

ASHTON LONGWALL 8 – END OF PANEL SUMMARY REPORT**1 INTRODUCTION**

This report has been prepared in conjunction with the SCT Operations Pty Ltd (SCT) Longwall 8 – End of Panel Subsidence Report and the Aquaterra “Ashton Underground Mine LW8 End of Panel Groundwater Report”.

The combination of these reports were prepared to satisfy the requirements of the *Subsidence Management Plan Approval, Ashton Coal Mine Extraction “Longwall / Miniwall 9 ”, Clause 17* and the *Ashton Coal Project (ACP) Development Consent No. 309-11-2001-i*.

End of Panel Report

SMP Clause 17: Within 4 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.

Development Consent (DC) (MOD8) Statement of Commitments Clause 3.3: Subsidence will be monitored and managed in accordance with approved Extraction Plans (or equivalent), the development of which will be informed by:

- Subsidence monitoring over LW1-4 in the lower seams, as each seam is mined, to allow more accurate predictions of subsidence parameters above LW5-8.
- An End of Panel Report for each longwall panel with a focus on subsidence.
- Consultation with the owner(s)/operator(s) of the Ravensworth Underground Mine on a seam by seam basis.

2 BACKGROUND

Longwall 8 began extraction on the 27th of February 2012 and completed longwall mining on 5th of June 2012. Longwall 8 was 1250m long, 120m wide and was mined without any unexpected impact to the surface environment or infrastructure above it.

The effects of subsidence were monitored in accordance with the document “Subsidence Management Plan - Longwall 6B-8”; this included both regular survey monitoring and visual inspection of both land features and infrastructure.

3 MINE SUBSIDENCE

The Pikes Gully Seam section has been mined along the length of Longwalls 1 to 7B ‘short’ at Ashton Underground Mine. Mining height is nominally in the 2.4m to 2.6m range. The seam dips to the southwest at a grade of up to 1 in 10. Overburden ranges in thickness from 180m near the start of the longwall 8 panel to 140m at the take off end. The final extraction void is nominally 134m wide. This includes the 5.5m width of development drivage either side of the longwall block. Maingate chain pillars are at a centre to centre width and length of 25m and 150m respectively. Tailgate chain pillars are at a centre to centre width and length of 40m and 150m respectively.

Ashton’s longwall mining operation commenced in February 2007. Since then 9 panels have been completed (inclusive of Longwall 8). The progress of longwall extraction is shown in **Figure 1**.

UNDERGROUND COAL MINE

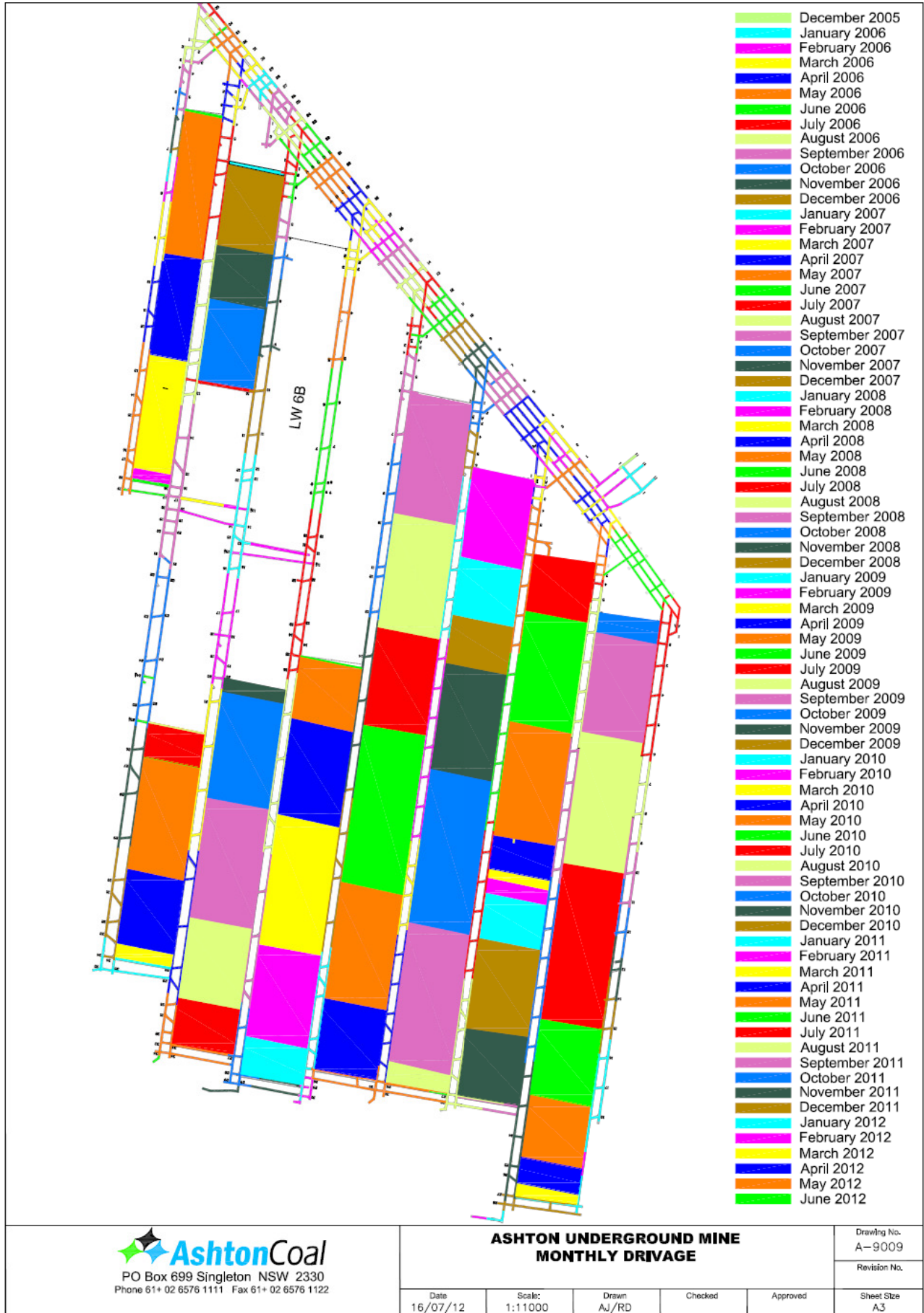


Figure 1: Progression of Longwall Extraction

UNDERGROUND COAL MINE

4 MONITORING

Ashton Coal has monitored the subsidence movement on the surface during the extraction of Longwalls 1-8 using longitudinal subsidence lines. These are located over the start and finish lines of each panel, a main cross line extending over all seven southern panels and a dedicated cross line extending over Longwall 7B and 8. All panels have monitoring data for each start and end lines and various cross lines relevant to the panel, surface features or strata features. Several other subsidence lines have been used to monitor the slope leading down to Glennies Creek, closure across the New England Highway, subsidence across a dyke, and subsidence towards neighbouring infrastructure to the West. These locations can be seen in **Figure 2**.

