APPENDIX 1

AIR QUALITY MONITORING DATA

2006 - 2007 High Volume Air Sampler TSP Results													
		Site 1 TSP			Site 2 TSP			Site 3 TSP			Site 8 TSP		
Date	Event	Site 1 TSP Result	Site 1 Rolling Annual Average	Site 1 Data Recovery	Site 1 TSP Result	Site 2 Rolling Annual Average	Site 2 Data Recovery	Site 3 TSP Result	Site 3 Rolling Annual Average	Site 3 Data Recovery	Site 8 TSP Result	Site 8 Rolling Annual Average	Site 8 Data Recovery
1/09/2006	1	161	99.3	100.0	113	81.1	100.0	77	83.4	100.0			
7/09/2006	2	28	96.7	100.0	25	79.4	100.0	27	82.0	100.0			
13/09/2006	3	31	95.6	100.0	27	78.9	100.0	53	82.0	100.0			
19/09/2006	4	172	97.1	100.0	138	79.0	100.0	105	81.9	100.0			
25/09/2006	5	102	97.1	100.0	91	78.6	100.0	90	81.8	100.0			
1/10/2006	6	52	96.2	100.0	38	76.2	100.0	54	79.6	100.0			
7/10/2006	7	88	93.8	100.0	71	76.0	100.0	89	78.7	100.0			
13/10/2006	8	341	98.3	100.0	239	79.0	100.0	135	79.9	100.0			
19/10/2006	9	246	101.6	100.0	152	80.0	100.0	153	82.1	100.0			
25/10/2006	10	196	103.4	100.0	92	81.0	100.0	94	83.1	100.0			
31/10/2006	11	191	106.2	100.0	112	82.2	100.0	121	84.4	100.0			
6/11/2006	12	45	106.5	100.0	38	80.7	100.0	41	83.2	100.0			
12/11/2006	13	152	107.3	100.0	103	81.0	100.0	68	82.7	100.0			
18/11/2006	14	85	107.6	100.0	60	80.8	100.0	52	82.5	100.0			
24/11/2006	15	87	108.3	100.0	78	81.2	100.0	90	83.3	100.0			
30/11/2006	16	135	110.0	100.0	114	80.6	100.0	161	83.6	100.0			
6/12/2006	17	74	109.2	100.0	81	80.3	100.0	89	83.6	100.0			
12/12/2006	18	68	109.1	100.0	55	80.0	100.0	101	84.1	100.0			
18/12/2006	19	96	109.2	100.0	63	79.5	100.0	63	83.6	100.0			
24/12/2006	20	105	109.9	100.0	69	78.6	100.0	68	81.9	100.0			
30/12/2006	21	52	103.9	100.0	49	77.7	100.0	69	81.5	100.0			
5/01/2007	22	67	103.1	100.0	66	78.0	100.0	94	82.0	100.0			
11/01/2007	23	101	104.0	100.0	97	78.6	100.0	118	82.9	100.0		**First Installed**	
17/01/2007	24	95	104.8	100.0	141	80.3	100.0	110	84.0	100.0	112	112.0	100.0
23/01/2007	25	129	106.2	100.0	131	81.6	100.0	151	85.5	100.0	131	121.5	100.0
29/01/2007	26	130	107.7	100.0	127	82.7	100.0	126	86.2	100.0	137	126.7	100.0
4/02/2007	27	69	107.7	100.0	62	81.8	100.0	104	85.9	100.0	68	112.0	100.0
10/02/2007	28	66	106.1	100.0	55	81.6	100.0	96	85.9	100.0	72	104.0	100.0
16/02/2007	29	81	106.3	100.0	70	82.0	100.0	91	86.7	100.0	73	98.8	100.0
22/02/2007	30	91	107.0	100.0	79	82.6	100.0	100	86.9	100.0	102	99.3	100.0
28/02/2007	31	91	107.7	100.0	79	83.5	100.0	79	87.6	100.0	85	97.5	100.0
6/03/2007	32	48	107.9	100.0	39	83.4	100.0	36	87.4	100.0	40	91.1	100.0
12/03/2007	33	98	108.6	100.0	79	82.6	100.0	114	87.7	100.0	96	91.6	100.0
18/03/2007	34	48	107.5	100.0	32	82.0	100.0	37	86.3	100.0		91.6	90.9
24/03/2007	35	182	109.2	100.0	102	82.6	100.0	24	85.3	100.0	123	94.5	91.7
30/03/2007	36	192	111.4	100.0	77	81.9	100.0	206	86.9	100.0	120	96.6	92.3
5/04/2007	37	169	111.7	100.0	83	81.9	100.0	102	86.5	100.0	97	96.6	92.9
11/04/2007	38	77	111.7	100.0	57	82.1	100.0	76	87.0	100.0	65	94.4	93.3
17/04/2007	39	89	112.1	100.0	88	82.6	100.0	93	87.5	100.0	71	92.8	93.8
23/04/2007	40	62	111.7	100.0	52	79.8	100.0	68	87.4	100.0	54	90.4	94.1
29/04/2007	41	186	113.3	100.0	58	78.6	100.0	74	87.2	100.0	95	90.6	94.4
5/05/2007	42	236	114.0	100.0	169	79.4	100.0	153	87.2	100.0	169	95.0	94.7
11/05/2007	43	52	111.7	100.0	50	79.4	100.0	78	86.2	100.0	47	92.5	95.0
17/05/2007	44	100	112.1	100.0	62	79.4	100.0	79	85.9	100.0	73	91.5	95.2
23/05/2007	45	145	113.3	100.0	103	80.5	100.0	70	86.2	100.0	98	91.8	95.5
29/05/2007	46	195	115.4	100.0	170	82.6	100.0	106	87.0	100.0	98	92.1	95.7
4/06/2007	47	125	116.3	100.0	82	83.1	100.0	34	86.6	100.0	101	92.5	95.8
10/06/2007	48	20	115.6	100.0	16	82.1	100.0	16	85.4	100.0	17	89.3	96.0
16/06/2007	49	79	114.2	100.0	2	81.5	100.0	14	85.0	100.0	20	86.6	96.2
22/06/2007	50	62	113.9	100.0	60	81.1	100.0	35	84.1	100.0	49	85.1	96.3
28/06/2007	51	59	112.9	100.0	48	80.4	100.0	21	83.5	100.0	39	83.4	96.4
4/07/2007	52	144	113.2	100.0	101	80.8	100.0	73	83.8	100.0	81	83.3	96.6
10/07/2007	53	53	111.9	100.0	43	80.9	100.0	32	83.5	100.0	11	80.8	96.7
16/07/2007	54	142	113.1	100.0	123	82.2	100.0	68	83.1	100.0	CT 390	80.8	93.5
22/07/2007	55	74	113.5	100.0	48	81.8	100.0	76	83.2	100.0		80.8	90.6
28/07/2007	56	169	114.3	100.0	73	81.4	100.0	93	83.2	100.0		80.8	87.9
3/08/2007	57	133	114.1	100.0	73	81.2	100.0	86	83.4	100.0	CT 201	80.8	85.3
9/08/2007	58	151	115.1	100.0	57	80.3	100.0	128	83.5	100.0	90	81.1	85.7
15/08/2007	59	90	111.2	100.0	56	79.9	100.0	140	84.5	100.0	33	79.6	86.1
21/08/2007	60	26	110.0	100.0	17	78.9	100.0	24	83.8	100.0	5	77.3	86.5
27/08/2007	61	121	110.7	100.0	112	79.5	100.0	72	83.7	100.0	91	77.7	86.8

2006 – 2007 Tapered Element Oscillating Microbalance (TEOM) PM10 Results

Date	Site 1		Site 2		Site 3		Site 8		Site4		Site 7		Ashton Contribution (only calculated for north westley winds)				
	Site 1 – PM10 24hr Average	Site 1 – PM10 Rolling Annual Average	Site 2 – PM10 24hr Average	Site 2 – PM10 Rolling Annual Average	Site 3 – PM10 24hr Average	Site 3 – PM10 Rolling Annual Average	Site 8 – PM10 24hr Average	Site 8 – PM10 Rolling Annual Average	Site 4 – PM10 24hr Average	Site 4 – PM10 Rolling Annual Average	Site 7 – PM10 24hr Average	Site 7 – PM10 Rolling Annual Average	Wind Direction	Site 1 Ashton Contribution	Site 2 Ashton Contribution	Site 3 Ashton Contribution	Site 8 Ashton Contribution
02-Sep-06	18.9	25.8	20.9	25.1	16.3	22.8			21.7	23.0	15.3	21.6	W - NW	4	6	1	
03-Sep-06	29.7	25.9	21.4	25.1	12.8	22.8			12.5	23.0	13.2	21.6	W - NW	17	9	0	
04-Sep-06	14.9	25.9	17.3	25.1	14.5	22.8			14.1	23.0	13.5	21.6	SE - S	NA	NA	NA	
05-Sep-06	17.7	25.9	24.7	25.1	18.8	22.8			20.4	23.1	18.6	21.6	E - SE	NA	NA	NA	
06-Sep-06	15.6	25.9	16.4	25.1	12.7	22.8			18.3	23.1	14.6	21.6	W - NW	1	2	-2	
07-Sep-06	9.4	25.9	8.5	25.1	8.5	22.8			9.2	23.1	9.1	21.6	W - NW	0	-1	-1	
08-Sep-06	11.2	25.9	14.4	25.1	12.5	22.8			11.7	23.0	13.3	21.6	SE - S	NA	NA	NA	
09-Sep-06	6.2	25.8	7.0	25.0	6.9	22.7			6.6	23.0	7.6	21.5	E - SE	NA	NA	NA	
10-Sep-06	6.7	25.7	7.2	24.9	7.0	22.7			7.3	23.0	7.8	21.5	E - SE	NA	NA	NA	
11-Sep-06	7.3	25.6	8.1	24.9	8.0	22.6			7.3	22.9	8.0	21.5	SE - S	NA	NA	NA	
12-Sep-06	9.9	25.6	12.7	24.9	13.2	22.6			10.9	22.9	12.3	21.5	E - SE	NA	NA	NA	
13-Sep-06	12.5	25.6	15.3	24.8	14.1	22.6			14.1	22.9	15.0	21.5	E - SE	NA	NA	NA	
14-Sep-06	22.1	25.5	25.7	24.8	22.0	22.6			23.7	22.9	22.0	21.5	W - NW	0	4	0	
15-Sep-06	15.9	25.4	20.2	24.8	18.4	22.5			20.9	22.9	18.6	21.5	E - SE	NA	NA	NA	
16-Sep-06	12.3	25.4	12.7	24.8	12.2	22.6			13.4	22.9	16.0	21.5	SE - S	NA	NA	NA	
17-Sep-06	21.7	25.4	25.0	24.8	26.0	22.6			30.6	23.0	23.4	21.6	E - SE	NA	NA	NA	
18-Sep-06	33.7	25.5	36.9	24.9	38.7	22.6			50.2	23.1	28.7	21.6	W - NW	5	8	10	
19-Sep-06	57.6	25.6	54.9	25.0	58.5	22.8			36.7	23.1	30.8	21.7	W - NW	27	24	28	
20-Sep-06	57.3	25.7	69.9	25.2	64.8	22.9			48.9	23.2	47.3	21.7	W - NW	10	23	17	
21-Sep-06	32.2	25.8	35.5	25.2	40.7	23.0			42.3	23.3	31.2	21.8	SW - W	NA	NA	NA	
22-Sep-06	66.5	25.8	61.6	25.3	42.0	23.0			39.5	23.3	34.5	21.8	W - NW	32	27	7	
23-Sep-06	59.0	25.9	59.6	25.3	51.4	23.1			83.7	23.5	37.3	21.8	W - NW	22	22	14	
24-Sep-06	63.2	26.0	85.4	25.4	77.0	23.2			62.2	23.5	50.2	21.9	W - NW	13	35	27	
25-Sep-06	23.5	25.9	27.0	25.4	30.3	23.2			27.5	23.6	28.6	21.9	E - SE	NA	NA	NA	
26-Sep-06	18.1	26.0	24.4	25.5	21.5	23.2			25.2	23.6	30.1	21.9	SE - S	NA	NA	NA	
27-Sep-06	22.4	26.0	19.0	25.5	19.9	23.2			15.2	23.6	17.6	21.9	W - NW	7	4	5	
28-Sep-06	31.8	26.0	32.0	25.5	33.5	23.3			31.4	23.6	31.1	22.0	E - SE	NA	NA	NA	
29-Sep-06	43.9	26.0	45.6	25.6	48.0	23.3			51.3	23.7	36.6	22.0	W - NW	7	9	11	
30-Sep-06	20.0	26.0	19.4	25.5	20.1	23.3			20.9	23.6	24.1	22.0	E - SE	NA	NA	NA	
01-Oct-06	20.0	26.0	20.3	25.5	20.6	23.3			21.7	23.6	19.1	22.0	E - SE	NA	NA	NA	
02-Oct-06	41.0	26.0	34.9	25.5	36.6	23.3			32.7	23.7	41.5	22.1	W - NW	8	2	4	
03-Oct-06	24.4	25.9	25.6	25.5	30.0	23.3			26.5	23.6	32.4	22.1	E - SE	NA	NA	NA	
04-Oct-06	19.1	25.8	22.3	25.4	19.2	23.2			20.8	23.6	23.2	22.0	E - SE	NA	NA	NA	
05-Oct-06	54.6	25.8	47.9	25.4	45.2	23.2			45.0	23.6	35.3	22.0	W - NW	19	13	10	
06-Oct-06	28.6	25.8	31.5	25.4	29.9	23.2			28.3	23.5	31.8	22.1	E - SE	NA	NA	NA	
07-Oct-06	NA	25.7	31.3	25.4	NA	23.1			NA	23.5	NA	22.1	E - SE	NA	NA	NA	
08-Oct-06	24.2	25.7	46.6	25.4	29.8	23.1			22.8	23.5	21.1	22.1	E - SE	NA	NA	NA	
09-Oct-06	25.6	25.6	29.7	25.5	35.8	23.1			34.4	23.6	31.3	22.2	E - SE	NA	NA	NA	
10-Oct-06	23.1	25.6	23.7	25.4	23.2	23.1			24.5	23.6	26.4	22.2	NE - E	NA	NA	NA	
11-Oct-06	37.3	25.6	37.1	25.4	35.2	23.1			51.5	23.6	31.2	22.2	N - NE	NA	NA	NA	
12-Oct-06	70.0	25.7	59.7	25.5	40.9	23.1			50.7	23.7	31.3	22.2	W - NW	39	28	10	
13-Oct-06	74.5	25.9	68.8	25.7	55.6	23.2			47.5	23.7	35.1	22.2	W - NW	39	34	21	
14-Oct-06	60.1	26.0	54.4	25.7	33.7	23.2			35.7	23.7	31.9	22.2	W - NW	28	23	2	
15-Oct-06	23.2	26.0	22.8	25.8	24.4	23.3			21.3	23.8	31.8	22.3	E - SE	NA	NA	NA	
16-Oct-06	16.3	26.0	19.4	25.8	17.1	23.3			16.6	23.8	43.9	22.4	E - SE	NA	NA	NA	
17-Oct-06	28.5	26.1	26.8	25.8	22.8	23.3			21.7	23.8	25.0	22.4	E - SE	NA	NA	NA	
18-Oct-06	78.4	26.2	55.5	25.9	47.1	23.4			39.2	23.9	40.2	22.5	W - NW	39	16	8	
19-Oct-06	82.1	26.4	54.9	26.0	63.7	23.5			51.1	24.0	56.0	22.6	E - SE	NA	NA	NA	
20-Oct-06	38.6	26.5	28.3	26.1	26.3	23.6			24.7	24.0	25.2	22.6	W - NW	14	4	2	
21-Oct-06	16.5	26.5	16.5	26.1	15.3	23.6			15.7	24.0	20.4	22.6	E - SE	NA	NA	NA	
22-Oct-06	15.9	26.5	15.9	26.1	16.2	23.6			16.3	24.0	19.4	22.7	E - SE	NA	NA	NA	
23-Oct-06	13.3	26.5	15.3	26.1	17.1	23.6			15.2	24.0	19.0	22.7	E - SE	NA	NA	NA	
24-Oct-06	26.5	26.5	27.9	26.1	25.5	23.6			38.8	24.0	23.2	22.7	NE - E	NA	NA	NA	
25-Oct-06	67.2	26.6	47.0	26.1	42.5	23.7			34.6	24.1	32.7	22.7	W - NW	35	14	10	
26-Oct-06	33.2	26.6	33.1	26.1	33.3	23.7			35.7	24.1	36.1	22.7	E - SE	NA	NA	NA	
27-Oct-06	65.4	26.7	56.3	26.2	44.8	23.7			37.3	24.1	29.3	22.8	W - NW	36	27	15	
28-Oct-06	32.6	26.7	40.3	26.2	36.7	23.8			29.7	24.1	34.6	22.8	W - NW	3	11	7	
29-Oct-06	23.9	26.7	24.2	26.2	26.7	23.8			34.9	24.2	33.9	22.8	E - SE	NA	NA	NA	
30-Oct-06	25.8	26.8	29.0	26.3	28.5	23.8			40.5	24.3	33.2	22.9	NE - E	NA	NA	NA	
31-Oct-06	51.9	26.9	43.5	26.4	40.6	23.9			40.3	24.3	27.8	22.9	W - NW	24	16	13	
01-Nov-06	48.6	27.0	38.1	26.4	39.5	24.0			43.8	24.4	37.2	22.9	W - NW	11	1	2	

Date	Site 1 – PM10 24hr Average	Site 1 – PM10 Rolling Annual Average	Site 2 – PM10 24hr Average	Site 2 – PM10 Rolling Annual Average	Site 3 – PM10 24hr Average	Site 3 – PM10 Rolling Annual Average	Site 8 – PM10 24hr Average	Site 8 – PM10 Rolling Annual Average	Site 4 – PM10 24hr Average	Site 4 – PM10 Rolling Annual Average	Site 7 – PM10 24hr Average	Site 7 – PM10 Rolling Annual Average	Wind Direction	Site 1 Ashton Contribution	Site 2 Ashton Contribution	Site 3 Ashton Contribution	Site 8 Ashton Contribution
	Site 1		**Site 2**		**Site 3**		**Site 8**		**Site4**		**Site 7**		**Ashton Contribution (only calculated for north westley winds)**				
02-Nov-06	49.7	27.1	40.4	26.5	23.7	24.0			29.5	24.4	21.0	23.0	W - NW	29	19	3	
03-Nov-06	10.4	27.0	9.1	26.4	9.7	24.0			9.5	24.4	9.3	22.9	SE - S	NA	NA	NA	
04-Nov-06	7.7	27.0	7.2	26.4	7.1	23.9			7.0	24.3	7.4	22.9	SE - S	NA	NA	NA	
05-Nov-06	7.9	27.0	6.6	26.4	5.7	23.9			7.0	24.3	5.8	22.9	S - SE	2	1	0	
06-Nov-06	14.9	27.0	15.2	26.4	16.9	23.9			15.5	24.3	18.9	22.9	SE - S	NA	NA	NA	
07-Nov-06	16.0	27.0	14.9	26.4	18.3	23.9			14.6	24.3	19.6	22.9	E - SE	NA	NA	NA	
08-Nov-06	12.6	27.0	12.4	26.3	16.3	23.9			14.6	24.3	17.9	22.9	E - SE	NA	NA	NA	
09-Nov-06	14.3	26.9	13.8	26.2	18.4	23.9			15.9	24.2	20.9	22.9	E - SE	NA	NA	NA	
10-Nov-06	30.3	26.9	24.5	26.2	22.3	23.9			20.6	24.2	20.1	22.8	SE - S	NA	NA	NA	
11-Nov-06	57.7	27.0	39.2	26.2	25.2	23.9			18.8	24.2	15.1	22.8	W - NW	43	24	10	
12-Nov-06	NA	27.0	NA	26.3	NA	23.9			NA	24.2	NA	22.8	E - SE	NA	NA	NA	
13-Nov-06	36.8	27.1	25.2	26.3	25.4	23.9			35.5	24.2	31.5	22.9	W- SW	5	-6	-6	
14-Nov-06	58.3	27.1	35.7	26.3	28.3	23.9			43.3	24.3	23.1	22.9	W - SW	35	13	5	
15-Nov-06	49.5	27.1	34.9	26.3	63.1	24.0			103.5	24.5	28.5	22.9	W - SW	21	6	35	
16-Nov-06	20.5	27.2	15.6	26.3	20.0	24.0			25.2	24.5	24.4	22.9	SE - S	NA	NA	NA	
17-Nov-06	17.6	27.2	33.0	26.3	16.7	24.0			17.4	24.5	22.3	22.9	SE - S	NA	NA	NA	
18-Nov-06	NA	27.2	33.4	26.3	NA	24.0			NA	24.5	NA	22.9	SE - S	NA	NA	NA	
19-Nov-06	58.4	27.2	28.6	26.3	32.3	24.0			49.7	24.6	30.5	22.9	E - SE	NA	NA	NA	
20-Nov-06	57.1	27.3	48.7	26.3	54.1	24.1			63.8	24.7	45.9	22.9	SE - S	NA	NA	NA	
21-Nov-06	86.2	27.5	63.6	26.5	60.3	24.3			65.7	24.8	43.3	23.0	W - NW	43	20	17	
22-Nov-06	95.3	27.7	69.6	26.6	69.6	24.4			96.3	25.0	52.4	23.1	W - NW	43	17	17	
23-Nov-06	46.8	27.8	49.8	26.7	53.1	24.5			53.0	25.1	57.1	23.2	SE - S	NA	NA	NA	
24-Nov-06	34.3	27.9	33.2	26.7	37.7	24.5			39.3	25.1	41.8	23.2	E - SE	NA	NA	NA	
25-Nov-06	44.1	28.0	42.9	26.8	47.2	24.7			46.5	25.2	46.4	23.3	SE - S	NA	NA	NA	
26-Nov-06	25.0	28.0	27.8	26.8	22.0	24.7			22.3	25.2	21.6	23.4	E - SE	NA	NA	NA	
27-Nov-06	32.6	28.1	24.8	26.9	29.5	24.8			31.0	25.3	33.6	23.4	E - SE	NA	NA	NA	
28-Nov-06	71.5	28.3	54.3	27.0	59.1	24.9			82.3	25.5	33.7	23.5	S- SW	NA	NA	NA	
29-Nov-06	54.0	28.4	52.8	27.1	48.9	25.0			49.7	25.6	73.8	23.7	E - SE	NA	NA	NA	
30-Nov-06	40.5	28.4	41.0	27.2	42.8	25.1			45.3	25.7	48.3	23.7	E - SE	NA	NA	NA	
01-Dec-06	86.1	28.6	77.4	27.3	66.2	25.2			74.9	25.8	59.4	23.8	W - NW	27	18	7	
02-Dec-06	21.6	28.6	23.9	27.3	21.4	25.2			19.5	25.8	24.8	23.9	SE - S	NA	NA	NA	
03-Dec-06	20.8	28.7	20.9	27.4	18.7	25.2			19.3	25.8	21.0	23.9	E - SE	NA	NA	NA	
04-Dec-06	18.5	28.6	19.3	27.3	22.0	25.2			18.6	25.8	24.0	23.9	E - SE	NA	NA	NA	
05-Dec-06	15.8	28.6	16.7	27.3	14.9	25.2			14.9	25.7	24.0	23.9	SE - S	NA	NA	NA	
06-Dec-06	32.2	28.5	36.2	27.3	31.2	25.1			33.3	25.7	33.7	23.9	SE - S	NA	NA	NA	
07-Dec-06	26.8	28.5	29.2	27.3	34.8	25.1			27.7	25.6	32.8	23.9	E - SE	NA	NA	NA	
08-Dec-06	20.5	28.4	20.6	27.3	27.5	25.2			17.8	25.5	32.5	23.9	E - SE	NA	NA	NA	
09-Dec-06	19.8	28.4	20.2	27.3	19.4	25.1			20.5	25.5	25.5	23.9	E - SE	NA	NA	NA	
10-Dec-06	30.5	28.4	26.3	27.3	29.2	25.1			28.4	25.4	30.6	23.9	SE - S	NA	NA	NA	
11-Dec-06	65.5	28.6	50.2	27.3	41.5	25.2			38.1	25.5	36.8	23.9	W - NW	29	13	5	
12-Dec-06	17.8	28.5	17.8	27.3	21.0	25.2			19.5	25.4	21.9	23.9	E - SE	NA	NA	NA	
13-Dec-06	21.3	28.5	22.1	27.3	21.8	25.1			19.9	25.4	26.9	23.9	E - SE	NA	NA	NA	
14-Dec-06	41.7	28.5	43.7	27.3	39.3	25.2			48.2	25.4	44.3	23.9	E - SE	NA	NA	NA	
15-Dec-06	14.1	28.5	15.5	27.3	13.7	25.2			13.1	25.4	16.4	23.9	E - SE	NA	NA	NA	
16-Dec-06	13.6	28.5	14.8	27.3	13.2	25.2			13.5	25.4	23.9	24.0	E - SE	NA	NA	NA	
17-Dec-06	20.9	28.5	16.3	27.3	15.8	25.2			16.5	25.4	28.0	24.0	E - SE	NA	NA	NA	
18-Dec-06	34.8	28.5	36.1	27.3	29.7	25.2			27.5	25.4	30.0	24.0	SE - S	NA	NA	NA	
19-Dec-06	54.9	28.5	53.7	27.4	49.8	25.2			40.1	25.4	63.6	24.1	SE - S	NA	NA	NA	
20-Dec-06	17.3	28.5	16.0	27.4	20.0	25.2			18.9	25.3	25.0	24.1	E - SE	NA	NA	NA	
21-Dec-06	18.9	28.3	19.2	27.3	18.3	25.2			18.1	25.3	25.9	24.0	E - SE	NA	NA	NA	
22-Dec-06	32.6	28.3	32.1	27.2	28.6	25.1			34.2	25.2	28.5	24.0	E - SE	NA	NA	NA	
23-Dec-06	NA	28.3	55.1	27.3	18.1	25.1			NA	25.2	NA	24.0	NW - N	NA	0	0	
24-Dec-06	NA	28.3	13.2	27.2	NA	25.0			NA	25.1	NA	23.9	W - NW	NA	0	NA	
25-Dec-06	NA	28.3	14.1	27.1	NA	25.0			NA	25.2	NA	23.9	W - NW	NA	0	NA	
26-Dec-06	15.7	28.3	17.1	27.1	13.3	25.0			18.0	25.1	17.5	23.9	W - NW	-2	0	-4	
27-Dec-06	26.3	28.3	24.5	27.1	26.1	24.9			28.5	25.1	25.5	23.8	E - SE	NA	NA	NA	
28-Dec-06	29.0	28.2	33.3	27.1	32.9	24.9			32.2	25.1	28.7	23.8	SE - S	NA	NA	NA	
29-Dec-06	20.9	28.1	21.9	27.0	23.6	24.9			23.5	25.0	25.0	23.8	SE - S	NA	NA	NA	
30-Dec-06	12.5	28.1	12.9	27.0	12.7	24.8			13.4	24.9	15.2	23.7	E - SE	NA	NA	NA	
31-Dec-06	10.6	28.0	10.3	26.9	9.3	24.8			11.1	24.9	16.3	23.7	E - SE	NA	NA	NA	
01-Jan-07	9.6	27.9	10.5	26.8	12.0	24.7			11.3	24.8	14.9	23.6	E - SE	NA	NA	NA	

2006 – 2007 Tapered Element Oscillating Microbalance (TEOM) PM10 Results

	Site 1		Site 2		Site 3		Site 8		Site4		Site 7		Ashton Contribution (only calculated for north westley winds)				
Date	Site 1 – PM10 24hr Average	Site 1 – PM10 Rolling Annual Average	Site 2 – PM10 24hr Average	Site 2 – PM10 Rolling Annual Average	Site 3 – PM10 24hr Average	Site 3 – PM10 Rolling Annual Average	Site 8 – PM10 24hr Average	Site 8 – PM10 Rolling Annual Average	Site 4 – PM10 24hr Average	Site 4 – PM10 Rolling Annual Average	Site 7 – PM10 24hr Average	Site 7 – PM10 Rolling Annual Average	Wind Direction	Site 1 Ashton Contribution	Site 2 Ashton Contribution	Site 3 Ashton Contribution	Site 8 Ashton Contribution
02-Jan-07	10.4	27.8	10.5	26.8	20.2	24.7			14.0	24.8	17.0	23.5	E - SE	NA	NA	NA	
03-Jan-07	17.3	27.7	18.5	26.7	18.5	24.7			13.2	24.7	29.5	23.5	E - SE	NA	NA	NA	
04-Jan-07	17.8	27.6	19.5	26.7	25.4	24.7			25.7	24.6	29.9	23.4	E - SE	NA	NA	NA	
05-Jan-07	21.7	27.6	23.8	26.7	19.6	24.7			17.7	24.7	25.9	23.5	E - SE	NA	NA	NA	
06-Jan-07	33.1	27.7	28.1	26.8	29.6	24.7			28.5	24.7	26.9	23.5	E - SE	NA	NA	NA	
07-Jan-07	32.8	27.7	27.8	26.8	25.1	24.8			31.2	24.7	27.9	23.5	W - NW	5	0	-3	
08-Jan-07	40.3	27.8	42.7	26.9	38.7	24.8			35.6	24.8	49.8	23.6	E - SE	NA	NA	NA	
09-Jan-07	30.0	27.9	29.7	27.0	36.9	24.9			30.6	24.8	47.5	23.7	E - SE	NA	NA	NA	
10-Jan-07	31.7	27.9	35.5	27.0	31.0	24.9			38.3	24.9	40.7	23.8	E - SE	NA	NA	NA	
11-Jan-07	53.2	28.0	53.7	27.1	52.0	25.0			67.1	25.0	60.6	23.9	E - SE	NA	NA	NA	
12-Jan-07	50.3	28.1	44.7	27.2	47.9	25.1			44.6	25.1	44.6	23.9	E - SE	NA	NA	NA	
13-Jan-07	28.2	28.1	22.7	27.2	18.9	25.1			25.7	25.1	46.3	24.0	E - SE	NA	NA	NA	
14-Jan-07	25.3	28.1	20.9	27.2	20.5	25.1			25.4	25.1	33.4	24.1	E - SE	NA	NA	NA	
15-Jan-07	29.4	28.2	25.2	27.2	26.5	25.1			33.0	25.2	39.2	24.1	E - SE	NA	NA	NA	
16-Jan-07	31.1	28.2	25.7	27.2	27.0	25.2			34.3	25.2	42.4	24.2	E - SE	NA	NA	NA	
17-Jan-07	38.4	28.2	34.4	27.3	36.5	25.2			40.3	25.3	44.3	24.3	E - SE	NA	NA	NA	
18-Jan-07	29.5	28.3	22.3	27.3	26.4	25.2			30.2	25.3	42.9	24.3	E - SE	NA	NA	NA	
19-Jan-07	45.9	28.3	34.4	27.3	30.7	25.3			37.1	25.4	43.6	24.4	SE - S	NA	NA	NA	
20-Jan-07	58.6	28.5	49.5	27.4	37.7	25.3			45.2	25.4	37.0	24.5	E - SE	NA	NA	NA	
21-Jan-07	96.5	28.7	81.1	27.6	46.4	25.4			51.1	25.5	44.8	24.5	W - NW	52	36	2	
22-Jan-07	52.8	28.8	53.1	27.7	74.0	25.6			45.4	25.6	93.5	24.7	E - SE	NA	NA	NA	
23-Jan-07	37.0	28.8	28.7	27.6	52.0	25.6			54.7	25.7	41.4	24.7	SE - S	NA	NA	NA	
24-Jan-07	16.9	28.8	13.3	27.6	9.4	25.6			NA	25.7	NA	24.7	E - SE	NA	NA	NA	
25-Jan-07	20.2	28.8	21.6	27.6	20.5	25.6			NA	25.7	24.7	24.7	E - SE	NA	NA	NA	
26-Jan-07	NA	28.8	27.3	27.6	NA	25.7			NA	25.7	NA	24.7	SE - S	NA	NA	NA	
27-Jan-07	NA	28.8	59.9	27.7	NA	25.7			NA	25.7	NA	24.7	W - NW	NA	0	NA	
28-Jan-07	29.3	28.9	55.8	27.8	49.4	25.8			NA	25.8	42.7	24.8	W - NW	-13	13	7	
29-Jan-07	36.3	28.9	39.4	27.9	39.7	25.8			NA	25.8	44.9	24.9	E - SE	NA	NA	NA	
30-Jan-07	69.2	29.1	61.1	28.0	50.7	25.9			NA	25.8	45.6	24.9	W - NW	24	16	5	
31-Jan-07	43.7	29.1	46.2	28.1	57.9	26.0			29.0	25.8	65.2	25.1	E - SE	NA	NA	NA	
01-Feb-07	30.3	29.1	32.2	28.1	36.9	26.1			30.0	25.9	45.6	25.1	E - SE	NA	NA	NA	
02-Feb-07	23.2	29.1	27.3	28.1	26.1	26.1			31.7	25.9	35.5	25.2	E - SE	NA	NA	NA	
03-Feb-07	29.4	29.2	31.1	28.2	35.5	26.1			32.7	26.0	42.2	25.2	E - SE	NA	NA	NA	
04-Feb-07	23.0	29.2	25.1	28.2	28.5	26.2			23.6	26.0	36.6	25.3	E - SE	NA	NA	NA	
05-Feb-07	28.6	29.2	29.5	28.2	34.2	26.2			30.8	26.0	32.5	25.3	E - SE	NA	NA	NA	
06-Feb-07	38.5	29.2	34.3	28.2	48.2	26.2			34.4	26.0	50.8	25.3	E - SE	NA	NA	NA	
07-Feb-07	23.2	29.2	25.2	28.1	26.8	26.2			23.1	26.0	NA	25.3	E - SE	NA	NA	NA	
08-Feb-07	27.9	29.2	27.0	28.1	26.2	26.2			23.1	26.0	NA	25.3	E - SE	NA	NA	NA	
09-Feb-07	18.3	29.1	21.0	28.1	25.0	26.2			20.5	25.9	25.9	25.3	E - SE	NA	NA	NA	
10-Feb-07	10.9	29.0	13.4	28.0	12.7	26.1			14.3	25.9	NA	25.2	SE - S	NA	NA	NA	
11-Feb-07	11.9	29.0	11.8	27.9	15.3	26.1			13.6	25.8	21.5	25.2	E - SE	NA	NA	NA	
12-Feb-07	7.1	28.9	6.4	27.9	9.9	26.0			11.1	25.8	11.3	25.1	E - SE	NA	NA	NA	
13-Feb-07	13.1	28.8	17.0	27.8	16.3	25.9			16.2	25.7	22.1	25.0	E - SE	NA	NA	NA	
14-Feb-07	13.3	28.8	16.7	27.8	16.6	25.9			16.8	25.7	26.8	25.0	E - SE	NA	NA	NA	
15-Feb-07	16.8	28.8	20.6	27.8	19.3	25.9			20.7	25.7	23.1	25.0	E - SE	NA	NA	NA	
16-Feb-07	17.7	28.8	21.8	27.8	21.3	25.9			21.5	25.7	24.5	25.1	SE - S	NA	NA	NA	
17-Feb-07	10.4	28.8	13.6	27.8	16.4	25.9			14.5	25.7	18.0	25.0	E - SE	NA	NA	NA	
18-Feb-07	19.5	28.8	20.0	27.8	22.7	25.9			22.6	25.7	26.6	25.1	E - SE	NA	NA	NA	
19-Feb-07	17.6	28.7	19.5	27.7	26.3	25.9			28.9	25.7	23.5	25.1	E - SE	NA	NA	NA	
20-Feb-07	25.0	28.7	22.8	27.7	24.3	25.9	22.5	22.5	22.6	25.7	30.9	25.1	E - SE	NA	NA	NA	NA
21-Feb-07	25.2	28.8	27.4	27.8	24.1	26.0	21.4	22.0	23.3	25.7	39.1	25.1	E - SE	NA	NA	NA	NA
22-Feb-07	35.5	28.8	35.7	27.8	28.5	26.0	28.5	24.1	29.5	25.7	NA	25.1	SE - S	NA	NA	NA	NA
23-Feb-07	33.9	28.8	32.3	27.9	30.5	26.0	25.4	24.4	27.0	25.8	31.4	25.1	SE - S	NA	NA	NA	NA
24-Feb-07	30.5	28.9	32.8	27.9	27.4	26.1	24.5	24.4	36.7	25.8	33.8	25.2	NE - E	NA	NA	NA	NA
25-Feb-07	13.1	28.9	13.6	27.9	12.0	26.0	11.4	22.3	12.2	25.8	13.9	25.2	SE - S	NA	NA	NA	NA
26-Feb-07	10.6	28.8	11.7	27.9	9.9	26.0	9.4	20.4	10.1	25.8	14.9	25.2	E - SE	NA	NA	NA	NA
27-Feb-07	20.6	28.8	23.4	27.9	21.5	26.0	18.5	20.2	21.0	25.8	24.3	25.2	E - SE	NA	NA	NA	NA
28-Feb-07	26.6	28.9	24.1	27.9	16.7	26.0	20.6	20.2	19.6	25.8	NA	25.2	SE - S	NA	NA	NA	NA
01-Mar-07	25.9	28.9	27.1	27.9	14.6	26.0	19.3	20.2	15.9	25.8	21.0	25.2	W - NW	10	11	-1	3
02-Mar-07	27.8	29.0	24.8	28.0	20.2	26.1	22.0	20.3	23.9	25.9	23.8	25.3	S - SW	NA	NA	NA	NA
03-Mar-07	47.6	29.0	40.0	28.0	31.0	26.1	35.0	21.5	30.7	25.9	33.0	25.3	W - NW	17	9	0	4

2006 – 2007 Tapered Element Oscillating Microbalance (TEOM) PM10 Results

	Site 1		Site 2		Site 3		Site 8		Site4		Site 7		Ashton Contribution (only calculated for north westley winds)				
Date	Site 1 – PM10 24hr Average	Site 1 – PM10 Rolling Annual Average	Site 2 – PM10 24hr Average	Site 2 – PM10 Rolling Annual Average	Site 3 – PM10 24hr Average	Site 3 – PM10 Rolling Annual Average	Site 8 – PM10 24hr Average	Site 8 – PM10 Rolling Annual Average	Site 4 – PM10 24hr Average	Site 4 – PM10 Rolling Annual Average	Site 7 – PM10 24hr Average	Site 7 – PM10 Rolling Annual Average	Wind Direction	Site 1 Ashton Contribution	Site 2 Ashton Contribution	Site 3 Ashton Contribution	Site 8 Ashton Contribution
04-Mar-07	29.3	29.1	24.6	28.0	25.5	26.1	25.3	21.8	34.6	26.0	24.8	25.3	SE - S	NA	NA	NA	NA
05-Mar-07	10.9	29.1	11.1	28.0	6.7	26.1	10.3	21.0	6.6	26.0	14.5	25.3	SE - S	NA	NA	NA	NA
06-Mar-07	13.7	29.0	14.4	28.0	11.0	26.1	12.1	20.4	12.0	25.9	19.1	25.3	E - SE	NA	NA	NA	NA
07-Mar-07	21.7	29.0	21.9	27.9	19.6	26.0	18.3	20.3	19.6	25.9	23.5	25.3	E - SE	NA	NA	NA	NA
08-Mar-07	30.0	29.0	30.6	28.0	12.4	26.0	21.1	20.3	13.0	25.8	21.5	25.3	SE - S	NA	NA	NA	NA
09-Mar-07	23.0	29.0	25.4	27.9	18.4	25.9	20.0	20.3	17.8	25.8	26.9	25.3	E - SE	NA	NA	NA	NA
10-Mar-07	32.5	28.9	34.1	27.9	23.6	25.9	26.3	20.6	25.4	25.7	30.6	25.2	E - SE	NA	NA	NA	NA
11-Mar-07	67.4	29.0	47.6	28.0	43.2	26.0	46.3	21.9	45.5	25.8	39.8	25.3	W - NW	28	8	3	6
12-Mar-07	26.2	29.1	24.9	28.0	21.0	26.0	22.1	21.9	19.9	25.8	36.6	25.3	E - SE	NA	NA	NA	NA
13-Mar-07	18.9	29.0	23.3	27.9	19.6	25.9	17.0	21.7	17.6	25.8	24.8	25.3	E - SE	NA	NA	NA	NA
14-Mar-07	18.2	28.9	19.1	27.8	15.9	25.9	15.8	21.4	15.3	25.7	21.5	25.2	SE - S	NA	NA	NA	NA
15-Mar-07	45.1	29.0	46.1	27.9	39.0	25.9	38.7	22.2	45.0	25.6	37.6	25.2	W - NW	7	9	1	1
16-Mar-07	79.2	29.1	83.8	28.0	44.6	25.9	56.7	23.5	53.2	25.5	39.5	25.3	W - NW	40	44	5	17
17-Mar-07	39.5	29.1	28.4	28.0	22.7	25.9	26.0	23.6	19.4	25.5	20.5	25.2	SE - S	NA	NA	NA	NA
18-Mar-07	14.6	29.1	15.4	27.9	13.2	25.9	7.9	23.1	15.7	25.5	16.5	25.2	E - SE	NA	NA	NA	NA
19-Mar-07	32.2	29.1	28.7	27.9	27.3	25.9	NA	23.1	29.3	25.5	NA	25.2	E - SE	NA	NA	NA	NA
20-Mar-07	32.2	29.2	24.8	27.9	23.5	25.9	20.0	22.9	21.2	25.5	22.3	25.2	E - SE	NA	NA	NA	NA
21-Mar-07	27.6	29.2	27.2	28.0	26.7	25.9	21.1	22.9	36.0	25.5	NA	25.2	E - SE	NA	NA	NA	NA
22-Mar-07	13.6	29.2	16.0	28.0	13.6	25.9	11.8	22.5		25.6	7.4	25.2	E - SE	NA	NA	NA	NA
23-Mar-07	25.5	29.2	24.2	28.0	20.0	25.9	20.8	22.5		25.6	26.4	25.2	E - SE	NA	NA	NA	NA
24-Mar-07	31.0	29.3	24.5	28.0	16.6	25.9	35.2	22.9		25.7	20.2	25.2	W - NW	11	4	-4	15
25-Mar-07	13.4	29.3	13.9	28.1	12.5	25.9	NA	22.9		25.7	14.0	25.2	E - SE	NA	NA	NA	NA
26-Mar-07	11.2	29.3	11.8	28.0	9.3	25.9	NA	22.9		25.7	12.7	25.2	E - SE	NA	NA	NA	NA
27-Mar-07	15.5	29.2	16.8	28.0	14.1	25.9	NA	22.9		25.7	17.4	25.2	SE - S	NA	NA	NA	NA
28-Mar-07	33.8	29.3	27.8	28.0	22.1	25.8	16.2	22.7		25.7	23.8	25.2	W - NW	10	4	-2	-8
29-Mar-07	48.9	29.3	37.9	28.1	29.0	25.9	32.4	22.9		25.8	24.4	25.2	W - NW	24	13	5	8
30-Mar-07	49.7	29.4	37.8	28.1	33.5	25.9	39.5	23.4		25.8	27.1	25.2	W - NW	23	11	6	12
31-Mar-07	16.4	29.4	29.1	28.1	17.7	25.9	14.4	23.2		25.8	19.2	25.2	E - SE	NA	NA	NA	NA
01-Apr-07	22.7	29.4	27.0	28.2	21.9	25.9	20.5	23.1		25.8	23.8	25.2	E - SE	NA	NA	NA	NA
02-Apr-07	28.9	29.5	33.1	28.1	30.8	25.9	26.1	23.2		25.8	29.1	25.2	SE - S	NA	NA	NA	NA
03-Apr-07	34.6	29.4	35.0	28.1	36.9	25.9	29.0	23.3		25.8	37.5	25.2	E - SE	NA	NA	NA	NA
04-Apr-07	23.5	29.4	25.2	28.0	19.6	25.9	19.3	23.2		25.8	24.4	25.2	SE - S	NA	NA	NA	NA
05-Apr-07	41.2	29.3	28.6	28.0	32.4	25.9	28.2	23.3		25.7	29.8	25.2	SE - S	NA	NA	NA	NA
06-Apr-07	9.4	29.3	9.9	27.9	9.3	25.8	7.8	23.0		25.7	10.6	25.2	E - SE	NA	NA	NA	NA
07-Apr-07	7.1	29.2	7.4	27.8	8.4	25.7	6.5	22.6		25.7	8.4	25.1	E - SE	NA	NA	NA	NA
08-Apr-07	9.0	29.1	10.2	27.8	10.5	25.6	8.9	22.3		25.7	15.4	25.1	E - SE	NA	NA	NA	NA
09-Apr-07	13.6	29.1	13.4	27.7	8.8	25.5	9.8	22.0		25.7	12.6	25.1	E - SE	NA	NA	NA	NA
10-Apr-07	13.1	29.0	13.7	27.6	10.7	25.5	12.0	21.8		25.7	14.5	25.0	SE - S	NA	NA	NA	NA
11-Apr-07	26.7	28.9	27.3	27.5	28.4	25.4	22.4	21.8	30.1	25.7	36.3	25.0	E - SE	NA	NA	NA	NA
12-Apr-07	19.8	28.8	27.3	27.4	19.5	25.4	18.4	21.7	24.6	25.6	24.2	25.0	E - SE	NA	NA	NA	NA
13-Apr-07	29.0	28.9	31.1	27.5	24.9	25.4	26.4	21.8	22.9	25.6	30.1	25.0	E - SE	NA	NA	NA	NA
14-Apr-07	31.8	28.9	52.5	27.6	28.6	25.4	25.8	21.9	28.6	25.7	34.7	25.1	SE - S	NA	NA	NA	NA
15-Apr-07	50.7	29.0	45.5	27.7	33.4	25.5	38.7	22.2	34.2	25.7	40.5	25.1	NE - E	NA	NA	NA	NA
16-Apr-07	51.4	29.1	46.0	27.8	46.1	25.6	42.7	22.6	44.4	25.9	49.2	25.3	SE - S	NA	NA	NA	NA
17-Apr-07	20.8	29.1	25.3	27.8	21.3	25.6	19.3	22.6	22.4	25.8	25.6	25.3	E - SE	NA	NA	NA	NA
18-Apr-07	24.5	29.1	24.5	27.8	22.7	25.6	22.3	22.6	24.5	25.8	24.5	25.3	E - SE	NA	NA	NA	NA
19-Apr-07	45.8	29.2	51.0	27.8	43.5	25.6	43.1	22.9	46.3	25.9	48.3	25.4	E - SE	NA	NA	NA	NA
20-Apr-07	41.8	29.2	46.6	27.9	44.4	25.7	36.7	23.2	44.7	26.0	41.6	25.4	E - SE	NA	NA	NA	NA
21-Apr-07	33.9	29.3	33.1	28.0	32.3	25.7	31.6	23.3	34.6	26.0	33.5	25.5	E - SE	NA	NA	NA	NA
22-Apr-07	28.4	29.3	26.7	28.0	28.6	25.8	25.4	23.4	30.8	26.1	30.8	25.5	SE - S	NA	NA	NA	NA
23-Apr-07	11.8	29.3	12.1	27.9	11.0	25.7	10.6	23.1	13.4	26.1	12.1	25.5	SE - S	NA	NA	NA	NA
24-Apr-07	7.5	29.3	7.7	27.9	8.4	25.7	7.4	22.9	8.7	26.1	8.5	25.5	E - SE	NA	NA	NA	NA
25-Apr-07	7.2	29.2	7.9	27.9	9.8	25.7	7.2	22.6	8.5	26.1	11.9	25.5	E - SE	NA	NA	NA	NA
26-Apr-07	15.9	29.2	15.9	27.9	24.0	25.7	16.2	22.5	22.6	26.1	17.7	25.5	E - SE	NA	NA	NA	NA
27-Apr-07	9.8	29.2	8.9	27.9	10.8	25.7	10.1	22.3	11.4	26.1	10.0	25.4	SE - S	NA	NA	NA	NA
28-Apr-07	13.9	29.2	15.8	27.7	6.9	25.7	10.7	22.1	8.0	26.0	9.1	25.4	W - NW	6	8	-1	3
29-Apr-07	44.9	29.3	29.1	27.8	21.5	25.7	32.2	22.3	18.9	26.0	17.2	25.4	W - NW	28	12	4	15
30-Apr-07	47.4	29.3	24.1	27.8	18.5	25.7	33.7	22.5	17.7	26.0	19.4	25.4	W - NW	30	6	1	16
01-May-07	26.3	29.4	27.4	27.8	17.4	25.7	22.6	22.5	17.4	26.0	17.4	25.4	W - NW	9	10	0	5
02-May-07	28.8	29.4	31.8	27.8	23.4	25.7	30.8	22.6	26.9	26.1	18.2	25.4	W - NW	11	14	5	13
03-May-07	44.8	29.4	34.7	27.8	37.6	25.7	39.5	22.8	78.4	26.2	26.4	25.4	W - NW	18	8	11	13

2006 – 2007 Tapered Element Oscillating Microbalance (TEOM) PM10 Results																	
	Site 1		**Site 2**		**Site 3**		**Site 8**		**Site4**		**Site 7**		**Ashton Contribution** (only calculated for north westley winds)				
Date	**Site 1 – PM10 24hr Average**	**Site 1 – PM10 Rolling Annual Average**	**Site 2 – PM10 24hr Average**	**Site 2 – PM10 Rolling Annual Average**	**Site 3 – PM10 24hr Average**	**Site 3 – PM10 Rolling Annual Average**	**Site 8 – PM10 24hr Average**	**Site 8 – PM10 Rolling Annual Average**	**Site 4 – PM10 24hr Average**	**Site 4 – PM10 Rolling Annual Average**	**Site 7 – PM10 24hr Average**	**Site 7 – PM10 Rolling Annual Average**	**Wind Direction**	**Site 1 Ashton Contribution**	**Site 2 Ashton Contribution**	**Site 3 Ashton Contribution**	**Site 8 Ashton Contribution**
04-May-07	80.1	29.5	66.9	27.9	63.7	25.8	73.5	23.6	63.0	26.3	51.4	25.5	W - NW	29	16	12	22
05-May-07	62.2	29.5	58.7	27.9	55.6	25.8	60.6	24.1	55.7	26.4	38.9	25.6	W - NW	23	20	17	22
06-May-07	35.2	29.5	35.6	27.9	34.0	25.8	34.9	24.2	36.2	26.4	31.2	25.6	W - NW	4	4	3	4
07-May-07	25.5	29.4	26.1	27.9	24.0	25.8	26.3	24.3	26.7	26.4	27.9	25.6	SE - S	NA	NA	NA	NA
08-May-07	46.9	29.4	50.2	27.9	39.3	25.8	46.0	24.6	51.4	26.5	30.8	25.6	W - NW	16	19	8	15
09-May-07	24.4	29.4	23.8	27.9	26.6	25.8	25.5	24.6	24.8	26.4	25.2	25.6	E - SE	NA	NA	NA	NA
10-May-07	15.6	29.3	16.4	27.8	15.9	25.7	15.9	24.5	16.5	26.4	17.3	25.5	E - SE	NA	NA	NA	NA
11-May-07	15.3	29.3	18.7	27.8	19.4	25.7	16.4	24.3	17.7	26.4	21.7	25.5	E - SE	NA	NA	NA	NA
12-May-07	13.0	29.3	25.4	27.8	13.3	25.7	14.0	24.2	14.6	26.4	13.7	25.5	SE - S	NA	NA	NA	NA
13-May-07	16.8	29.2	19.9	27.8	15.3	25.6	16.3	24.1	16.0	26.4	18.3	25.5	E - SE	NA	NA	NA	NA
14-May-07	21.5	29.2	21.8	27.8	20.1	25.6	20.3	24.1	20.0	26.4	21.4	25.5	SE - S	NA	NA	NA	NA
15-May-07	19.7	29.2	20.0	27.8	17.4	25.6	19.7	24.0	20.3	26.4	18.4	25.5	SE - S	NA	NA	NA	NA
16-May-07	28.2	29.3	28.5	27.8	19.7	25.6	24.9	24.0	20.6	26.4	18.6	25.5	W - NW	10	10	1	6
17-May-07	21.2	29.2	20.5	27.8	21.9	25.6	22.3	24.0	23.2	26.4	22.3	25.5	E - SE	NA	NA	NA	NA
18-May-07	8.8	29.2	10.4	27.7	5.2	25.6	6.8	23.8	6.1	26.3	5.5	25.4	W - NW	3	5	0	1
19-May-07	39.0	29.2	13.4	27.7	16.6	25.5	27.6	23.8	9.9	26.2	9.4	25.3	W - NW	30	4	7	18
20-May-07	21.5	29.2	32.6	27.7	16.3	25.5	19.5	23.8	16.8	26.2	12.1	25.3	W - NW	9	21	4	7
21-May-07	37.7	29.2	33.0	27.7	25.7	25.5	32.6	23.9	20.0	26.2	18.1	25.3	W - NW	20	15	8	14
22-May-07	61.2	29.3	27.6	27.7	32.5	25.6	49.7	24.2	30.0	26.2	21.4	25.3	W - NW	40	6	11	28
23-May-07	29.3	29.3	34.7	27.8	19.0	25.5	26.5	24.2	27.0	26.3	18.2	25.3	W - NW	11	17	1	8
24-May-07	37.4	29.3	38.2	27.7	28.4	25.5	36.8	24.4	60.1	26.4	22.2	25.3	W - NW	15	16	6	15
25-May-07	34.2	29.3	33.0	27.7	29.6	25.5	33.7	24.5	33.4	26.4	27.8	25.3	W - NW	6	5	2	6
26-May-07	32.2	29.3	38.4	27.7	28.2	25.5	34.9	24.6	32.3	26.4	30.4	25.3	W - NW	2	8	-2	5
27-May-07	34.9	29.4	42.5	27.8	24.1	25.5	30.8	24.6	34.0	26.4	25.8	25.3	W - NW	9	17	-2	5
28-May-07	47.1	29.4	45.8	27.9	34.5	25.6	39.6	24.8	45.2	26.5	41.5	25.4	W - NW	6	4	-7	-2
29-May-07	46.7	29.5	49.1	27.9	32.1	25.6	42.5	25.0	37.0	26.5	27.0	25.4	W - NW	20	22	5	16
30-May-07	30.5	29.5	24.6	27.9	18.4	25.5	25.2	25.0	15.3	26.5	16.0	25.4	W - NW	15	9	3	10
31-May-07	44.2	29.5	23.1	27.8	24.9	25.5	38.1	25.1	33.3	26.5	19.1	25.4	W - NW	25	4	6	19
01-Jun-07	34.3	29.4	30.8	27.8	20.9	25.4	30.6	25.2	23.0	26.5	24.2	25.3	W - NW	11	8	-2	8
02-Jun-07	36.4	29.3	30.3	27.8	24.0	25.3	34.9	25.3	22.1	26.5	19.4	25.3	W - NW	17	11	5	15
03-Jun-07	35.1	29.4	36.8	27.8	28.7	25.4	35.5	25.4	24.2	26.5	21.4	25.3	W - NW	14	15	7	14
04-Jun-07	23.2	29.4	27.3	27.8	18.6	25.4	21.9	25.3	19.8	26.5	18.8	25.3	W - NW	4	8	0	3
05-Jun-07	16.9	29.4	18.2	27.9	21.2	25.4	21.3	25.3	19.3	26.5	23.9	25.4	E - SE	NA	NA	NA	NA
06-Jun-07	13.6	29.5	12.7	27.9	18.3	25.4	14.1	25.2	16.3	26.5	18.2	25.4	E - SE	NA	NA	NA	NA
07-Jun-07	5.3	29.4	5.4	27.8	5.4	25.4	4.0	25.0	4.7	26.5	4.7	25.4	SE - S	NA	NA	NA	NA
08-Jun-07	4.6	29.4	4.3	27.8	4.2	25.4	3.2	24.8	3.1	26.5	12.0	25.4	W - NW	1	1	1	0
09-Jun-07	11.4	29.4	9.5	27.8	9.6	25.4	11.0	24.7	8.6	26.5	66.9	25.5	W - NW	3	1	1	2
10-Jun-07	12.3	29.4	12.0	27.8	8.1	25.4	10.5	24.5	7.3	26.5	NA	25.6	W - NW	5	5	1	3
11-Jun-07	23.1	29.5	17.8	27.8	13.0	25.4	16.5	24.4	11.5	26.5	NA	25.6	W - NW	12	6	1	5
12-Jun-07	19.0	29.5	14.9	27.8	11.4	25.4	14.4	24.4	10.0	26.5	33.5	25.7	W - NW	9	5	1	4
13-Jun-07	20.4	29.5	19.2	27.8	12.5	25.4	18.0	24.3	11.8	26.5	NA	25.7	W - NW	9	7	1	6
14-Jun-07	15.2	29.5	14.1	27.8	12.3	25.3	13.5	24.2	11.0	26.4	NA	25.7	W - NW	4	3	1	3
15-Jun-07	13.2	29.4	11.7	27.7	10.2	25.3	12.6	24.1	10.6	26.4	NA	25.8	W - NW	3	1	0	2
16-Jun-07	5.9	29.3	7.1	27.6	6.8	25.3	6.9	23.9	6.6	26.3	NA	25.8	W - NW	-1	0	0	0
17-Jun-07	7.9	29.3	8.2	27.6	7.2	25.2	8.4	23.8	7.9	26.3	NA	25.8	SE - S	NA	NA	NA	NA
18-Jun-07	7.2	29.3	5.7	27.6	6.1	25.2	6.1	23.7	5.9	26.3	NA	25.8	S - SW	NA	NA	NA	NA
19-Jun-07	11.8	29.3	8.9	27.6	5.7	25.1	8.3	23.5	7.2	26.2	NA	25.8	W - NW	5	2	-2	1
20-Jun-07	12.0	29.3	12.9	27.5	6.9	25.1	9.7	23.4	7.8	26.2	NA	25.9	W - NW	4	5	-1	2
21-Jun-07	21.1	29.3	16.1	27.6	13.0	25.1	17.9	23.4	10.9	26.2	NA	25.9	W - NW	10	5	2	7
22-Jun-07	16.9	29.3	19.4	27.6	12.2	25.1	17.0	23.3	15.1	26.2	NA	26.0	W - NW	2	4	-3	2
23-Jun-07	15.9	29.3	15.7	27.6	14.4	25.1	15.8	23.2	16.0	26.2	NA	26.0	W - NW	0	0	-2	0
24-Jun-07	14.7	29.3	14.5	27.6	15.8	25.1	15.8	23.2	15.4	26.2	NA	26.0	SE - S	NA	NA	NA	NA
25-Jun-07	8.4	29.2	8.3	27.6	10.8	25.1	9.0	23.1	10.2	26.2	NA	26.0	SE - S	NA	NA	NA	NA
26-Jun-07	11.3	29.2	11.2	27.5	4.5	25.0	8.1	22.9	7.7	26.1	NA	26.0	W - NW	4	4	-3	0
27-Jun-07	19.8	29.1	18.2	27.5	9.8	25.0	16.3	22.9	7.8	26.1	NA	26.1	W - NW	12	10	2	9
28-Jun-07	14.5	29.1	11.6	27.4	8.7	24.9	12.3	22.8	10.3	26.0	NA	26.1	W - NW	4	1	-2	2
29-Jun-07	22.5	29.1	14.8	27.4	14.5	24.9	19.1	22.8	14.9	26.0	NA	26.1	W - NW	8	0	0	4
30-Jun-07	19.1	29.1	10.5	27.4	12.4	24.9	16.3	22.7	9.7	25.9	NA	26.1	W - NW	9	1	3	7
01-Jul-07	25.0	29.1	13.3	27.4	17.4	24.9	22.5	22.7	13.6	26.0	NA	26.2	W - NW	11	0	4	9
02-Jul-07	32.4	29.1	18.3	27.4	21.0	24.9	29.3	22.8	18.3	26.0	NA	26.2	W - NW	14	0	3	11
03-Jul-07	43.5	29.2	25.1	27.4	27.3	25.0	37.1	22.9	24.8	26.0	NA	26.3	W - NW	19	0	2	12

2006 – 2007 Tapered Element Oscillating Microbalance (TEOM) PM10 Results

Date	Site 1		Site 2		Site 3		Site 8		Site4		Site 7		Ashton Contribution (only calculated for north westley winds)				
	Site 1 – PM10 24hr Average	Site 1 – PM10 Rolling Annual Average	Site 2 – PM10 24hr Average	Site 2 – PM10 Rolling Annual Average	Site 3 – PM10 24hr Average	Site 3 – PM10 Rolling Annual Average	Site 8 – PM10 24hr Average	Site 8 – PM10 Rolling Annual Average	Site 4 – PM10 24hr Average	Site 4 – PM10 Rolling Annual Average	Site 7 – PM10 24hr Average	Site 7 – PM10 Rolling Annual Average	Wind Direction	Site 1 Ashton Contribution	Site 2 Ashton Contribution	Site 3 Ashton Contribution	Site 8 Ashton Contribution
04-Jul-07	47.1	29.3	27.7	27.4	28.9	25.0	40.8	23.0	22.6	26.1	NA	26.3	W - NW	25	5	6	18
05-Jul-07	41.2	29.4	18.3	27.4	26.9	25.0	34.3	23.1	19.4	26.1	20.3	26.3	W - NW	22	-1	8	15
06-Jul-07	20.5	29.4	19.0	27.4	12.6	25.0	17.8	23.1	14.4	26.1	12.9	26.3	W - NW	8	6	0	5
07-Jul-07	19.0	29.3	15.3	27.4	10.6	25.0	16.0	23.0	10.6	26.1	10.7	26.3	W - NW	8	5	0	5
08-Jul-07	15.4	29.2	14.8	27.4	9.5	25.0	14.5	23.0	10.2	26.1	8.7	26.3	W - NW	7	6	1	6
09-Jul-07	10.4	29.1	10.5	27.3	9.0	25.0	9.5	22.9	10.2	26.0	12.4	26.3	SE - S	NA	NA	NA	NA
10-Jul-07	14.2	29.0	NA	27.3	9.5	24.9	12.6	22.8	12.2	26.0	11.9	26.3	SE - S	NA	NA	NA	NA
11-Jul-07	15.7	28.8	NA	27.3	9.7	24.8	15.2	22.7	12.0	25.9	10.7	26.2	W - NW	5	NA	-1	4
12-Jul-07	22.3	28.7	NA	27.3	11.7	24.7	18.8	22.7	14.8	25.9	10.9	26.2	W - NW	11	NA	1	8
13-Jul-07	23.7	28.7	NA	27.2	14.1	24.7	18.8	22.7	13.1	25.8	11.5	26.1	W - NW	12	NA	3	7
14-Jul-07	18.2	28.7	NA	27.3	10.8	24.7	16.7	22.6	11.5	25.8	10.6	26.1	W - NW	8	NA	0	6
15-Jul-07	19.6	28.8	NA	27.3	14.8	24.7	19.4	22.6	13.8	25.9	12.8	26.1	W - NW	7	NA	2	7
16-Jul-07	29.1	28.8	NA	27.4	20.0	24.8	25.0	22.6	18.4	25.9	19.8	26.1	W - NW	11	NA	2	7
17-Jul-07	37.6	28.8	NA	27.4	26.1	24.8	31.8	22.7	20.8	25.9	20.0	26.1	W - NW	18	NA	6	12
18-Jul-07	35.9	28.9	NA	27.5	23.2	24.8	28.2	22.7	18.8	25.9	15.4	26.2	W - NW	21	NA	8	13
19-Jul-07	31.5	28.9	NA	27.5	23.9	24.9	31.1	22.8	23.7	26.0	21.0	26.2	W - NW	11	NA	3	10
20-Jul-07	18.4	29.0	NA	27.6	17.1	24.9	18.9	22.8	18.2	26.0	16.7	26.2	W - NW	2	NA	0	2
21-Jul-07	19.0	29.0	NA	27.6	19.6	24.9	19.3	22.7	19.2	26.0	18.9	26.2	E - SE	NA	NA	NA	NA
22-Jul-07	11.4	29.0	NA	27.6	14.0	24.9	12.0	22.7	13.4	26.0	14.9	26.2	SE - S	NA	NA	NA	NA
23-Jul-07	24.2	29.0	26.6	27.6	22.0	24.9	24.4	22.7	27.3	26.0	22.6	26.2	W - NW	2	4	-1	2
24-Jul-07	29.6	29.0	25.1	27.6	24.6	24.9	27.3	22.7	29.8	26.0	21.0	26.2	W - NW	9	4	4	6
25-Jul-07	35.8	29.1	36.0	27.7	30.8	24.9	37.1	22.8	34.8	26.1	29.3	26.3	W - NW	7	7	2	8
26-Jul-07	31.8	29.1	32.1	27.7	27.5	25.0	30.5	22.8	45.1	26.2	20.5	26.3	W - NW	11	12	7	10
27-Jul-07	32.6	29.1	22.4	27.7	21.3	25.0	28.9	22.9	25.3	26.2	17.2	26.3	W - NW	15	5	4	12
28-Jul-07	29.9	29.1	13.7	27.7	15.4	24.9	23.0	22.9	12.8	26.1	11.3	26.3	W - NW	19	2	4	12
29-Jul-07	32.7	29.1	23.3	27.7	18.7	24.9	29.8	22.9	18.8	26.1	18.5	26.3	W - NW	14	5	0	11
30-Jul-07	16.6	29.1	21.6	27.7	18.6	24.9	19.1	22.9	28.2	26.2	17.8	26.3	W - NW	-1	4	1	1
31-Jul-07	31.8	29.1	30.9	27.7	25.0	24.9	31.0	23.0	34.8	26.2	23.4	26.3	W - NW	8	8	2	8
01-Aug-07	36.3	29.1	40.3	27.7	28.3	24.9	37.7	23.0	29.2	26.2	43.6	26.4	W - NW	7	11	-1	9
02-Aug-07	45.6	29.1	39.8	27.8	32.6	24.9	41.8	23.2	29.8	26.2	24.3	26.4	W - NW	21	15	8	17
03-Aug-07	12.1	29.1	12.0	27.7	9.6	24.9	9.4	23.1	11.7	26.2	8.7	26.4	W - NW	3	3	1	1
04-Aug-07	18.8	29.1	10.6	27.7	9.2	24.9	14.2	23.0	8.0	26.2	8.3	26.4	W - NW	11	3	1	6
05-Aug-07	24.5	29.1	12.7	27.7	17.4	24.9	19.0	23.0	10.8	26.2	9.5	26.4	W - NW	15	3	8	10
06-Aug-07	31.0	29.2	34.4	27.8	19.5	24.9	28.7	23.0	25.4	26.2	21.9	26.4	W - NW	9	12	-2	7
07-Aug-07	32.9	29.2	35.6	27.8	27.3	24.9	30.5	23.1	28.9	26.2	20.3	26.4	W - NW	13	15	7	10
08-Aug-07	46.7	29.3	36.8	27.8	33.4	25.0	39.0	23.2	39.6	26.3	23.5	26.4	W - NW	23	13	10	16
09-Aug-07	56.5	29.3	24.2	27.8	44.4	25.0	48.2	23.3	42.0	26.3	18.8	26.4	W - NW	38	5	26	29
10-Aug-07	79.2	29.4	29.9	27.8	69.6	25.1	63.0	23.6	44.2	26.3	23.9	26.4	W - NW	55	6	46	39
11-Aug-07	58.0	29.5	33.7	27.8	38.0	25.1	52.1	23.7	31.9	26.3	32.4	26.4	W - NW	26	2	6	20
12-Aug-07	49.9	29.6	34.6	27.8	36.2	25.2	44.8	23.9	33.1	26.3	43.4	26.5	W - NW	17	1	3	12
13-Aug-07	19.3	29.5	22.2	27.8	17.1	25.1	20.4	23.8	21.6	26.3	25.3	26.5	E - SE	NA	NA	NA	NA
14-Aug-07	13.9	29.4	16.3	27.7	17.7	25.1	15.5	23.8	21.8	26.3	17.4	26.4	E - SE	NA	NA	NA	NA
15-Aug-07	17.2	29.3	16.9	27.7	23.9	25.1	19.5	23.8	23.5	26.2	26.6	26.4	E - SE	NA	NA	NA	NA
16-Aug-07	19.4	29.3	19.0	27.7	16.5	25.0	15.9	23.7	17.1	26.2	18.8	26.4	SW - W	NA	NA	NA	NA
17-Aug-07	38.9	29.2	20.0	27.6	25.0	25.0	30.1	23.8	18.5	26.1	19.7	26.3	W - NW	20	2	7	12
18-Aug-07	20.9	29.2	18.3	27.5	19.0	24.9	17.8	23.7	18.7	26.1	18.1	26.3	SE - S	NA	NA	NA	NA
19-Aug-07	7.6	29.1	7.2	27.5	7.1	24.9	6.8	23.6	6.6	26.0	9.6	26.3	SE - S	NA	NA	NA	NA
20-Aug-07	9.8	29.0	9.8	27.4	10.0	24.8	8.7	23.5	9.8	25.9	11.7	26.2	E - SE	NA	NA	NA	NA
21-Aug-07	13.0	28.9	11.0	27.3	15.1	24.8	12.8	23.5	13.9	25.8	17.3	26.2	E - SE	NA	NA	NA	NA
22-Aug-07	11.4	28.8	9.8	27.2	14.5	24.6	10.7	23.4	14.7	25.7	15.6	26.1	E - SE	NA	NA	NA	NA
23-Aug-07	13.6	28.7	12.5	27.1	17.1	24.6	14.1	23.4	15.0	25.7	20.3	26.1	E - SE	NA	NA	NA	NA
24-Aug-07	9.4	28.7	9.0	27.0	11.6	24.5	9.7	23.3	11.8	25.6	11.4	26.1	E - SE	NA	NA	NA	NA
25-Aug-07	12.5	28.7	19.1	27.0	11.7	24.5	13.0	23.2	13.0	25.6	13.8	26.1	E - SE	NA	NA	NA	NA
26-Aug-07	25.3	28.7	19.9	27.1	20.0	24.6	21.7	23.2	16.6	25.6	17.6	26.1	W - NW	9	3	3	5
27-Aug-07	34.0	28.7	30.8	27.1	22.8	24.6	32.4	23.3	23.1	25.6	26.8	26.1	W - NW	11	8	0	9
28-Aug-07	33.6	28.8	29.1	27.1	24.4	24.6	31.0	23.3	39.7	25.7	20.3	26.1	W - NW	13	9	4	11
29-Aug-07	27.8	28.8	20.6	27.1	25.6	24.6	24.9	23.3	33.6	25.8	20.5	26.1	W - NW	7	0	5	4
30-Aug-07	30.9	28.9	30.9	27.2	30.1	24.7	33.3	23.4	33.7	25.8	28.9	26.2	E - SE	NA	NA	NA	NA
31-Aug-07	35.9	29.0	33.5	27.2	31.6	24.7	32.0	23.4	29.0	25.9	26.5	26.2	W - NW	9	7	5	6
01-Sep-07	18.7	28.9	16.8	27.2	20.9	24.7	20.7	23.4	18.8	25.9	26.6	26.3	E - SE	NA	NA	NA	NA

APPENDIX 2

GROUNDWATER REPORT

ASHTON COAL OPERATIONS PTY LIMITED

ASHTON COAL MINE
2007 AEMR
GROUNDWATER MANAGEMENT REPORT

BY

PETER DUNDON & ASSOCIATES PTY LTD

14 FEBRUARY 2008

08-0204-R01F

EXECUTIVE SUMMARY

This report has been prepared in accordance with Consent Condition 9.2 (d) of the Ashton Coal Project Approval, and covers the reporting period 2 September 2006 to 1 September 2007. It accompanies the Ashton Coal Operations Pty Ltd 2006-2007 Annual Environmental Management Report.

The report details the monitoring and other work carried out as part of the groundwater management activities for the project. The results of monitoring are presented, together with analysis of trends displayed by the data. The groundwater response to the mining operations has been compared with impacts predicted for this stage of mining in the EIS and the SMP for LWs 1 to 4.

There has been a significant expansion of the groundwater monitoring network during the 2006-2007 year, with up to 91 piezometer bores monitored at some stage during the period. Most attention was directed towards the underground mine. The subsidence monitoring network of multi-level vibrating wire piezometer bores and shallow standpipe piezometers was completed. Further monitoring bores were installed between the mine and the Glennies Creek alluvium to the east. Finally, a comprehensive drilling program to better define the extent and nature of the Bowmans Creek alluvium aquifer system was initiated during the review period.

The monitoring frequency was intensified in the early stages of underground mining, above that specified in the GWMP, until the groundwater system response became clear. It is proposed that the monitoring frequency will now in most cases revert to that outlined in the GWMP.

Groundwater inflows to the underground have been monitored closely for both volume and water quality (EC). Net groundwater inflows have been calculated by a water balance approach, from measured flow rates in various points in the water management system, and allowing for water imported form operation of the longwall. Average total groundwater inflows to the underground mine during the reporting period were 0.4 ML/d (4.6 L/s) compared with 0.45 ML/d (5.2 L/s) predicted in the EIS for this stage of mining.

Seepages into the eastern rib-line of the underground mine closest to Glennies Creek (TG1A) have been isolated from other inflows and continue to be monitored separately, with a high level of accuracy. The seepages have an average EC of about 2000 µS/cm, compared with typical ECs of 5000-8000 µS/cm for groundwater in the Permian coal seams. The reduced EC in TG1A seepage is believed due to a component of seepage from Glennies Creek alluvium in the total seepage inflows. The average rate of seepage from the Glennies Creek alluvium calculated during the reporting period was under 1.8 L/s, less than the rate of 2.0 L/s predicted in the EIS for this stage of mining.

Large drawdown responses have been observed in restricted area local to LWs 1 and 2 in the underground mine, in the Pikes Gully seam and to a lesser extent in the overlying coal measures. Drawdowns in the alluvium have been limited to the small area between the mine and Glennies Creek. The magnitude of drawdown to date

(0.5m at WML120B) is much smaller than the 1.3m drawdown predicted for this location in the EIS at this stage of mining. No mining related drawdown has been observed in either Hunter River or Bowmans Creek alluvium.

Extensive water quality monitoring has shown variable salinity in both the alluvium and the Permian coal measures, some exchange of groundwater between the two units. The groundwater in the alluvium is generally more saline than surface water in Hunter River, Bowmans Creek and Glennies Creek. Generally, groundwater in the coal measures is much more saline, but at some sites in the Bowmans Creek valley the groundwater in the upper levels of the Permian is at similar or lower salinity to the alluvium.

Flow ceased in Bowmans Creek during the drought, prior to the major rainfall event in June 2007. During the no-flow period, water in disconnected pools was sustained by baseflow seepages, which led to increases in salinity, to a high of 14,000 µS/cm in one instance.

pH of all groundwaters is generally close to neutral.

The groundwater model has been modified to allow for more precise representation of the expected changes in permeability above the longwall panels. Additional model layers have been introduced (13 layers compared with 7 in the EIS studies), and smaller cell size (25m x 25m compared with 100m x 100m in the EIS studies) have been incorporated. The amended model is beong re-calibrated against the measured impacts of mining LWs 1 and 2, and will be used to model mine plan options for future mining of the Pikes Gully seam beneath the Bowmans Creek alluvium.

In conclusion, the monitoring program has been carried out in accordance with the GWMP and the requirements detailed in the Consent conditions. Impacts have in all aspects been at or below those predicted for this stage of mining in the EIS and the LW1-4 SMP.

CONTENTS

TABLES

FIGURES

1 INTRODUCTION

This report covers the reporting period 2 September 2006 to 1 September 2007, and forms part of the Ashton Coal Operations Pty Ltd 2006-2007 Annual Environmental Management Report.

In accordance with Consent Condition 9.2 (d), this document presents a review of the work undertaken and the level of compliance, for the groundwater management measures as defined in the Groundwater Management Plan. A brief analysis of trends displayed by the monitoring data is also undertaken, together with a comparison of responses with predictions made in the EIS and the SMP for LWs 1 to 4.

2 GROUNDWATER MONITORING

2.1 Piezometers

Ashton has maintained a comprehensive groundwater monitoring program on up to 91 piezometer bores, as well as monitoring within the underground mine. The network of monitoring piezometers, their function and current status are detailed in **Table 2.1**. The piezometers include both open standpipes and multi-level vibrating wire piezometer bores. Locations are shown on **Figure 1**.

Table 2.1: Ashton Coal Project Monitoring Bore Network

Bore	Location	Aquifer/ Geological Unit*	Construction details**	Comments
Open Cut Monitoring:				
GM1	Rail loop	UL	SP	EIS recommended monitoring bores. Installed 2003.
GM3	Camberwell Village	GC alluvium	SP	
GM3A	Village	UB	SP	
GM4	Open Cut		SP	
GM5	Open Cut		SP	
WML172	Glennies Ck		SP	Replacements for OC1 and OC2 (lost to mining activity). Installed 2007.
WML173	Glennies Ck		SP	
WML174	Glennies Ck Rd		SP	
Underground Mine Monitoring:				
RM01	Bowmans Ck		SP	EIS Investigations (Bowmans Ck alluvium). Installed 2001.
RM02			SP	
RM03			SP	
RM04			SP	
RM05			SP	
RM06			SP	
RM07			SP	
RM09			SP	
RM10			SP	
RA01			SP	
RSGM1		Seam unknown	SP	
PB1		BC Alluvium	SP	
WML20	Above underground mine	PG	SP	
WML21		PG	SP	
WML106		Lem15	VW	Subsidence monitoring

Bore	Location	Aquifer/ Geological Unit*	Construction details**	Comments
		Lem19 PG		
WML107		Lem11 Lem15 Lem19	VW	
WML107B		Lem8-9	SP	
WML108		Lem11-12 Lem15	VW	
WML108B		Lem8-9	SP	
WML109		Lem8-9 Lem12 Lem15	VW	
WML109B		Lem7	SP	
WML110		Lem6 Lem8-9 IB Lem11-12 Lem15	VW	
WML110B		CM OB	SP	
WML110C		Alluvium	SP	
WML111		Lem4 Lem7 Lem11-12 Lem15	VW	
WML111B		CM OB	SP	network – UG mine (2006-2007)
WML112		Lem2-3 Lem6-7 Lem8 Lem15	VW	
WML112B		Bays 1-2	SP	
WML112C		Alluvium	SP	
WML113		Bays2 Lem3-4 Lem9 Lem10-12	VW	
WML113B		Bays1	SP	
WML113C		Alluvium	SP	
WML114		Lem10-12 Lem15 Lem19	VW	
WML114B		Lem6-9	SP	
WML115		Lem7 Lem8-9 Lem15 Lem19 PG	VW	
WML115B		CM OB	SP	
WML115C		Alluvium	SP	
WML119	Between Glennies Ck and LW1	PG	SP	Monitoring of impacts of LW1-4 on Glennies Ck alluvium (2006)
WML120A		PG	SP	
WML120B		GC alluvium	SP	
WML129		GC alluvium	SP	
WML144	East of Glennies Ck	UL ML1 ML2 ULL LLL UB LB	VW	Deeper seam baseline monitoring (2007)

Bore	Location	Aquifer/ Geological Unit*	Construction details**	Comments
WML145		GC alluvium	SP	Monitoring of impacts on Glennies Ck alluvium (2006)
WML146		GC alluvium	SP	
WML148		GC alluvium	SP	
WML155		GC alluvium	SP	
WML157		GC alluvium	SP	
WML158		GC alluvium	SP	
WML166		GC alluvium	SP	
WML167		GC alluvium	SP	
WML175	Between UG and Hunter R	HR Alluvium	SP	Monitoring impacts on HR alluvium (2006)
WML180		HR Alluvium	SP	
WML181	Between LW1 and Glennies Ck	PG	SP	Monitoring subsidence impacts in barrier between LW1 and Glennies Ck (2007)
WML182		PG	SP	
WML183		PG	SP	
WML184		PG	SP	
WML185		PG	SP	
WML186		PG	SP	
WML189	Above UG	Lem15 PG Arties	VW	Subsidence impacts of LW2-3 (2007)
WML191	Above UG	Lem15 PG UL ULL LB	VW	Deeper seam baseline monitoring (2007)
RA8	Bowmans Creek	BC Alluvium	SP	Bowmans Creek alluvium investigations (2007)
RA9		BC Alluvium	SP	
RA10		BC Alluvium	SP	
RA12		BC Alluvium	SP	
RA14		BC Alluvium	SP	
RA16		BC Alluvium	SP	
RA17		BC Alluvium	SP	
RA18		BC Alluvium	SP	
RA20		BC Alluvium	SP	
RA27		BC Alluvium	SP	
RA30		BC Alluvium	SP	
T1-A		BC Alluvium	SP	
T1-P		CM OB	SP	
T2-A		BC Alluvium	SP	
T2-P		CM OB	SP	
T3-A		BC Alluvium	SP	
T3-P		CM OB	SP	
T4-A		BC Alluvium	SP	
T4-P		CM OB	SP	
T5		BC Alluvium	SP	
T6		BC Alluvium	SP	
T7		BC Alluvium	SP	
T8		BC Alluvium	SP	
T9		BC Alluvium	SP	
T10		BC Alluvium	SP	

* *Alluvium:* BC = Bowmans Creek; GC = Glennies Creek; HR = Hunter River
Coal seams: Bays = Bayswater; Lem = Lemington; PG = Pikes Gully; UL = Upper Liddell seam; ML = Middle Liddell; ULL = Upper Lower Liddell; LLL = Lower Lower Liddell; UB = Upper Barrett; LB = Lower Barrett
Overburden: CM OB = coal measures overburden

** VW = multi-level vibrating wire piezometer bore; SP = standpipe piezometer

The monitoring network has been expanded significantly during the review period:

- The subsidence monitoring bore network has now been fully installed, including multi-level vibrating wire piezometers and shallow standpipe piezometers above each of the first four longwall panels, and over the proposed future underground mine areas underlying Bowmans Creek. These installations (WML106 to WML115) monitor groundwater pressures and shallow water levels in the sequence above the Pikes Gully seam.

- Six standpipe piezometers were installed in the barrier between Glennies Creek and LW1, to allow groundwater level monitoring and sampling, as well as periodic re-testing of permeability of the Pikes Gully seam. These bores were drilled to allow detection of any subsidence-induced changes in permeability within the barrier.

- Additional multi-level vibrating wire piezometers have been installed to establish baseline monitoring of the main coal seams beneath the Pikes Gully seam (WML191 and WML144).

- A network of monitoring piezometers was installed in the Glennies Creek alluvium on the eastern side of Glennies Creek, to monitor for potential impacts of current mining of the Pikes Gully seam, and baseline monitoring for future deeper seam mining.

- In late 2007, an extensive shallow drilling program was undertaken to more accurately define the location and extent of saturated alluvium adjacent to Bowmans Creek. Several bores were completed as standpipe piezometers, to allow sampling and hydraulic testing, as well as ongoing water level monitoring. This work was carried out to assist with preliminary mine designs for the areas beneath the Bowmans Creek alluvium.

- A number of surface water level gauges were also installed to allow monitoring of levels in Glennies Creek relative to nearby groundwater levels.

The piezometers have been monitored at various frequencies during the review period, with the EIS investigation and monitoring bores generally monitored 3-monthly in accordance with the GWMP, and piezometers associated with underground mining monitored at least every 3 months, but generally more frequently (weekly or fortnightly) during critical stages of the longwall panel advance.

The monitoring frequency was intensified in the early stages of underground mining, above that specified in the GWMP, until the groundwater system response became clear. It is proposed that the monitoring frequency will now in most cases revert to that outlined in the GWMP, while some bores in the Bowmans Creek alluvium will continued to be monitored with increased frequency in preparation for the proposed extension of mining beyond LW panels 1-4. The proposed monitoring frequency for the next review period (September 2007 to August 2008) is summarised in **Table 2.2**.

A number of bores were drilled to help define the extent, depth and depth of saturation of the alluvium, and were completed as temporary standpipe piezometers. Many of these bores have never contained groundwater, as they were terminated above the water table. A number of bores which have always been dry have now been eliminated from the monitoring network.

Table 2.2: Ashton Coal Project –
Proposed Piezometer Monitoring Frequency

Piezometers (refer Table 2.1)	Monitoring Frequency in 2006-2007	Proposed Monitoring Frequency in 2007-2008	Comments
GM1, GM3 and GM3A	quarterly	quarterly	
GM4, GM5	quarterly	-	Removed – always dry
WML172-174	not monitored	quarterly	New – replacement for OC1 and OC2
RM01 to RM10	quarterly	monthly	
RA01, RSGM1, PB1	quarterly	monthly	
WML20-21	weekly	monthly	
WML106-115	standpipes weekly; VW piezos fortnightly	fortnightly or monthly	
WML119, 120A-B and 129	continuous (dataloggers)	monthly	
WML144, 189 and 191	fortnightly	fortnightly or monthly	
WML145-167	fortnightly	quarterly	
WML175 and 180	fortnightly	quarterly	
WML181-186	weekly	monthly	
RA8-RA30	fortnightly	monthly	
T1-4A and P	fortnightly	monthly	
T5-T10	fortnightly	monthly	

The standpipe piezometers have been monitored for water levels, and also sampled periodically for water quality monitoring. Vibrating wire piezometers have been monitored for groundwater pressures only. Automatic water level dataloggers have been installed in six standpipe piezometers, to allow continuous water level monitoring in the barrier region between LW1 and Glennies Creek.

Selected monitoring bores were sampled periodically for detailed laboratory analysis, comprising TDS, EC, pH, major ions, dissolved metals, nutrients, cyanide, fluoride, turbidity and total suspended solids.

2.2 Underground Monitoring

Groundwater monitoring was also carried out within the underground mine, including:

- Groundwater inflow rates (metering of dewatering pipelines)
- Seepages inflows from the eastern rib of the LW1 tailgate (combination of V-notch weirs and meters on dewatering pipelines)
- Metering of water imported to the underground mine for longwall operation.
- Metering of total water volumes pumped from the mine to the dam beside the mine portal in Arties pit, or directly into the mine water management system.
- Water quality monitoring of individual seepages into the LW1 tailgates (EC).
- Water quality monitoring at various in-mine sumps, and total water pumped out of the mine.

2.3 Groundwater Levels

Hydrographs are shown on **Figures 2** to **12**.

2.4 Discussion of Groundwater Level Changes

2.4.1 Permian Coal Measures

The greatest change in groundwater level was observed in monitoring bores in the Pikes Gully seam close to the underground mine, viz standpipes WML20 and WML21, and vibrating wire piezometers WML106-84m, WML115-VW144m and WML189-VW93m (**Figure 2**).

WML106-VW84m is close to the southern end of LW1, and drew down in response to groundwater drainage into LW1. Most impact occurred during the development stage, with only minor additional impact during longwall extraction. WML189-VW93m is located in a chain pillar between LW2 and LW3, and also responded mainly during the development of LW2 maingate headings, not the subsequent longwall 2 extraction.

WML20, WML21 and WML115-VW144m are located some distance from LW1 and LW2, but the magnitude of response is due partly to the influence of angled holes drilled along the Pikes Gully seam from outcrop near Glennies Creek, and partly due to influence of drainage into the NW Mains. Each time one of the angled drill-holes is intersected in a development heading, at a lower elevation than the previous intersection, it discharges groundwater for a time, acting as a quasi dewatering bore. WML20 and WML21 have shown responses to the effects of periodic flow from the drill-holes into the underground workings. WML21 and WML115-VW144m are probably also responding to drainage into the NW Mains.

Small drawdowns of 3m and 2m respectively were also observed in Pikes Gully seam piezometers WML119 and WML120A during the installation of development headings for LW1, but drawdowns had stabilised before commencement of longwall extraction on 19 March 2007 (**Figure 3**). Drawdown is interpreted to have commenced once the LW1 tailgate headings passed below the Pikes Gully regional water table level around the end of July 2006. Maximum drawdown was reached in late October 2006 when the LW1 tailgate headings passed WML120A. Thereafter, no further drawdown occurred and the water level actually started recovering about 3 months later.

Groundwater level drawdown continued to occur at WML119 until the LW1 tailgate headings passed WML119 in around February 2007. No further drawdowns occurred thereafter.

Neither WML119 nor WML120A showed any additional drawdown response during the LW1 longwall extraction (March to October 2007). Both bores showed major water level rise in response to rainfall recharge during the large rainfall event of 8-10 June 2007, and a further smaller recharge event on 19-21 August 2007.

The vibrating wire piezometers in subsidence monitoring bores over the underground mine have showed a restricted pattern of vertical and areal responses to the underground mining. Apart from the large Pikes Gully seam responses close to LW1 and LW2 (during installation of development headings), small drawdown responses have been noted in some of the Lemington seam piezometers located close to LW1 and LW2, partly during the development stage, but mostly during longwall extraction (**Figures 4** and **5**). As expected, larger responses are seen in the lower seams (ie Lemington 15 to 19 seams).

A piezometer set in the Arties seam 8m below the Pikes Gully seam at bore WML189 (**Figure 2**) has shown a rise in groundwater pressure following the passing of longwall extraction in LW2. This is believed to be a response to a temporary increase in abutment pressure in the chain pillar immediately following goaf development, and is expected to dissipate over time.

Shallow standpipe piezometers in the upper sections of the Permian overburden (eg WML107B, WML111B, WML112B and WML113B – see **Figure 4**) show small but sustained recharge responses to the June and August 2007 rainfall events, consistent with the receipt of recharge by vertical infiltration from above. None has shown any drawdown in response to the longwall extraction in LW1 and LW2.

Piezometers at deeper levels in the Permian only show recharge response where located close to outcrop (eg WML119 and WML120A – see **Figure 3**). Piezometers remote from outcrop have not yet shown any response to the 2007 recharge events.

Piezometers set at seams below the Pikes Gully seam have not shown any response to the underground mining (**Figure 6**).

2.4.2 Alluvium

Alluvium piezometers mostly show periodic influence of rainfall recharge, notably in June and August 2007, when significant rainfalls were received (**Figure 7**). Prior to June 2007, groundwater levels in the Bowmans Creek alluvium were at close to long-term lows, and Bowmans Creek itself had ceased to flow. The June 2007 recharge event restored alluvium groundwater levels to close to long-term highs. The long-term hydrographs of alluvium bores in the Bowmans Creek area do not show any evidence of mining-induced impacts.

The monitoring record in the Glennies Creek alluvium covers a shorter time period, but groundwater levels were probably also at close to long-term lows prior to June 2007.

A small mining-induced drawdown of approximately 0.5m occurred in piezometer WML120B between the end of July 2006 when the LW1 tailgate headings passed below the water table, and the end of October 2006, when the headings passed WML120B, but thereafter no further drawdown occurred. The groundwater level in WML120B was stable from October 2006 until the June 2007 recharge. There has been no mining-induced drawdown in any other Glennies Creek alluvium piezometer.

The June 2007 recharge event caused an immediate temporary water level rise of 3m at WML120B, and 7.5m at WML129 (**Figure 8**). WML129 was submerged by floodwaters for 2 days. Both bores then displayed a steady recession over the next 3-4 months, interrupted by a smaller recharge event in August 2007. No further mining-induced drawdown was observed in either bore, nor has any mining-related drawdown been observed in any other Glennies Creek alluvium piezometer.

The Hunter River alluvium piezometers WML175, WML180 and RA27 have only a short record, but show trends that are inconsistent with rainfalls in 2007, and are probably more responsive to Hunter River water levels than to local rainfall or other local factors (**Figure 7**).

Composite plots of both alluvium and coal measures piezometers are presented on **Figures 9** to **12**, with piezometers grouped approximately in alignment with the cross-sections shown on **Figure 1**. These plots illustrate the different responses between the shallow alluvium and deeper coal measures aquifer systems. The bed levels of Bowmans Creek on each cross-section are shown on **Figures 10** to **12**, indicating that the alluvium groundwater levels are generally higher than creek water levels.

2.5 Groundwater Quality

The EC and pH data from sampling of piezometers and basic statistical analysis results are summarised in **Table 2.3** and **Table 2.4** respectively.

Table 2.3: Groundwater Salinity measured as Electrical Conductivity (µS/cm)

BORE	Nov 2006	Jan-Feb 2007	May-Jun 2007	Aug-Nov 2007	Min	Ave	Max	Standard Deviation
Bowmans Creek Alluvium:								
RM01	Dry	Dry	Dry	Dry	-	-	-	-
RM04	-	1760	1760	1620	1620	1713	1760	81
RM06	-	1490	1480	1100	1100	1357	1490	222
RM07	1800	1770	1930	1530	1530	1758	1930	166
RM09	1500	1520	1500	1330	1330	1462	1520	89
RM10	1570	1610	1660	1690	1570	1633	1690	53
RA02	Moist	Moist	Moist	Moist	-	-	-	-

BORE	Nov 2006	Jan-Feb 2007	May-Jun 2007	Aug-Nov 2007	Min	Ave	Max	Standard Deviation
PB1	-	1740	1710	1690	1690	1713	1740	25
RA8	-	-	-	8370	-	-	-	-
RA10	-	-	-	1780	-	-	-	-
RA14	-	-	-	2050	-	-	-	-
RA16	-	-	-	13400	-	-	-	-
RA17	-	-	-	1190	-	-	-	-
RA18	-	-	-	2100	-	-	-	-
RA30	-	-	-	1560	-	-	-	-
WML110C	-	-	-	9340	-	-	-	-
WML112C	-	-	-	1360	-	-	-	-
WML113C	-	-	-	1450	-	-	-	-
WML115C	-	-	-	4100	-	-	-	-
T1-A	-	-	-	2040	-	-	-	-
T2-A	-	-	-	1680	-	-	-	-
T3-A	-	-	-	2150	-	-	-	-
T4-A	-	-	-	2270	-	-	-	-
T5	-	-	-	1330	-	-	-	-
T6	-	-	-	1280	-	-	-	-
T7	-	-	-	6420	-	-	-	-
T9	-	-	-	2490	-	-	-	-
T10	-	-	-	2050	-	-	-	-
Total Bowmans Creek Alluvium:					**1100**	**2492**	**13400**	**2477**
Hunter River Alluvium:								
RA27	-	-	-	2550	-	-	-	-
Glennies Creek Alluvium:								
WML120B	1831	1331	1020	1240	1020	1356	1831	343
WML129	-	571	522	577	522	557	577	30
WML148	-	-	-	2610	-	-	-	-
WML155	-	-	-	915	-	-	-	-
WML157	-	-	-	803	-	-	-	-
WML158	-	-	-	705	-	-	-	-
Total Glennies Creek Alluvium:					**522**	**1102**	**2610**	**637**
Permian Coal Measures Overburden:								
RM02	Moist	5530	5360	Lost	5360	5445	5530	120
RM05	-	2260	2170	2300	2170	2233	2300	67
T1-P	-	-	-	9220	-	-	-	-
T2-P	-	-	-	1070	-	-	-	-
T3-P	-	-	-	2050	-	-	-	-
T4-P	-	-	-	2000	-	-	-	-
WML108B	-	-	14700	-	-	-	-	-
WML109B	-	-	11500	-	-	-	-	-
WML110B	-	-	9260	9590	9260	9425	9590	233
WML111B	-	-	-	2580	-	-	-	-
WML112B	-	-	1030	1720	1030	1375	1720	488
WML113B	-	-	-	875	-	-	-	-

BORE	Nov 2006	Jan-Feb 2007	May-Jun 2007	Aug-Nov 2007	Min	Ave	Max	Standard Deviation
WML114B	-	-	-	6730	-	-	-	-
WML115B	-	-	-	3790	-	-	-	-
Total Coal Measures Overburden:					**875**	**4933**	**14700**	**4106**
Pikes Gully Seam:								
WML 20	6240	2470	3820	5980	2470	4628	6240	665
WML 21	-	8480	8200	8700	8200	8460	8700	75
WML119	5410	4940	3090	2320	2320	3940	5410	543
WML120A	1068	1470	742	757	742	1009	1470	126
WML181	-	-	3570	-	-	-	-	-
WML182	-	-	4420	8680	4420	6550	8680	642
WML183	-	-	8570	8180	8180	8375	8570	59
WML184	-	-	-	4580	-	-	-	-
WML185	-	-	-	4430	-	-	-	-
WML186	-	-	-	387	-	-	-	-
Pikes Gully Seam:					**387**	**4631**	**8700**	**2851**
Other Major Coal Seams:								
GM3A	Dry	Dry	Dry	Dry	-	-	-	-
RSGM1	11300	12200	11200	8200	8200	10725	12200	1742
GM1	7110	6520	6330	295	295	5064	7110	3196
GM3B	Dry	Dry	Dry	Dry	-	-	-	-
Other Major Coal Seams:					**295**	**7894**	**12200**	**3851**

The groundwater quality monitoring data has highlighted some variation from the normal pattern of low salinity in the alluvium and high salinity in the Permian. The main variances are as follows:

Bowmans Creek alluvium:

- Salinities in the Bowmans Creek alluvium ranged from a minimum of 1100 to a maximum of 13400 µS/cm EC (at RM02 and RA16 respectively). The 2007 Bowmans Creek alluvium investigation revealed a number of locations where the groundwater in the alluvium is highly saline. In particular, bores RA8 (8370 µS/cm), RA16 (13400 µS/cm), WML110C (9340 µS/cm), WML115C (4100 µS/cm) and T7 (6420 µS/cm) are reflecting hydraulic connection to the underlying Permian coal measures groundwater.

- The average EC for all Bowmans Creek alluvium samples is 2492 µS/cm (**Table 2.3**), but even without the five high salinity bores listed above, the average EC is still relatively high at 1680 µS/cm.

- By comparison, the EC of surface water in Bowmans Creek over the review period ranged from 569 to 14400 µS/cm (**Figure 13**). The low values occurred generally in either June or August 2007, shortly after runoff-generating rainfall events. The highest values occurred during March-April 2007, within the extended drought. In March 2007, the EC at site SM4 increased to 14400 µS/cm. