone Colliery.

Flora

Gingra Ecological Surveys undertook the flora baseline seasonal monitoring pre, during and post LW29 extraction. In summary, comparison of results over the monitoring period shows a response to seasonal conditions with recent increased levels of species richness and of weed occurrence and abundance. Species richness at most sites were at the higher end of the previously recorded range following good rainfall. All species diversity records between summer, autumn and spring from 2007 to 2009 are shown in the following table (**Table 6**).

Table 6 - Plant Species Diversity for Baal Bone Colliery Longwall 29-31 SMP Area

Site	Species Count						
	Summer 2007	Spring 2007	Autumn 2008	Spring 2008	Autumn 2009	August 2009	Spring 2009
BB05	28	26	33	33	41	NS	35
BB06	22	24	29	26	31	NS	28
BB07	18	19	29	23	26	NS	24
BB08	22	24	33	27	29	NS	25
BB09	14	14	23	20	19	16	22
BB10	9	12	14	12	10	10	13

In terms of weeds, Yorkshire Fog, Catsear Fleabane and Spear Thistle has increased in abundance at Long Swamp over the monitoring period (2007 to 2009). This appears to be related to improved seasonal conditions and is consistent with observations across the region.

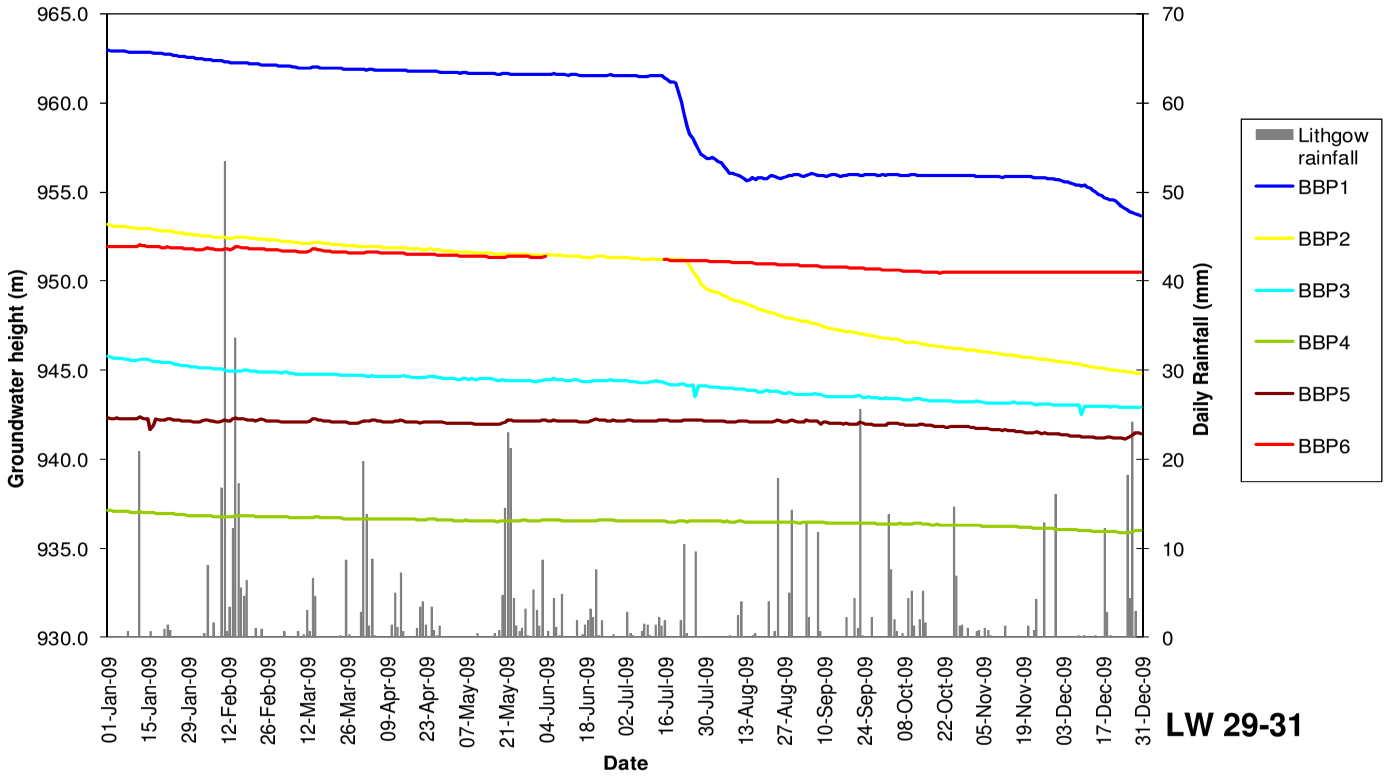
As indicated in previous reports, the temporary decline in ground water levels near Long Swamp during July 2009, has not impacted on the results from sampling of vegetation at Long Swamp survey sites in August and November 2009. The results do not indicate any effect of subsidence on species diversity, plant species composition or weed invasion.

The species richness data obtained to date provide baseline information across a range of seasonal conditions enabling future assessment of the relative impacts of subsidence against climatic variation and other forms of disturbance.

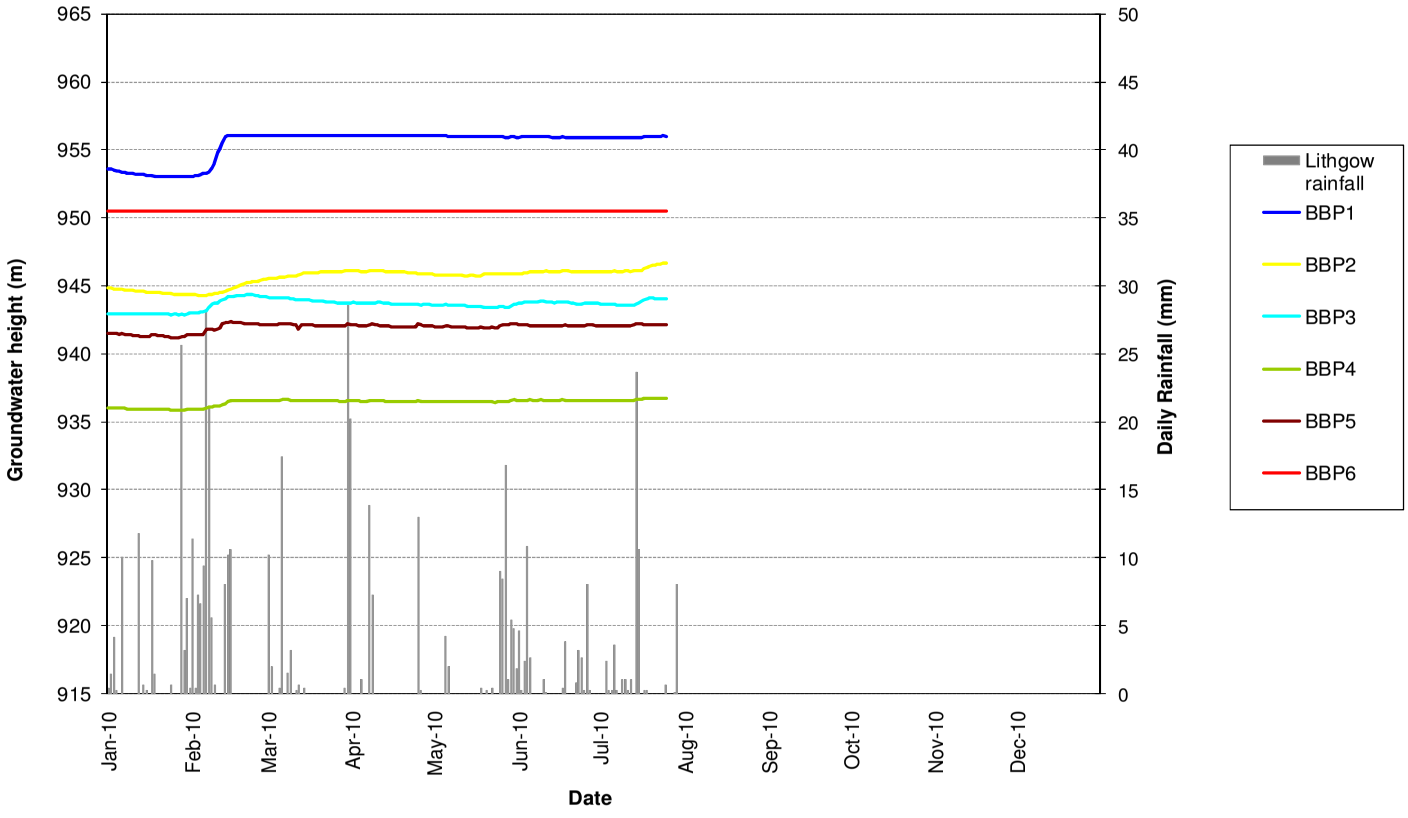
Ground Water

Ian Forster from Aurecon monitors data loggers in the six piezometers on a bimonthly basis to gather baseline data regarding groundwater level fluctuations in the vicinity of the Coxs River Swamp (**Figure 6**). To date, the data obtained confirms a strong correlation between groundwater levels and prevailing climatic conditions; most particularly the relationship to rainfall. 2009 to 2010 results are shown in the following figures.

LW 29-31 Piezometer Groundwater Levels - 2009



Piezometer Groundwater Levels - 2010



Data for BBP6 between 4 June 2009 to 16 July 2009 was not collected as the contractor responsible for collecting water quality samples failed to reinstall the instrument when samples were collected on 4 June; the instrument was subsequently replaced by the contractor when the July water samples were collected on the 16th. A normal data stream recommenced after this date.

During July 2009, it was observed that BBP1 was showing anomalous groundwater behaviour. These levels had declined independent of the response normally attributed to the effect of climatic conditions. Some potential irregularities were noted in the data and an error was suspected due to temporary removal of the monitoring equipment by the water sampling contractor. After consultation with the Principal Subsidence Engineer, it was agreed that this situation constitutes an "irregular result" as defined in the Trigger Action Response Plan (TARP) for both the Environmental Monitoring Program (Condition 13) and the Surface and Groundwater Response Strategy (Condition 16), and that written notification should be made in accordance with Condition 18 of Baal Bone's SMP Approval.

In line with the response required by the TARP, an internal meeting was held with Baal Bone's groundwater and subsidence consultants. As a result, a preliminary Action Plan was formulated and discussed with the Principal Subsidence Engineer. As part of the action plan, the frequency of downloading data was increased to a fortnightly cycle to enable more detailed monitoring of any future changes, completion of a snapshot flora assessment adjacent to the swamp piezometers, increasing the frequency of in-pit monitoring for additional seepage and inflows; together with a full review of the potential impact that Coxs River Lineament and/or other known geological structures in the immediate vicinity may have had on water levels in the aquifers.

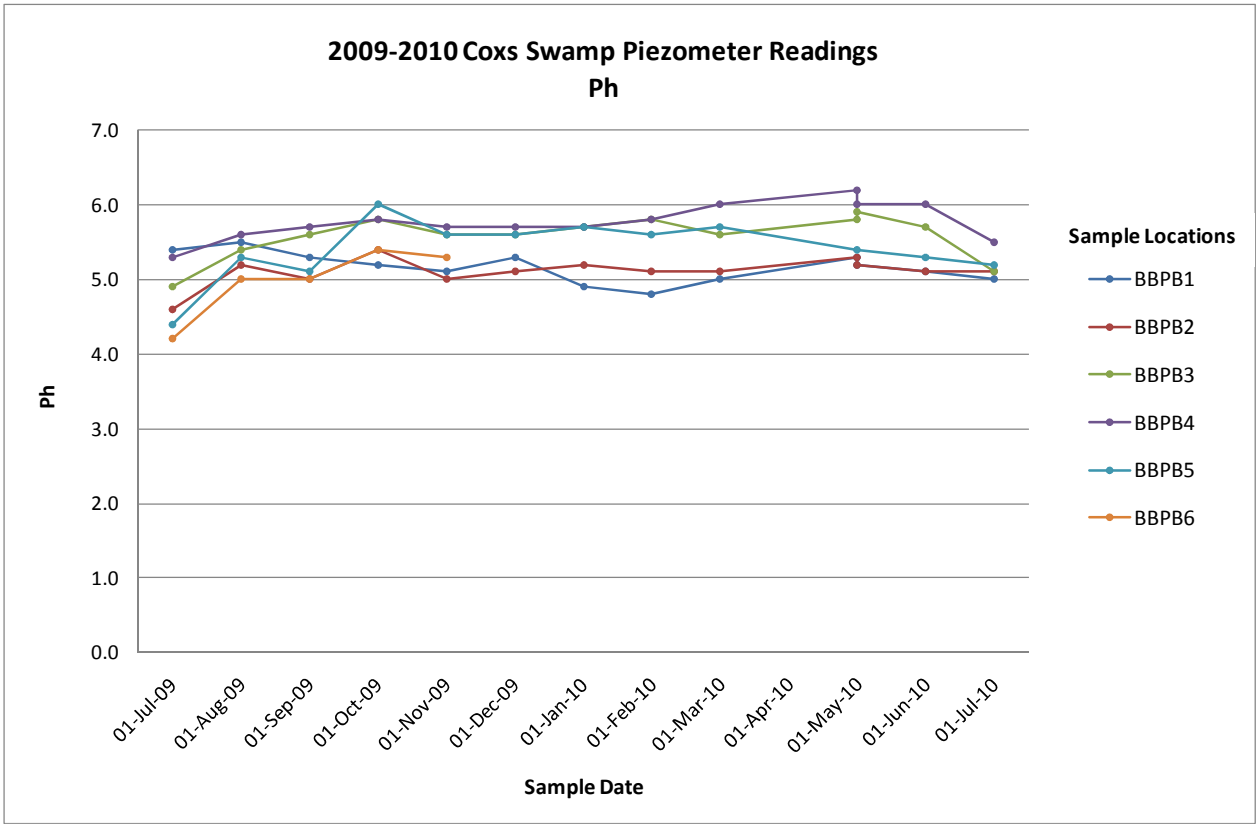
Fortnightly monitoring was continued during late August and September, and an investigation report into the anomalous groundwater behaviour was prepared by Ian Forster of Aurecon Australia Pty Ltd (dated 01.10.09) and lodged with the Principal Subsidence Engineer on 1 October 2009.

Ongoing monitoring of groundwater levels in the piezometers continued throughout October and November 2009. While all sites showed a slight decline in levels consistent with the ongoing dry conditions, the levels in the two piezometers affected by mining stabilised; BBP1 begun to recover slightly and the decline at BBP2 had flattened out. There have been no additional mining related impacts observed at these sites. At no time has there been any indication of mining related impacts in the piezometers in the Coxs River swamp.

During the earlier months of 2010, all of the bores were still showing a stabilising trend and BBP2 was also showing a rising groundwater level following the rain in February. BBP1 upstream of the swamp is now stable again after rising rapidly during the rainfall. The continuing response of the groundwater levels is as expected.

Baseline groundwater quality monitoring commenced in September 2008.Results had shown slightly elevated iron and copper levels, and slightly lower pH levels in several of the swamp piezometers, presumably due to the lower inflows received during the drier months. All levels are within TARP trigger levels and are in line with the normal range or expected response to climatic conditions.

The 2009 to 2010 piezometer readings for pH, electrical conductivity, zinc, iron and copper are shown in the following figures. The ongoing response of the ground water quality levels is currently as expected and responding to the weather conditions.


2009-2010 Coxs Swamp Piezometer Readings
Ph
Ph
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
01-Jul-09
01-Aug-09
01-Sep-09
01-Oct-09
01-Nov-09
01-Dec-09
01-Jan-10
01-Feb-10
01-Mar-10
01-Apr-10
01-May-10
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Sample Date
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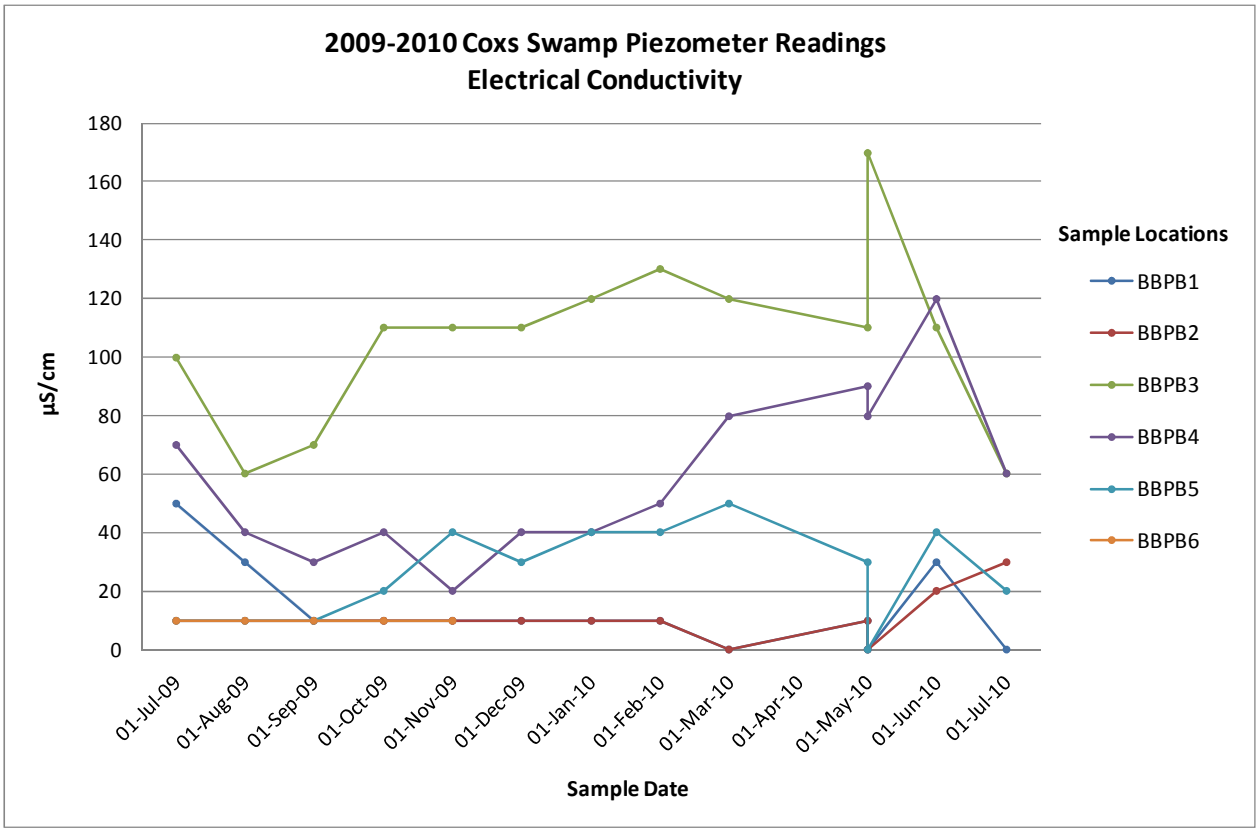
BBPB2
BBPB3
BBPB4
BBPB5
BBPB6


2009-2010 Coxs Swamp Piezometer Readings
Electrical Conductivity
µS/cm
180
160
140
120
100
80
60
40
20
0
01-Jul-09
01-Aug-09
01-Sep-09
01-Oct-09
01-Nov-09
01-Dec-09
01-Jan-10
01-Feb-10
01-Mar-10
01-Apr-10
01-May-10
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Sample Date
Sample Locations
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BBPB2
BBPB3
BBPB4
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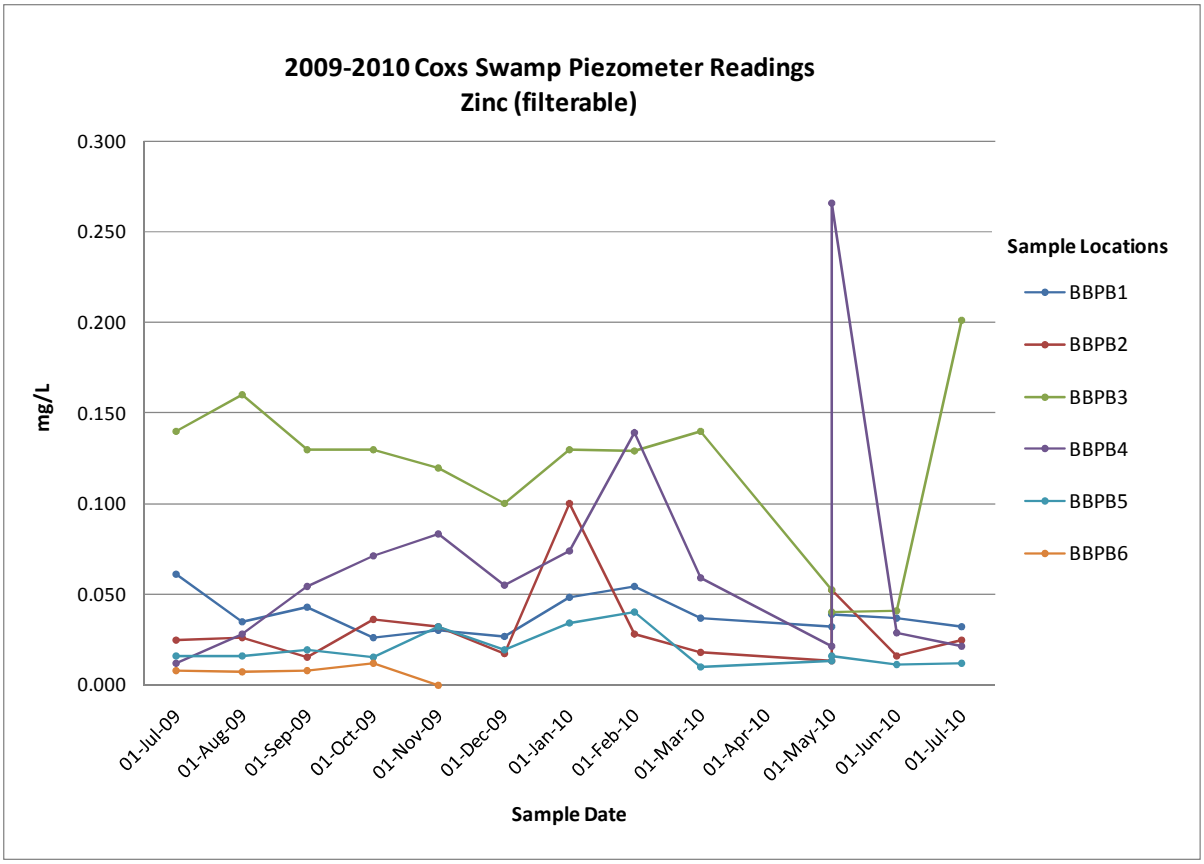
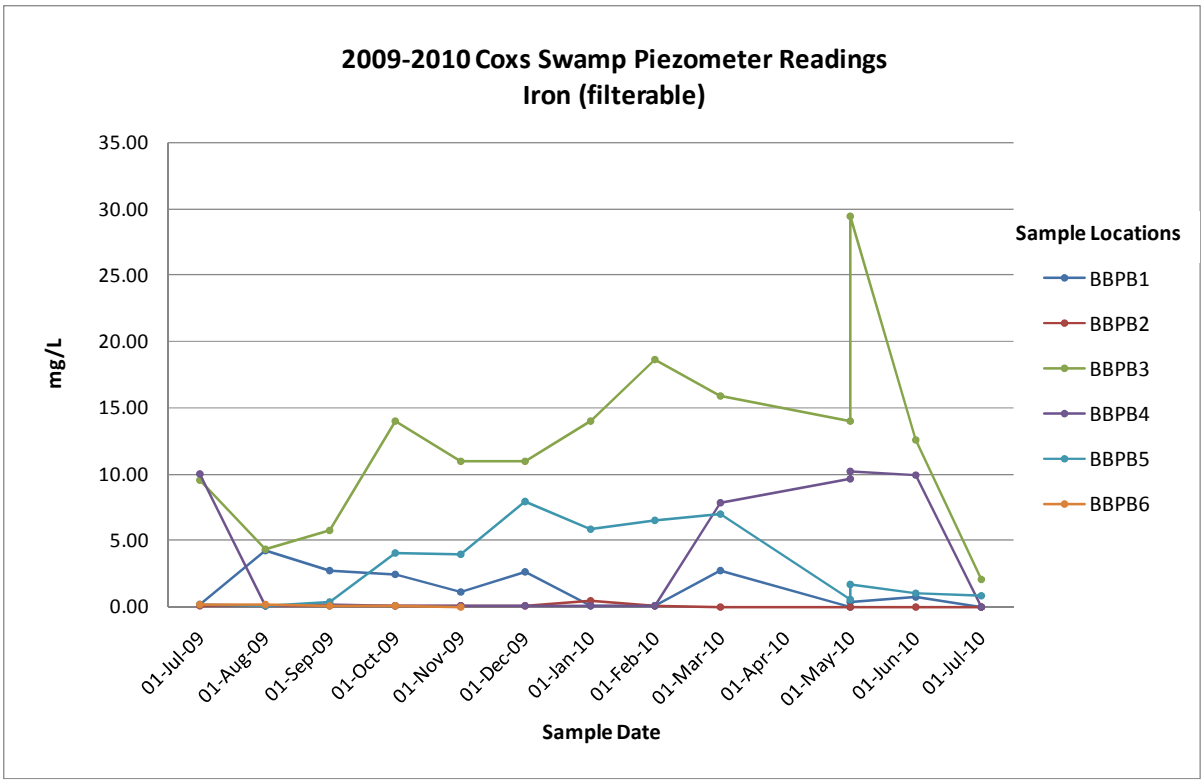
BBPB6


2009-2010 Coxs Swamp Piezometer Readings
Zinc (filterable)
mg/L
0.300
0.250
0.200
0.150
0.100
0.050
0.000
01-Jul-09
01-Aug-09
01-Sep-09
01-Oct-09
01-Nov-09
01-Dec-09
01-Jan-10
01-Feb-10
01-Mar-10
01-Apr-10
01-May-10
01-Jun-10
01-Jul-10
Sample Date
Sample Locations
BBPB1
BBPB2
BBPB3
BBPB4
BBPB5
BBPB6


2009-2010 Coxs Swamp Piezometer Readings
Iron (filterable)
mg/L
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
01-Jul-09
01-Aug-09
01-Sep-09
01-Oct-09
01-Nov-09
01-Dec-09
01-Jan-10
01-Feb-10
01-Mar-10
01-Apr-10
01-May-10
01-Jun-10
01-Jul-10
Sample Date
Sample Locations
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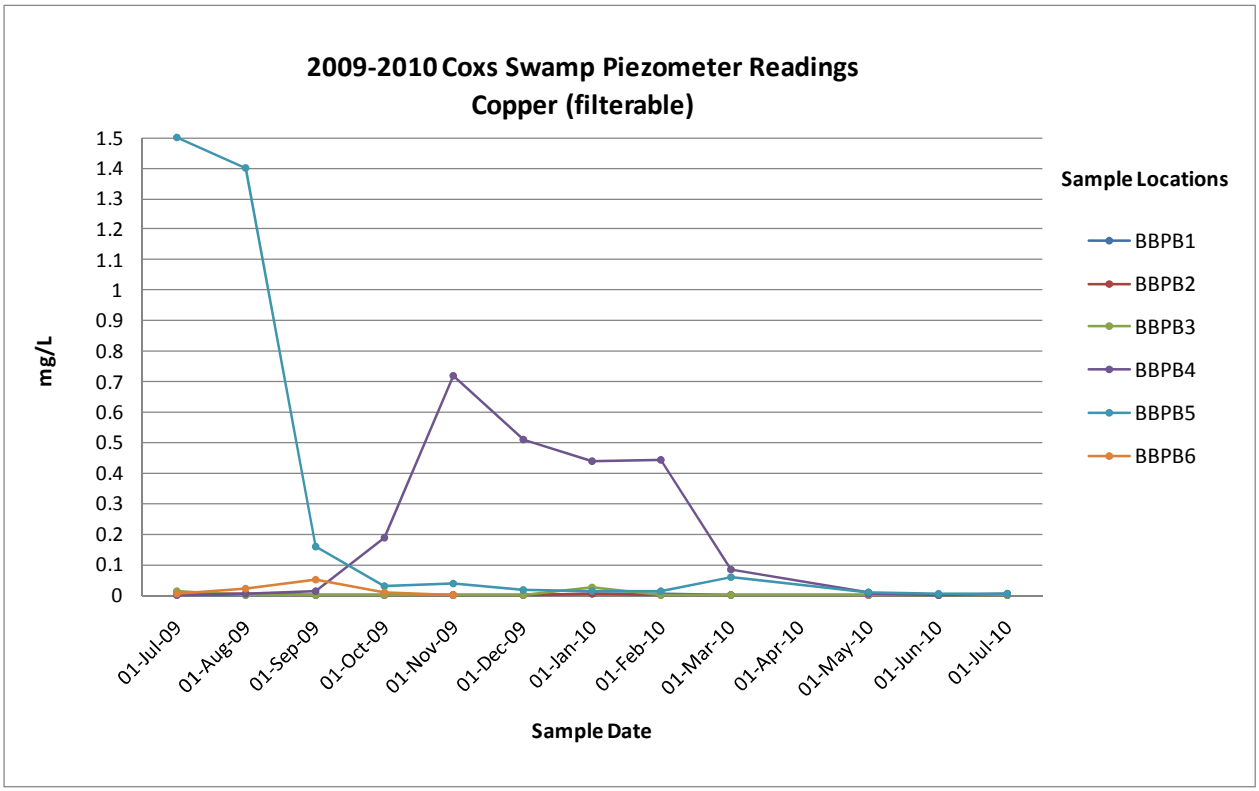
BBPB2
BBPB3
BBPB4
BBPB5
BBPB6



Subsidence Development (Summary of Survey Results)

Baseline (pre-mining) survey monitoring of the E-E and F-F lines were conducted on 10 July 2009 and 27 May 2009 respectively. Refer to **Figure 3** for locations. During early 2010, the H-H, I-I and J-J lines around northern and southern pinch points were established and a pre-mining survey completed; as were the scattered arrays at both northern and southern pinch points. Refer **Figure 4** (northern pinch point) and **Figure 5** (southern pinch point).

Following commencement of extraction of LW29, three dimensional subsidence movement surveys on the F-F line were undertaken on 3 August and again on 11 August 2009. Results from these surveys confirm that subsidence movements remain within the acceptable range as defined in the SMP Application and as noted in the Subsidence Monitoring Program.

A slightly elevated level of horizontal movement (ie. 7mm) was however noted at Station 20 on the F-F line, which is inside the goaf area. Following a discussion with Dr Ken Mills of SCT Operations Pty Ltd, it was concluded that the steep nature of the terrain at this point would have exacerbated the level of horizontal movement (ie. creep) in a down slope (northward) direction; and that the systematic horizontal movement would nevertheless remain within the predicted range.

A summary of the survey monitoring results has been included above in Section 5.

8 ADEQUACY, QUALITY AND EFFECTIVENESS

The adequacy, quality and effectiveness of the implemented management response processes, based on compliance with approval conditions, are considered to be satisfactory to date. The identification and management of the anomalous groundwater behaviour confirms that the monitoring, review TARP processes are effective.

9 STAKEHOLDER CONSULTATION

Stakeholders were consulted during this period as part of the notification made under Condition 18(b) regarding anomalous groundwater behaviour. Stakeholders consulted included:

- Department of Industry and Investment – Environmental Sustainability Branch
- Department of Industry and Investment – Principal Subsidence Engineer
- Forests NSW and Department of Lands (as landholders)
- Department of Environment, Climate Change and Water
- NSW Office of Water
- Sydney Catchment Authority

10 MANAGEMENT ACTIONS

Actions taken to ensure adequate management of any potential subsidence impacts due to mining include:

• Various monitoring programs (flora, fauna and groundwater), subsidence surveys, visual surface inspections, photographic monitoring to detect any impact;

• Management Plans (Longwall LW29- LW31 Subsidence Management Plan)

• Continuing consultation with landholders and infrastructure owners relating to asset and property management procedures and plans;

• Erection of warning signs around perimeter of SMP area, and associated forest tracks that traverse the SMP area;

• Public notice placed in Lithgow Mercury highlighting potential risks associated with traversing SMP area;

• Approval from Director-General (DII) for minor variation (reduction) to width of LW31 (approval received 24 August 2009) to protect the Wolgan escarpment;

• TARPs (Trigger, Action, Response Plans) forming part of approved Public Safety Management Plans and Environmental Monitoring Programs which include mitigation/remediation options and notification procedures relating to subsidence monitoring, surface cracking on both roads / fire trails and vegetated areas and impacts on rock mass / steep slopes and Aboriginal sites.

11 CONCLUSIONS

Anomalous groundwater behaviour in several monitoring bores as reported previously appears to have stabilised and is showing signs of normalising.

Pre, during and post Longwall 29 extraction, routine scientific and survey monitoring of impacts on rock features, escarpments, and surface and groundwater regimes continued, as did seasonal monitoring of flora and fauna. All other monitoring results were within expected / predicted parameters and displayed no discernable trends. Routine and scheduled seasonal monitoring will continue for future longwall panels.

FIGURE 1: Depth of Cover for SMP LW 29-30 Southeast area.

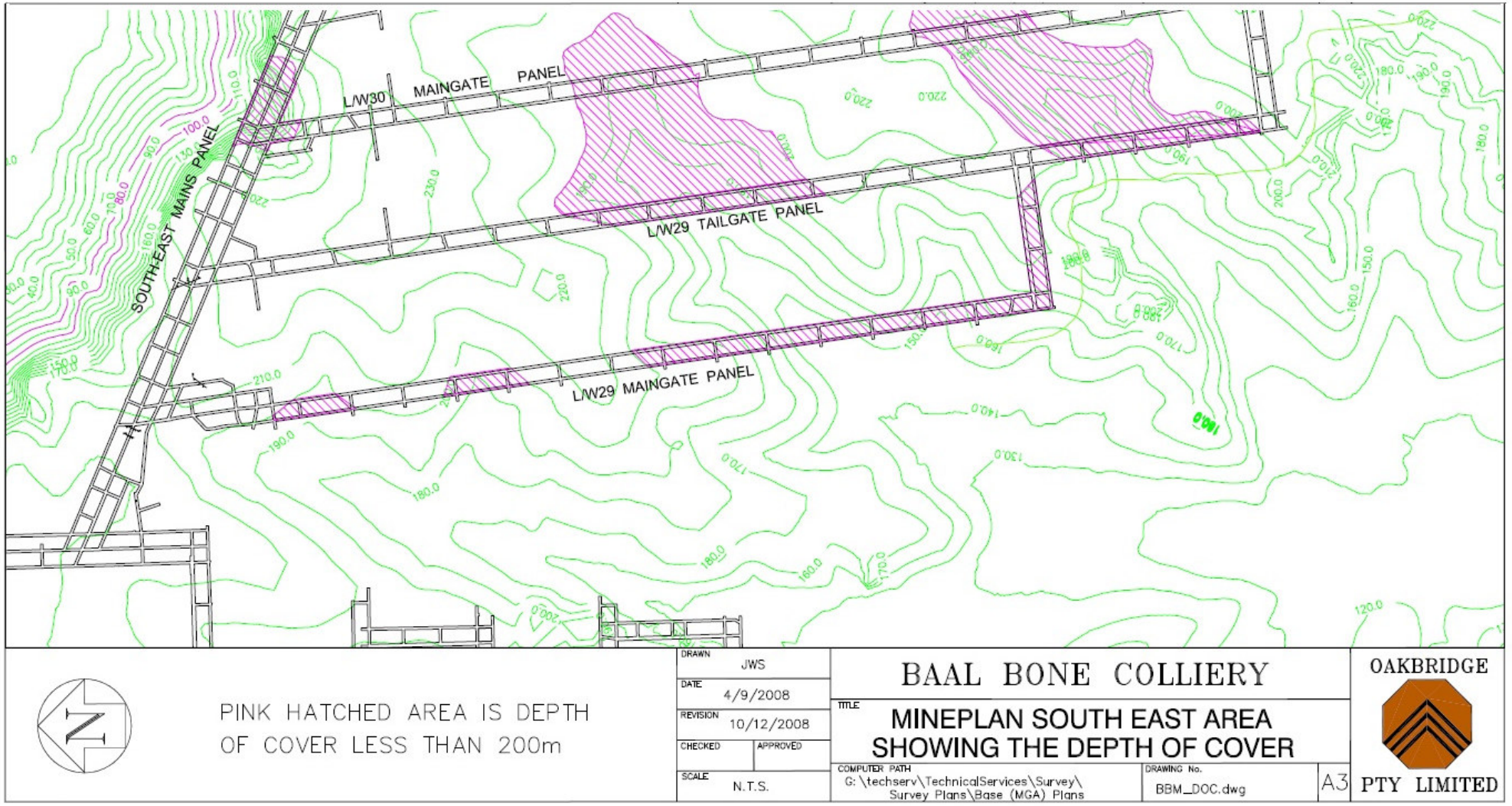
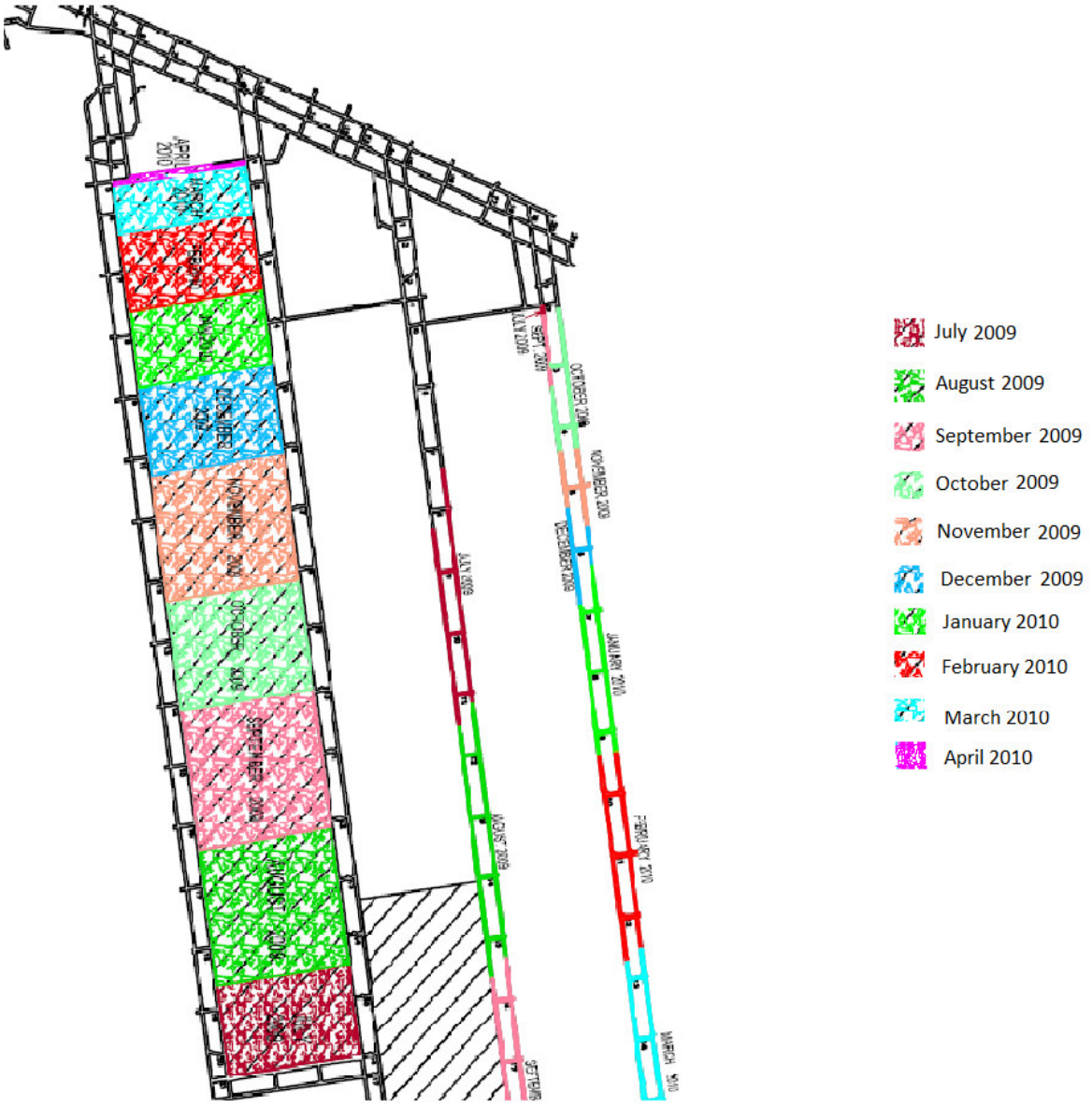


FIGURE 2: Progression of Longwall 29 Extraction



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CHECKED		
APPROVED		
SCALE NTS A4	COMPUTER PATH G:\techserv\Technical Services\Survey\Survey Plans\Production Plans\2009-2010	DRAWING No. BBM_YEARLY_PRODN0910.dwg

PTY LIMITED

FIGURE 3: Proposed Subsidence Survey and Data Monitoring Locations (Source: *Baal Bone Colliery LW29-31 SMP Subsidence Monitoring Program*)

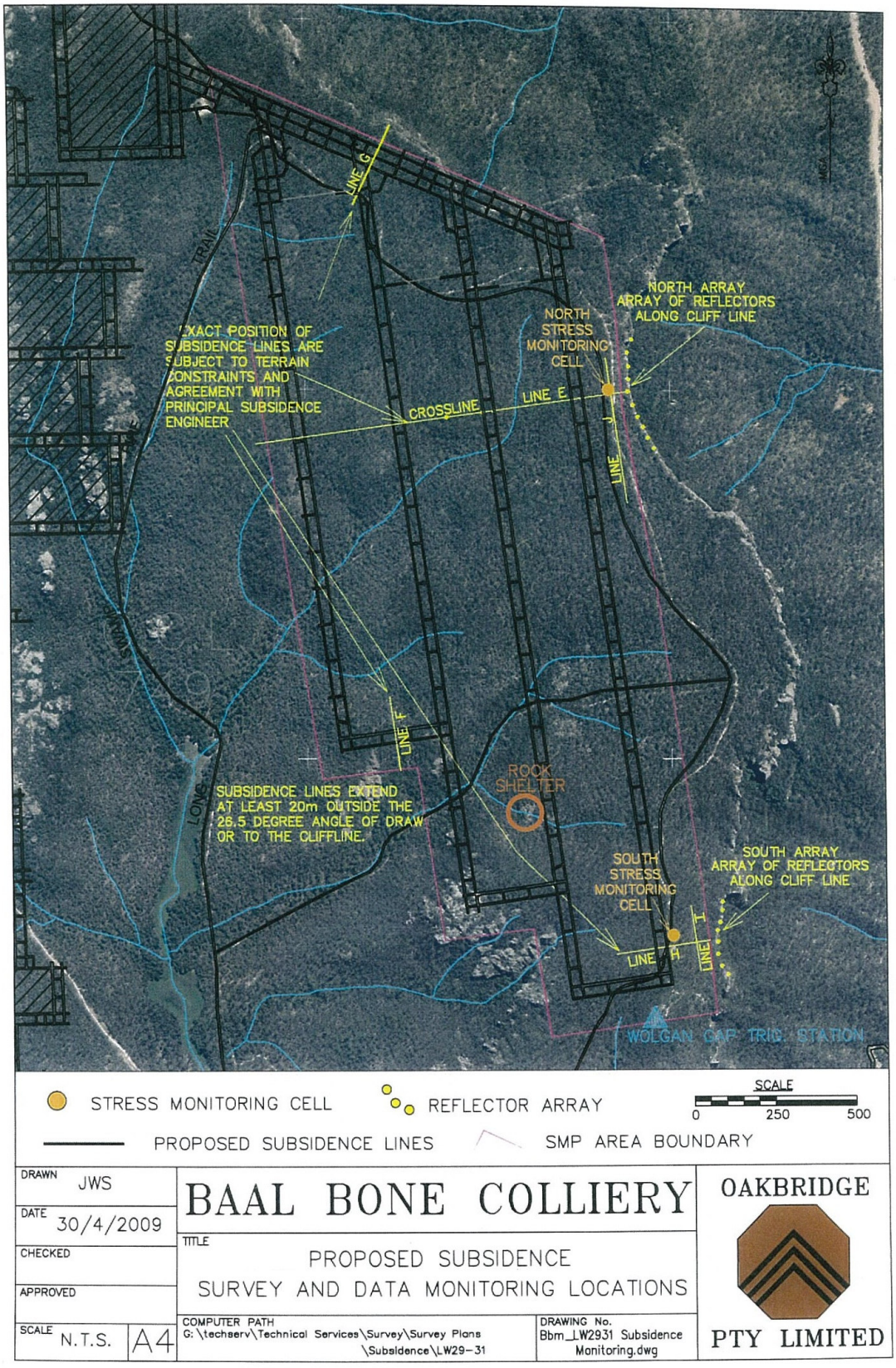

FIGURE 4: Survey Monitoring of Northern Pinch Point Area

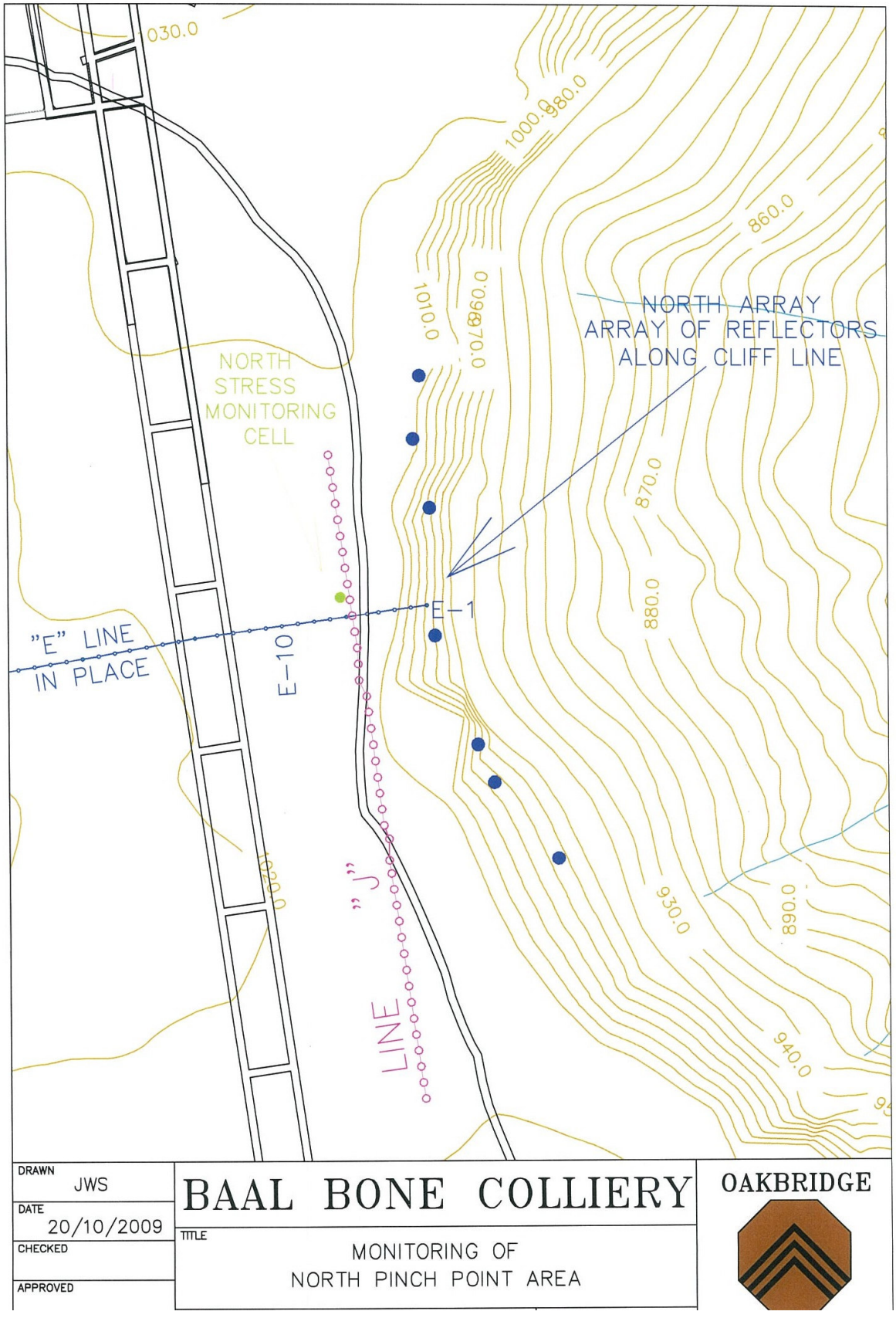

FIGURE 5: Survey Monitoring of Southern Pinch Point Area

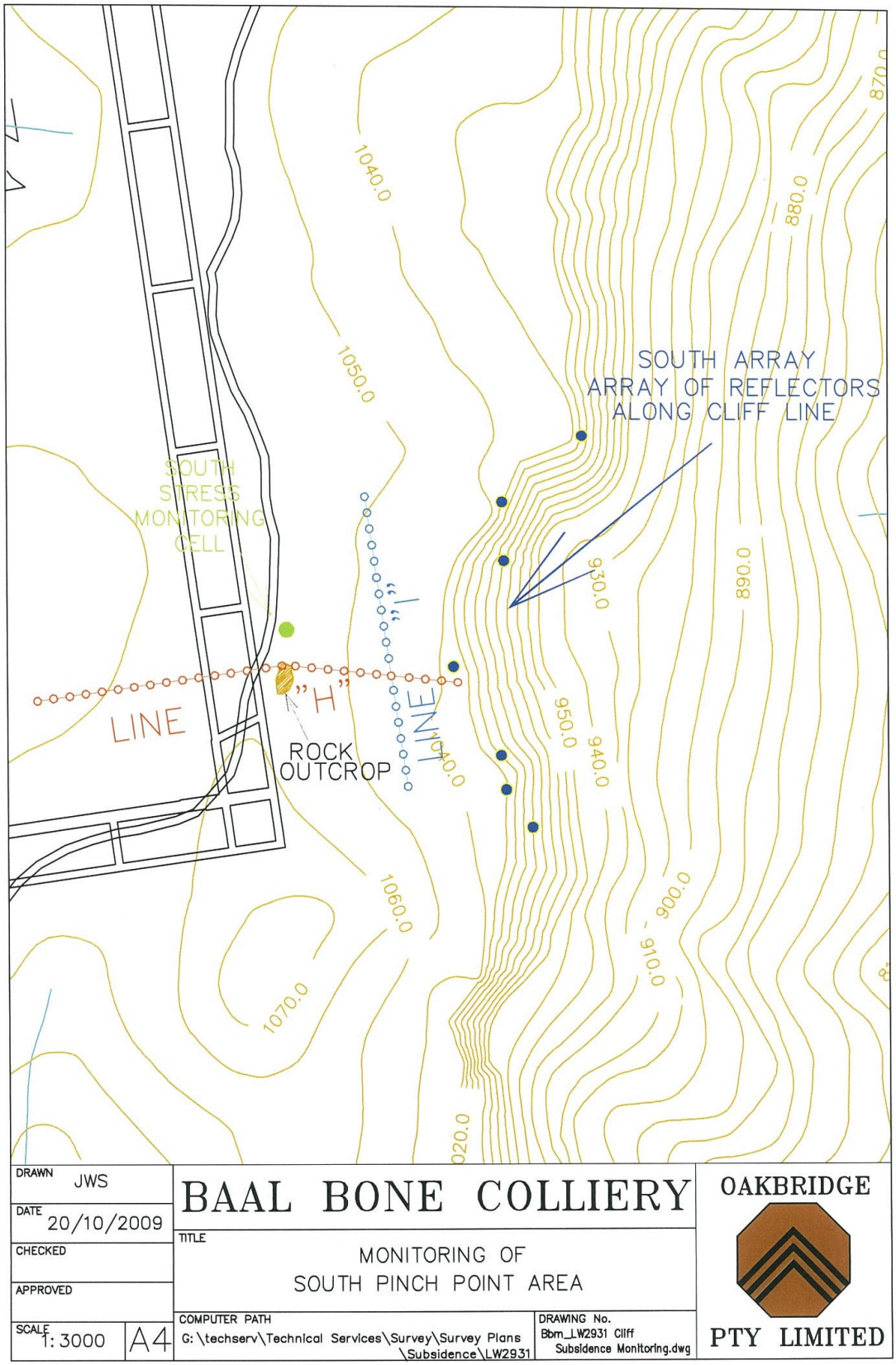

FIGURE 6: Location of Groundwater Observation Bores and Geological Structures

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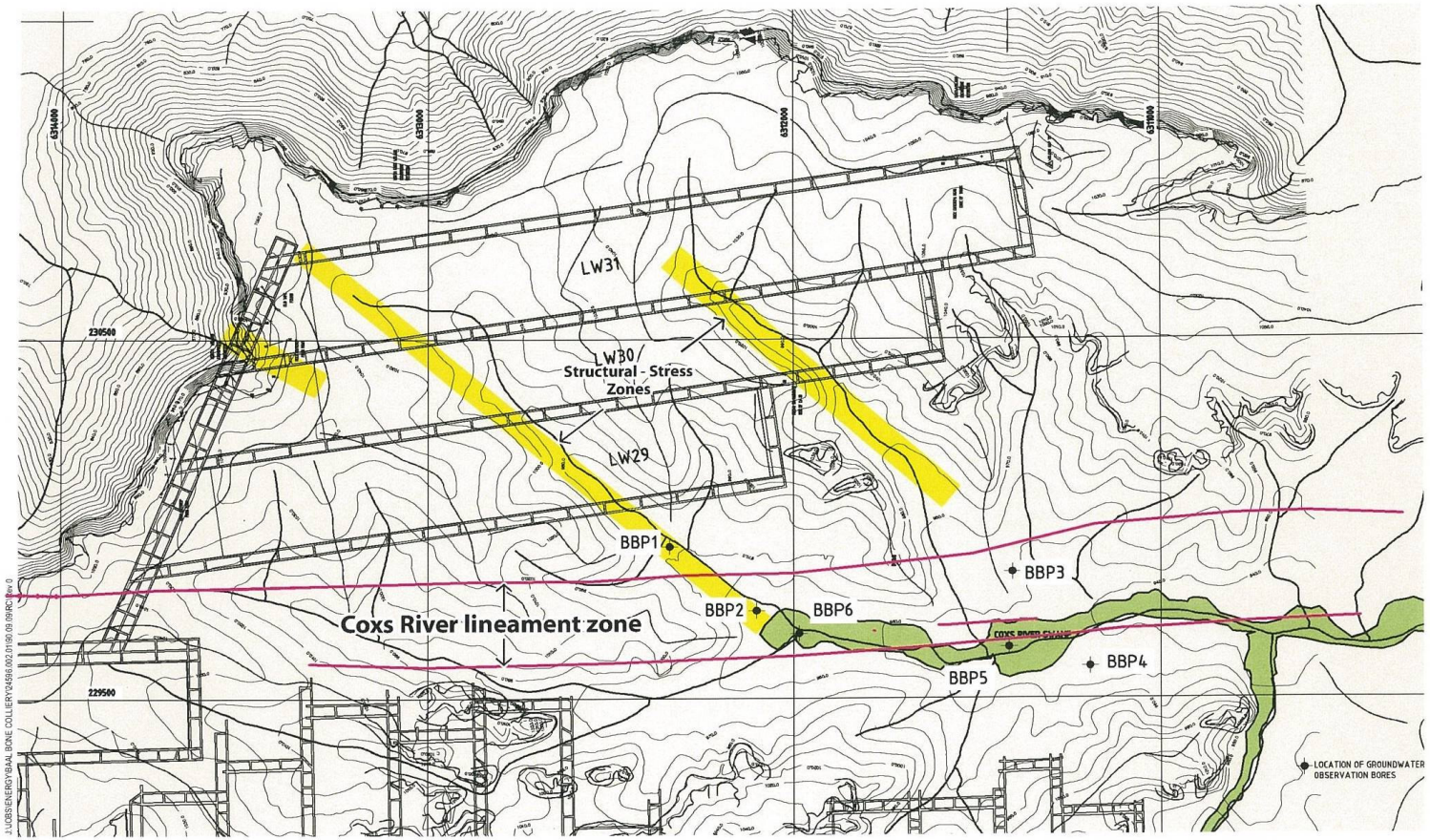

SCALE
0 250 500m

Baal Bone Colliery Groundwater Response Strategy

FIGURE: Location of Groundwater Observation Bores and Geological Structures