The following table (**Table 1**) outlines the maximum subsidence parameters predicted and recorded during regular survey of subsidence lines as the longwall passed each location.

Subsidence monitoring over Longwall 8 consisted of regular survey of centreline 1 (LW8 CL1), centreline 2 (LW8 CL2), cross line 13 (XL13) and 14 (XL14). The frequency and results of this have been maintained per monitoring document *Ashton Mine Subsidence Monitoring Programme Longwall 6B-8*. This information was supplied to the Principal Subsidence Engineer.

Visual and survey monitoring of existing single pole 33kV power structures over Longwall 8 were undertaken regularly. The 33kV poles have been referenced as PP30 to PP32, PP36 to PP38 (pole number referenced from north to south). The 33kV powerline was surveyed prior to and post undermining and visually inspected during/post undermining to ensure adequate clearance and safety. Signage has been erected to indicate maximum load heights under the 33kV powerline prior to commencement of LW8. Erected powerline clearance signage can be seen in **Appendix 1** (Figure 6). Survey data from the 33kV power lines was recorded and supplied to the Principal Subsidence Engineer as per the *Ashton Mine Subsidence Monitoring Programme Longwall 6B-8*. The effects of subsidence on the 33kV structures can be seen in **Appendix 2**. Maximum subsidence measured on power poles (PP30, PP31, PP32, PP36, PP37 & PP38) during Longwall 8 mining are as follows: 0.007m, 0.386m, 0.099m, 0.077m, 0.212m, and 0.027m respectively.

During mining of LW8, monthly surveys were completed on Narama Dam due to extraction taking place within the notification area. Narama Dam is a prescribed dam under the Dam Safety Act 1978. Monitoring information was sent to the Dams Safety Committee weekly as required under DSC ASHTON-2 Approval: Mining in the Narama Notification Area. Measurements show there was no perceptible effect on the dam from Longwall 8 extraction.

Table 1: Subsidence of Mined Longwall Panels - Predicted vs. Actual (SCT Longwall 8 End of Panel Subsidence Report, 2012)

	Maximum Predicted EIS	Maximum Predicted SMP	Maximum Measured	
North End of LW1			CL2	XL8
Subsidence (mm)	1430	1800	1550	1550
Tilt (mm/m)	122	244	100	125
Horizontal Movement (mm)	-	>500	530	535
Tensile Strain (mm/m)	16	73	36	20
Compressive Strain (mm/m)	25	98	40	30
Remainder of LW1			CL1	XL5
Subsidence (mm)	1690	1700	1381	1429
Tilt (mm/m)	60	141	61	100
Horizontal Movement (mm)	-	300-500	502	428
Tensile Strain (mm/m)	8	42	49	22

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Compressive Strain (mm/m)	12	56	23	19		
	Maximum Predicted EIS	Maximum Predicted SMP	Maximum Measured			
Longwall 2			CL1	CL2	XL5	
Subsidence (mm)	1690	1600	1332	1566	1286	
Tilt (mm/m)	91	102	40	94	63	
Horizontal Movement (mm)	-	300-500	501	298	425	
Tensile Strain (mm/m)	12	30	17	42	28	
Compressive Strain (mm/m)	18	41	17	19	11	
Longwall 3			CL1	CL2	XL5	
Subsidence (mm)	1500	1600	1443	1451	1480	
Tilt (mm/m)	65	78	41	59	99	
Horizontal Movement (mm)	-	300-500	430	360	450	
Tensile Strain (mm/m)	9	23	10	40	22	
Compressive Strain (mm/m)	13	31	7	29	25	
Longwall 4			CL1	CL2	XL5	XL10
Subsidence (mm)	1430	1600	1421	1235	1491	1288
Tilt (mm/m)	46	78	36	40	55	34
Horizontal Movement (mm)	-	300-500	252	584	373	267 ¹
Tensile Strain (mm/m)	6	23	10	31	10	10
Compressive Strain (mm/m)	9	31	9	67	9	6
Longwall 5			CL1	CL2	XL5	
Subsidence (mm)	1430	1600	1305	1374	1429	
Tilt (mm/m)	29	78	23	30	35	
Horizontal Movement (mm)	-	300-500	413	362 ²	402	
Tensile Strain (mm/m)	4	23	22	6	15	
Compressive Strain (mm/m)	5	31	9	8	6	
Longwall 6A			CL1	CL2	XL5	
Subsidence (mm)	1430	1600	1415	1332	1410	
Tilt (mm/m)	29	57	19	25	39	
Horizontal Movement (mm)	-	300-500	290	262	333	
Tensile Strain (mm/m)	4	17	7	10	9	
Compressive Strain (mm/m)	5	23	7	10	8	
Longwall 7A			CL1	CL2	XL5	
Subsidence (mm)	1430	1600	1452	>1010	1334	
Tilt (mm/m)	29	57	24	16	24	
Horizontal Movement (mm)	-	300-500	355	145	426	
Tensile Strain (mm/m)	4	17	8	>4	12	
Compressive Strain (mm/m)	5	23	10	>5	10	

UNDERGROUND COAL MINE

	Maximum Predicted EIS	Maximum Predicted SMP	Maximum Measured			
			CL3	CL4	XL13	
Longwall 7B						
Subsidence (mm)	1430	1600	1400	1258	1500 ³	
Tilt (mm/m)	29	57	30	22	30 ³	
Horizontal Movement (mm)	-	300-500	321	180	415	
Tensile Strain (mm/m)	4	17	10	6	12	
Compressive Strain (mm/m)	5	23	8	10	6	
Longwall 8			CL1	CL2	XL13	XL14
Subsidence (mm)	1430	1200	548 ⁴	739 ⁵	569	869 ⁶
Tilt (mm/m)	29	50	8	11	12	21
Horizontal Movement (mm)	-	300-500	90	88	218	243
Tensile Strain (mm/m)	4	15	0.8	2.6	6.1	6.4
Compressive Strain (mm/m)	5	20	1.0	2.5	10.6	12.7

¹ XL10 was installed after some horizontal movement associated with the previous longwall may have occurred so not all horizontal movements were measured.

² Maximum measured at end line.

³ Estimated from the shape of the profile because subsidence line did not extend across the area of greatest subsidence.

⁴ Maximum measured at end of line, construction activities prevented the monitoring points extending further into the panel.

⁵ Maximum measured at the end of the line, monitoring line did not extend past the adjacent LW7B recovery point.

⁶ Maximum measured at the end of the line, monitoring line installed to monitor subsidence effects outside the panel edge towards Ravensworth Underground Shaft 5 only.

UNDERGROUND COAL MINE

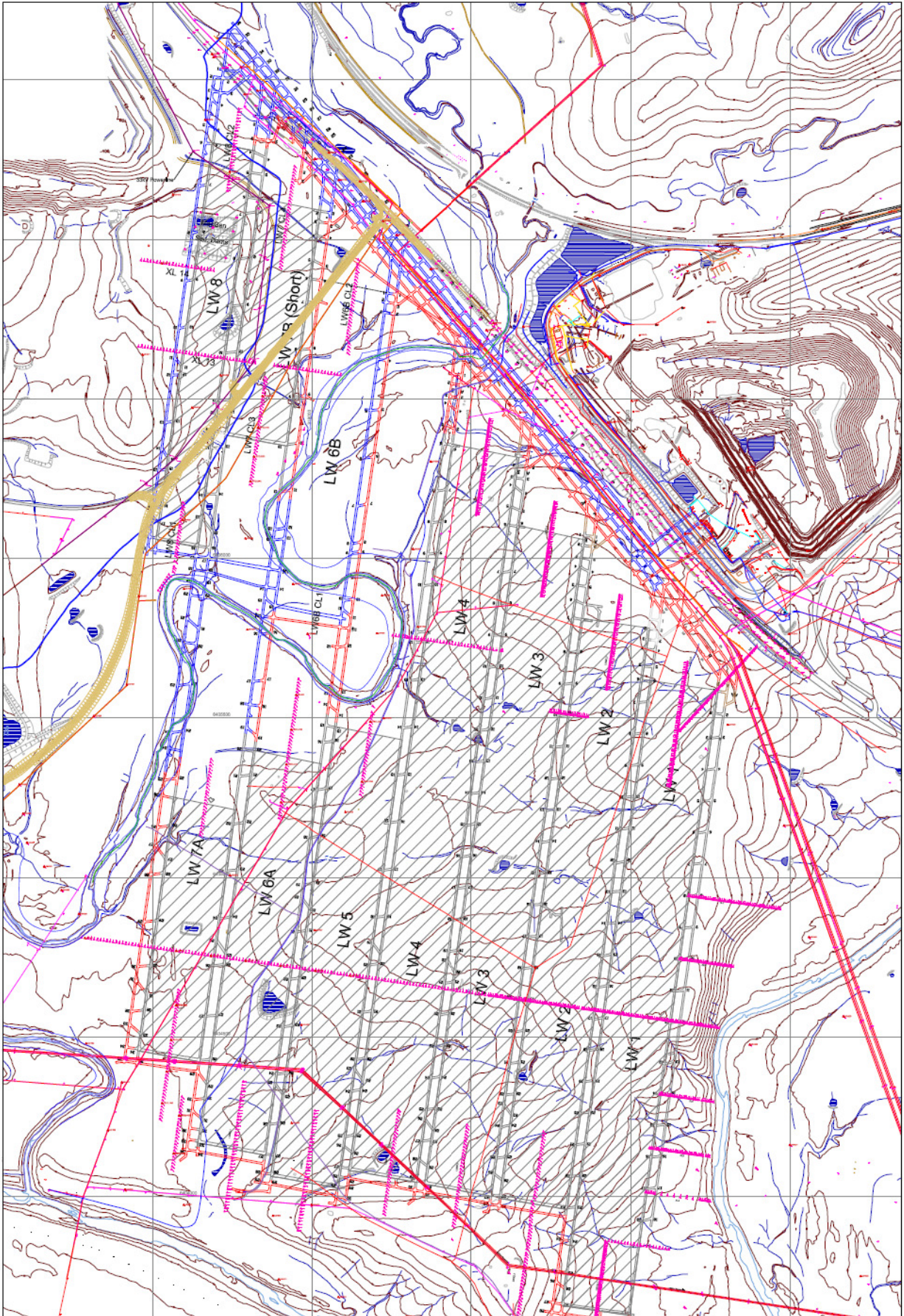


Figure 2: Plan location of Monitoring Cross Lines. Also shown is the 33kV power line and monitoring points (poles 30 to 38).

5 ABORIGINAL HERITAGE

Aboriginal Conservation Heritage Management Plan (ACHMP) procedures were followed during mining, prior to and during surface remediation. Prior to subsidence occurring in Longwall8 Ashton identified zones that would potentially require remediation. Archaeological investigations and, where required, salvage was undertaken in these zones in accordance with AHIP 1130976 and the ACHMP. It is noted that due to the active construction of the Lemington Road realignment by Xstrata at the time of this work some areas of LW8 were not able to be accessed by ACOL. For these areas ACOL actively consulted Xstrata in relation to the archaeological works that they had undertaken in the area and incorporated this information into the ACOL investigations.

While preservation is the ongoing aim of ACOL, due to the nature of subsidence impacts and the potential for emergency remediation works being required due to safety related issues. Aboriginal Heritage Impact Permits (AHIP) have been applied for and received. These permits cover the surface area above all longwall panels (Longwalls 1 to 8) at Ashton.

A permit to disturb system operates onsite to take into account a range of issues, including archaeology, flora and fauna, survey location of boreholes and other surface infrastructure (either buried or otherwise). This has proved successful as it requires systematic investigation of a range of potential issues prior to land disturbance activities. Prior to remediation occurring operators undertaking the remediation are required to undergo an induction outlining the requirements of the ACHMP and are shown any sites located within the work area that are not to be disturbed prior to commencing work.

6 SUBSIDENCE IMPACTS

Surface subsidence cracks have developed along each gate edge of the Longwall panel. These generally run parallel to the gate road within the longwall block. **Appendix 1: Photos** (Figures 4-5).

Brunkers Lane and the Macquarie Generation access road were undermined by Longwall 8. Brunkers Lane at the time of undermining was in the process of being upgraded by Ravensworth North to become Lemington Road. The roadworks being undertaken continually involved drainage and other earthworks thus restricted access for both survey and visual monitoring. Remediation of cracks over Longwall 8 has been completed. Most cracking which has been identified is on the Macquarie Generation access road. Due to the limited width of cracking it poses minimal risk to injury of personnel, equipment or wildlife. No subsidence cracking has been identified after grading of Macquarie Generation access road.

The extent of subsidence remediation at the goaf edge for all longwalls is outlined in **Figure 3**.

Initial caving over the start of Longwall 8 was typical of the caving behaviour observed elsewhere at ACOL and consistent with predicted subsidence behaviour.

All previously reported areas of ponding remain relatively unchanged across the ACOL lease.

No farm dams were undermined by LW8. Dam 14 was located above Maingate 8 and showed little subsidence induced tilt or cracking during undermining. The dam remained full during undermining with little reduction in storage capacity observed.

No overhead power lines were negatively impacted by undermining by LW8. The 33kV powerline was suitably fitted with rollers pre undermining and monitored for subsidence impacts. This work was undertaken in consultation with the infrastructure owners, Ravensworth Operations. Powerlines remained visually stable and relatively straight during and post undermining. A buried phone cable was undermined by LW8 with no reported issues occurring.

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An Xstrata Coal owned buried water pipeline was undermined with no subsidence induced issues occurring. Prior to undermining, ACOL notified Ravensworth Operations and requested that 'broken pipeline' procedures were in place so that water loss due to a pipe split could be minimised (by means of flow rate monitoring and pump shut-down). This was implemented satisfactorily by Ravensworth Operations. LW8 also undermined an ACOL owned tailings pipeline with no issues occurring. This pipeline was exposed within a 'spoon drain' and had 'broken pipeline' monitoring in place.

The maximum subsidence movements detected over Longwall 8 were less than those predicted in the SMP. This occurred for all centreline (CL) survey monitoring lines. Maximum cross line (XL) survey results were calculated based on the subsidence curve due to XL13 intersecting Brunkers Lane which was being upgraded. The upgrade resulted in no survey monitoring being placed in the vicinity of the road. Horizontal and vertical movement was within predictions for XL13, CL1 and CL2. Horizontal movement has occurred in the upslope direction above each of the Longwall panels. This movement has predominantly occurred within the longwall panels with limited displacement detected outside the panel. This result is consistent with previously mined panels. Cross line 13 (XL13) showed an angle of draw of 32° to the 20mm subsidence limit compared to an estimate of 26.5°. This is likely due to the presence of and open cut out of pit spoil dump on the surface. This loose material would cause an increase in the angle of draw within the area of the spoil. However the result is still within 10% for the given depth and is considered to be within expectation. The results compared to other panels vary slightly due to depth of cover, strata and surface conditions.

No subsidence impact has been measured on the New England Highway.

UNDERGROUND COAL MINE

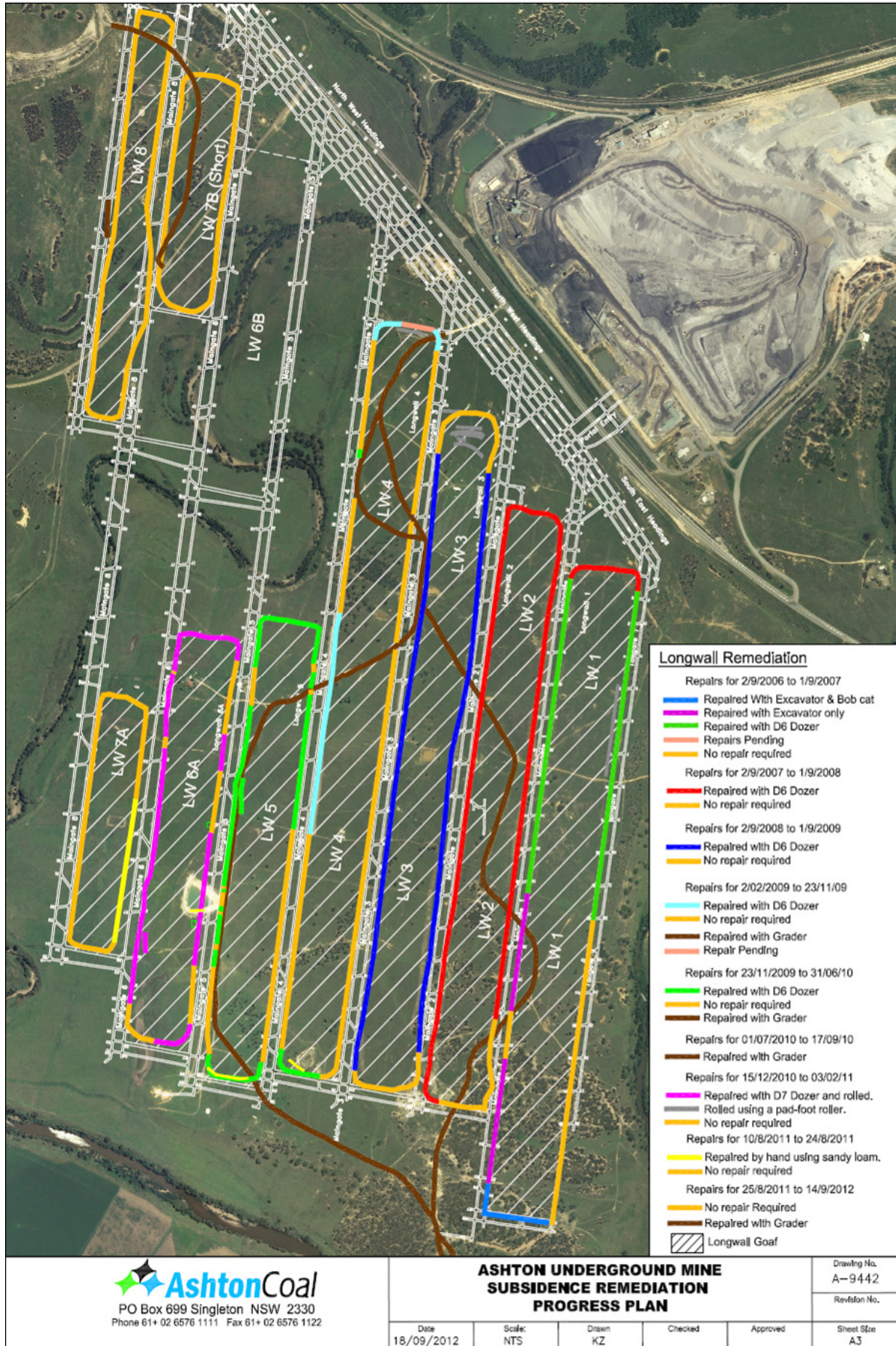


Figure 3: Subsidence remediation progress.

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APPENDIX 1: PHOTO'S



Figure 4: Surface crack along LW8 Maingate (3/05/12).



Figure 5: Surface crack along LW8 Maingate (3/05/12).



Figure 6: 33kV power line clearance signs located at the entrance of Macquarie Generation access road (turn from the Brunkers Lane) prior to LW8 start.

UNDERGROUND COAL MINE
APPENDIX 2: SURVEY MONITORING RESULTS
Table 2 Ashton Coal Underground Survey Monitoring of 33kV Power Line - Pole number CB430

AshtonCoal		Ashton Underground - 33kV Power Pole CB30 Monitoring													
Point	Original East	1:00:00 PM 15/5/2012 North	R.L.	LW8 Ch of Poles						36					
PP30BASE	317626.872	6407274.358	85.352												
PP30TOP	317626.679	6407274.847	101.095												
Direction of Longwall Extraction		8.04 16	(hms)												
Test-01		11:00:00 AM 17/5/2012	-110m	Incremental						Total					
		LW8 Ch=	146												
	East	North	R.L.	East	North	R.L.	Hr	Bearing	Distance	East	North	R.L.	Hr	Bearing	Distance
PP30BASE	317626.870	6407274.359	85.353	-0.003	0.001	0.001	#	289.47 56	0.003	-0.003	0.001	0.001	#	289.47 56	0.003
PP30TOP	317626.685	6407274.835	101.096	0.006	-0.012	0.001	#	154.45 14	0.014	0.006	-0.012	0.001	#	154.45 14	0.014
Test-02		10:00:00 AM 21/5/2012	-69m	Incremental						Total					
		LW8 Ch=	105												
PP30BASE	317626.874	6407274.358	85.353	0.004	-0.001	0.000	#	100.18 17	0.004	0.002	0.000	0.001	#	86.59 14	0.002
PP30TOP	317626.681	6407274.862	101.093	-0.003	0.028	-0.003	#	353.21 46	0.028	0.003	0.015	-0.002	#	9.42 24	0.015
Test-03		2:00:00 PM 25/5/2012	6m	Incremental						Total					
		LW8 Ch=	30												
PP30BASE	317626.877	6407274.361	85.349	0.003	0.003	-0.004	#	49.50 38	0.004	0.005	0.003	-0.003	#	61.13 56	0.006
PP30TOP	317626.684	6407274.861	101.092	0.003	-0.001	-0.001	#	108.26 06	0.003	0.005	0.014	-0.003	#	20.20 10	0.015
Test-04		12:00:00 PM 1/6/2012	28m	Incremental						Total					
		LW8 Ch=	8												
PP30BASE	317626.879	6407274.362	85.346	0.002	0.001	-0.003	#	60.38 32	0.002	0.007	0.004	-0.006	#	61.05 27	0.008
PP30TOP	317626.683	6407274.860	101.091	-0.001	-0.001	-0.001	#	225.00 00	0.002	0.004	0.013	-0.003	#	17.39 00	0.014
Test-05		11:00:00 AM 16/6/2012	36m	Incremental						Total					
		LW8 Ch=	0												
PP30BASE	317626.882	6407274.362	85.345	0.003	0.001	-0.001	#	81.07 10	0.003	0.010	0.004	-0.007	#	67.00 41	0.011
PP30TOP	317626.685	6407274.862	101.088	0.002	0.002	-0.003	#	42.16 25	0.003	0.006	0.015	-0.007	#	21.55 47	0.017

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Table 3: Ashton Coal Underground Survey Monitoring of 33kV Power line - Pole Number CB431

Ashton Coal		Ashton Underground - 33kV Power Pole CB431 Monitoring													
Point	Original East	1:00:00 PM 22/9/2011 North	R.L.	LW7B Ch of Poles		LW8 Ch of Poles									
PP31BASE	317751.337	6407186.374	83.354												
PP31TOP	317751.121	6407186.406	97.510												
Direction of Longwall Extraction		8.04 16	(hms)												
Test-01		1:00:00 PM 22/12/2011	-83m	Incremental J					Total J						
		LW7 Ch=	38												
	East	North	R.L.	JEast	JNorth	J.R.L.	Hr	Bearing	Distance	JEast	JNorth	J.R.L.	Hr	Bearing	Distance
PP31BASE	317751.338	6407186.375	83.342	0.002	0.001	-0.012	#	56.18 36	0.002	0.001	-0.012	#	56.18 36	0.002	
PP31TOP	317751.118	6407186.416	97.498	-0.003	0.010	-0.012	#	344.53 26	0.010	-0.003	0.010	-0.012	#	344.53 26	0.010
Test-02		2:00:00 PM 3/1/2012	-55m	Incremental J					Total J						
		LW7 Ch=	10												
PP31BASE	317751.338	6407186.374	83.345	0.000	-0.001	0.003	#	175.14 11	0.001	0.002	0.000	-0.009	#	97.07 30	0.002
PP31TOP	317751.109	6407186.407	97.502	-0.009	-0.010	0.004	#	224.41 49	0.013	-0.012	0.000	-0.008	#	272.21 58	0.012
Test-03		12:00:00 PM 24/1/2012	-51m	Incremental J					Total J						
		LW7 Ch=	6												
PP31BASE	317751.339	6407186.375	83.346	0.001	0.001	0.001	#	36.52 12	0.001	0.003	0.001	-0.008	#	68.11 55	0.003
PP31TOP	317751.124	6407186.417	97.501	0.015	0.011	-0.001	#	55.42 47	0.019	0.003	0.011	-0.009	#	16.41 57	0.011
Test-04		12:00:00 PM 15/5/2012	-92m	Incremental J					Total J						
		LW8 Ch=	198												
PP31BASE	317751.341	6407186.356	83.345	0.002	-0.019	-0.001	#	173.14 20	0.020	0.005	-0.018	-0.008	#	165.22 45	0.019
PP31TOP	317751.118	6407186.363	97.499	-0.006	-0.054	-0.002	#	185.55 14	0.054	-0.002	-0.043	-0.011	#	183.03 42	0.043
Test-05		12:00:00 PM 17/5/2012	-40m	Incremental J					Total J						
		LW8 Ch=	146												
PP31BASE	317751.340	6407186.356	83.342	-0.001	0.000	-0.004	#	264.48 20	0.001	0.004	-0.019	-0.012	#	168.41 24	0.019
PP31TOP	317751.117	6407186.359	97.496	-0.002	-0.004	-0.003	#	205.20 46	0.004	-0.004	-0.047	-0.013	#	185.00 24	0.047
Test-06		11:00:00 AM 21/5/2012	1m	Incremental J					Total J						
		LW8 Ch=	105												
PP31BASE	317751.340	6407186.347	83.331	0.000	-0.009	-0.011	#	181.16 23	0.009	0.004	-0.027	-0.023	#	172.44 48	0.028
PP31TOP	317751.116	6407186.385	97.484	-0.001	0.026	-0.012	#	357.48 51	0.026	-0.005	-0.021	-0.026	#	193.54 19	0.021
Test-07		2:00:00 PM 25/5/2012	76m	Incremental J					Total J						
		LW8 Ch=	30												
PP31BASE	317751.276	6407186.309	83.128	-0.064	-0.037	-0.203	#	239.45 17	0.074	-0.060	-0.065	-0.226	#	222.59 02	0.088
PP31TOP	317750.927	6407186.306	97.280	-0.189	-0.080	-0.204	#	247.02 25	0.205	-0.194	-0.101	-0.230	#	242.34 40	0.218
Test-08		11:00:00 AM 16/6/2012	106m	Incremental J					Total J						
		LW8 Ch=	0												
PP31BASE	317751.251	6407186.325	82.976	-0.026	0.015	-0.152	#	301.01 46	0.030	-0.086	-0.049	-0.378	#	240.08 51	0.099
PP31TOP	317750.787	6407186.319	97.124	-0.140	0.013	-0.156	#	275.18 32	0.141	-0.334	-0.088	-0.386	#	255.18 11	0.345

Table 4 Ashton Coal Underground Survey Monitoring of 33kV Power line - Pole Number CB432

Ashton Coal		Ashton Underground - 33kV Power Pole 32 Monitoring													
Point	Original East	1:00:00 PM 22/9/2011 North	R.L.	LW7B Ch of Poles		LW8 Ch of Poles									
PP32BASE	317865.536	6407105.557	81.918												
PP32TOP	317865.518	6407105.282	97.401												
Direction of Longwall Extraction		8.04 16	(hms)												
Test-01		1:00:00 PM 22/12/2011	-19m	Incremental					Total						
		LW7 Ch=	38												
	East	North	R.L.	East	North	R.L.	Hr	Bearing	Distance	East	North	R.L.	Hr	Bearing	Distance
PP32BASE	317865.549	6407105.538	81.889	0.013	-0.019	-0.029	#	145.37 11	0.023	0.013	-0.019	-0.029	#	145.37 11	0.023
PP32TOP	317865.523	6407105.267	97.370	0.005	-0.015	-0.031	#	161.33 54	0.016	0.005	-0.015	-0.031	#	161.33 54	0.016
Test-02		2:00:00 PM 3/1/2012	9m	Incremental					Total						
		LW7 Ch=	10												
PP32BASE	317865.563	6407105.525	81.867	0.014	-0.013	-0.022	#	133.15 51	0.019	0.027	-0.032	-0.051	#	140.05 18	0.041
PP32TOP	317865.526	6407105.252	97.336	0.003	-0.015	-0.034	#	170.13 49	0.015	0.008	-0.030	-0.065	#	165.49 46	0.031
Test-03		12:00:00 PM 24/1/2012	13m	Incremental					Total						
		LW7 Ch=	6												
PP32BASE	317865.572	6407105.514	81.840	0.009	-0.011	-0.027	#	139.59 37	0.015	0.036	-0.043	-0.078	#	140.03 49	0.056
PP32TOP	317865.541	6407105.236	97.302	0.015	-0.016	-0.034	#	135.54 55	0.022	0.023	-0.046	-0.099	#	153.26 06	0.051
Test-04		12:00:00 PM 15/5/2012	13m	Incremental					Total						
		LW7 Ch=	6												
PP32BASE	317865.574	6407105.490	81.829	0.002	-0.024	-0.011	#	174.54 54	0.024	0.038	-0.067	-0.089	#	150.13 38	0.077
PP32TOP	317865.571	6407105.186	97.302	0.029	-0.050	0.000	#	149.15 27	0.058	0.052	-0.096	-0.099	#	151.13 34	0.109

UNDERGROUND COAL MINE

Table 5 Ashton Coal Underground Survey Monitoring of 33kV Power line - Pole Number CB436

Ashton Coal		Ashton Underground - 33kV Power Pole CB436 Monitoring													
Point	Original East	1:00:00 PM 22/9/2011 North	R.L.	LW7B Ch of Poles			665								
				LW8 Ch of Poles			816								
PP36BASE	317702.551	6406475.737	67.804												
PP36TOP	317702.697	6406475.907	81.059												
Direction of Longwall Extraction		8.04 16	(hms)												
Test-01		3:00:00 PM 10/10/2011	-27m	Incremental δ			Total δ								
				LW7 Ch=			692								
East		North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance	δEast	δNorth	δR.L.	Hr	Bearing	Distance
PP36BASE	317702.551	6406475.734	67.788	0.000	-0.003	-0.016	#	183.41 29	0.003	0.000	-0.003	-0.016	#	183.41 29	0.003
PP36TOP	317702.697	6406475.881	81.043	0.000	-0.026	-0.016	#	179.07 19	0.026	0.000	-0.026	-0.016	#	179.07 19	0.026
Test-02		3:00:00 PM 14/10/2011	28m	Incremental δ			Total δ								
				LW7 Ch=			637								
East		North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance	δEast	δNorth	δR.L.	Hr	Bearing	Distance
PP36BASE	317702.558	6406475.736	67.784	0.007	0.002	-0.004	#	75.45 46	0.007	0.007	-0.001	-0.019	#	102.09 18	0.007
PP36TOP	317702.692	6406475.894	81.039	-0.006	0.013	-0.004	#	337.09 59	0.014	-0.005	-0.013	-0.020	#	202.06 34	0.014
Test-03		3:00:00 PM 18/10/2011	60m	Incremental δ			Total δ								
				LW7 Ch=			605								
East		North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance	δEast	δNorth	δR.L.	Hr	Bearing	Distance
PP36BASE	317702.565	6406475.734	67.779	0.007	-0.001	-0.005	#	100.40 11	0.007	0.013	-0.003	-0.025	#	101.23 32	0.014
PP36TOP	317702.705	6406475.890	81.035	0.013	-0.004	-0.004	#	108.50 02	0.014	0.008	-0.017	-0.024	#	155.52 59	0.019
Test-04		1:00:00 PM 21/10/2011	104m	Incremental δ			Total δ								
				LW7 Ch=			561								
East		North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance	δEast	δNorth	δR.L.	Hr	Bearing	Distance
PP36BASE	317702.5731	6406475.736	67.7734	0.009	0.002	-0.006	#	76.16 40	0.009	0.022	-0.001	-0.031	#	91.33 44	0.022
PP36TOP	317702.7216	6406475.887	81.028	0.017	-0.003	-0.006	#	100.16 31	0.017	0.025	-0.020	-0.030	#	129.18 07	0.032
Test-05		#####	262m	Incremental δ			Total δ								
				LW7 Ch=			403								
East		North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance	δEast	δNorth	δR.L.	Hr	Bearing	Distance
PP36BASE	317702.585	6406475.744	67.7676	0.012	0.007	-0.006	#	59.10 41	0.014	0.034	0.007	-0.036	#	79.08 45	0.035
PP36TOP	317702.7655	6406475.898	81.0217	0.044	0.011	-0.006	#	76.10 44	0.045	0.069	-0.009	-0.037	#	97.52 23	0.069
Test-06		3:00:00 PM 26/2/2012	665m	Incremental δ			Total δ								
				LW7 Ch=			0								
East		North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance	δEast	δNorth	δR.L.	Hr	Bearing	Distance
PP36BASE	317702.6173	6406475.77	67.7573	0.032	0.026	-0.010	#	51.03 36	0.042	0.066	0.033	-0.047	#	63.46 56	0.074
PP36TOP	317702.7834	6406475.936	81.0143	0.018	0.038	-0.007	#	25.13 22	0.042	0.087	0.029	-0.044	#	71.47 01	0.091
Test-07		1:00:00 PM 28/3/2012	-46m	Incremental δ			Total δ								
				LW8 Ch=			862								
East		North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance	δEast	δNorth	δR.L.	Hr	Bearing	Distance
PP36BASE	317702.6059	6406475.765	67.7511	-0.011	-0.005	-0.006	#	248.01 32	0.012	0.055	0.028	-0.053	#	62.56 07	0.062
PP36TOP	317702.7714	6406475.949	81.0055	-0.012	0.014	-0.009	#	318.47 04	0.018	0.075	0.042	-0.053	#	60.30 14	0.086
Test-08		11:00:00 AM 30/3/2012	-16m	Incremental δ			Total δ								
				LW8 Ch=			832								
East		North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance	δEast	δNorth	δR.L.	Hr	Bearing	Distance
PP36BASE	317702.5977	6406475.75	67.7529	-0.008	-0.015	0.002	#	208.11 20	0.017	0.047	0.013	-0.051	#	74.45 19	0.048
PP36TOP	317702.7617	6406475.94	81.0069	-0.010	-0.009	0.001	#	227.08 38	0.013	0.065	0.033	-0.052	#	62.54 28	0.073
Test-09		11:00:00 AM 5/4/2012	52m	Incremental δ			Total δ								
				LW8 Ch=			764								
East		North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance	δEast	δNorth	δR.L.	Hr	Bearing	Distance
PP36BASE	317702.6039	6406475.749	67.7372	0.006	0.000	-0.016	#	94.36 38	0.006	0.053	0.012	-0.067	#	76.59 22	0.054
PP36TOP	317702.763	6406475.943	80.9916	0.001	0.003	-0.015	#	23.25 43	0.003	0.066	0.036	-0.067	#	61.19 44	0.075
Test-10		1:00:00 PM 13/4/2012	96m	Incremental δ			Total δ								
				LW8 Ch=			720								
East		North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance	δEast	δNorth	δR.L.	Hr	Bearing	Distance
PP36BASE	317702.5933	6406475.755	67.7275	-0.011	0.006	-0.010	#	298.41 10	0.012	0.042	0.018	-0.076	#	66.53 59	0.046
PP36TOP	317702.7647	6406475.938	80.9815	0.002	-0.005	-0.010	#	162.49 27	0.006	0.068	0.031	-0.077	#	65.40 14	0.075

UNDERGROUND COAL MINE

Table 6 Ashton Coal Underground Survey Monitoring of 33kV Power line - Pole Number CB437

Ashton Coal		Ashton Underground - 33kV Power Pole CB437 Monitoring											
Point	Original East	3:00:00 PM 27/2/2012 North	R.L.	LW8 Ch of Poles			996						
PP37BASE	317570.905	6406313.567	71.215										
PP37TOP	317571.138	6406313.439	87.207										
Direction of Longwall Extraction		8.04 16		(hms)									
Test-01		1:00:00 PM 13/3/2012	-157m	Incremental			Total						
		LW8 Ch=	1153										
		East	North	R.L.	Hr	Bearing	Distance	East	North	R.L.	Hr	Bearing	Distance
PP37BASE	317570.904	6406313.566	71.212	-0.001	-0.001	-0.004	# 235.00 29	0.001	-0.001	-0.001	-0.004	# 235.00 29	0.001
PP37TOP	317571.123	6406313.417	87.206	-0.016	-0.022	-0.002	# 215.42 44	0.027	-0.016	-0.022	-0.002	# 215.42 44	0.027
Test-02		11:00:00 AM 15/3/2012	-109m	Incremental			Total						
		LW7 Ch=	1105										
		East	North	R.L.	Hr	Bearing	Distance	East	North	R.L.	Hr	Bearing	Distance
PP37BASE	317570.902	6406313.570	71.211	-0.003	0.003	-0.001	# 322.00 05	0.004	-0.004	0.003	-0.004	# 305.32 16	0.004
PP37TOP	317571.121	6406313.429	87.203	-0.002	0.011	-0.003	# 349.28 20	0.011	-0.018	-0.010	-0.004	# 239.33 46	0.021
Test-03		10:00:00 AM 20/3/2012	-45m	Incremental			Total						
		LW8 Ch=	1041										
		East	North	R.L.	Hr	Bearing	Distance	East	North	R.L.	Hr	Bearing	Distance
PP37BASE	317570.901	6406313.563	71.211	-0.001	-0.006	0.000	# 187.07 30	0.006	-0.004	-0.004	-0.005	# 227.47 34	0.006
PP37TOP	317571.106	6406313.427	87.199	-0.014	-0.002	-0.004	# 264.00 43	0.014	-0.032	-0.012	-0.008	# 249.36 04	0.034
Test-04		12:00:00 PM 22/3/2012	18m	Incremental			Total						
		LW8 Ch=	978										
		East	North	R.L.	Hr	Bearing	Distance	East	North	R.L.	Hr	Bearing	Distance
PP37BASE	317570.914	6406313.546	71.178	0.014	-0.017	-0.032	# 141.47 05	0.022	0.009	-0.021	-0.037	# 156.11 15	0.023
PP37TOP	317571.155	6406313.405	87.168	0.048	-0.022	-0.031	# 114.38 24	0.053	0.016	-0.034	-0.040	# 154.18 55	0.038
Test-05		11:00:00 AM 26/3/2012	74m	Incremental			Total						
		LW8 Ch=	922										
		East	North	R.L.	Hr	Bearing	Distance	East	North	R.L.	Hr	Bearing	Distance
PP37BASE	317570.946	6406313.535	71.109	0.031	-0.011	-0.069	# 108.49 02	0.033	0.041	-0.032	-0.106	# 128.06 27	0.052
PP37TOP	317571.207	6406313.356	87.098	0.052	-0.049	-0.069	# 133.18 31	0.072	0.069	-0.083	-0.109	# 140.31 13	0.108
Test-06		1:00:00 PM 28/3/2012	134m	Incremental			Total						
		LW8 Ch=	862										
		East	North	R.L.	Hr	Bearing	Distance	East	North	R.L.	Hr	Bearing	Distance
PP37BASE	317571.026	6406313.545	71.006	0.080	0.010	-0.103	# 83.04 10	0.080	0.121	-0.022	-0.210	# 100.28 34	0.123
PP37TOP	317571.356	6406313.352	86.995	0.149	-0.004	-0.103	# 91.20 54	0.149	0.217	-0.087	-0.212	# 111.47 16	0.234

Table 7 Ashton Coal Underground Survey Monitoring of 33kV Power line - Pole Number CB438

Ashton Coal		Ashton Underground - 33kV Power Pole CB438 Monitoring											
Point	Original East	3:00:00 PM 27/2/2012 North	R.L.	LW8 Ch of Poles			1086						
PP38BASE	317478.572	6406235.048	74.058										
PP38TOP	317478.730	6406235.174	86.108										
Direction of Longwall Extraction		8.04 16		(hms)									
Test-01		1:00:00 PM 13/3/2012	-67m	Incremental			Total						
		LW7 Ch=	1153										
		East	North	R.L.	Hr	Bearing	Distance	East	North	R.L.	Hr	Bearing	Distance
PP38BASE	317478.573	6406235.046	74.053	0.001	-0.002	-0.004	# 159.08 44	0.002	0.001	-0.002	-0.004	# 159.08 44	0.002
PP38TOP	317478.726	6406235.174	86.104	-0.004	0.000	-0.004	# 264.33 35	0.004	-0.004	0.000	-0.004	# 264.33 35	0.004
Test-02		11:00:00 AM 15/3/2012	-29m	Incremental			Total						
		LW8 Ch=	1115										
		East	North	R.L.	Hr	Bearing	Distance	East	North	R.L.	Hr	Bearing	Distance
PP38BASE	317478.570	6406235.046	74.052	-0.003	0.000	-0.002	# 270.00 00	0.003	-0.002	-0.002	-0.006	# 218.59 28	0.003
PP38TOP	317478.724	6406235.169	86.103	-0.002	-0.005	-0.001	# 198.05 00	0.005	-0.006	-0.005	-0.005	# 227.34 45	0.008
Test-03		10:00:00 AM 20/3/2012	45m	Incremental			Total						
		LW8 Ch=	1041										
		East	North	R.L.	Hr	Bearing	Distance	East	North	R.L.	Hr	Bearing	Distance
PP38BASE	317478.577	6406235.041	74.047	0.006	-0.005	-0.005	# 126.08 07	0.008	0.005	-0.007	-0.011	# 145.31 40	0.008
PP38TOP	317478.736	6406235.171	86.098	0.012	0.002	-0.005	# 79.26 20	0.012	0.006	-0.003	-0.010	# 117.19 26	0.007
Test-04		12:00:00 PM 22/3/2012	108m	Incremental			Total						
		LW8 Ch=	978										
		East	North	R.L.	Hr	Bearing	Distance	East	North	R.L.	Hr	Bearing	Distance
PP38BASE	317478.589	6406235.038	74.039	0.012	-0.003	-0.008	# 105.41 42	0.013	0.017	-0.010	-0.019	# 121.09 55	0.020
PP38TOP	317478.751	6406235.164	86.090	0.015	-0.007	-0.008	# 113.38 56	0.017	0.021	-0.010	-0.018	# 114.42 25	0.023
Test-05		11:00:00 AM 26/3/2012	164m	Incremental			Total						
		LW8 Ch=	922										
		East	North	R.L.	Hr	Bearing	Distance	East	North	R.L.	Hr	Bearing	Distance
PP38BASE	317478.591	6406235.045	74.033	0.002	0.007	-0.007	# 15.15 18	0.007	0.019	-0.004	-0.025	# 100.42 47	0.019
PP38TOP	317478.752	6406235.171	86.083	0.001	0.006	-0.007	# 6.08 48	0.007	0.022	-0.003	-0.025	# 98.31 51	0.022
Test-06		1:00:00 PM 28/3/2012	224m	Incremental			Total						
		LW8 Ch=	862										
		East	North	R.L.	Hr	Bearing	Distance	East	North	R.L.	Hr	Bearing	Distance
PP38BASE	317478.603	6406235.047	74.032	0.012	0.003	-0.001	# 78.25 10	0.012	0.031	-0.001	-0.026	# 91.51 56	0.031
PP38TOP	317478.763	6406235.176	86.082	0.012	0.006	-0.001	# 64.01 32	0.013	0.034	0.002	-0.027	# 85.55 35	0.034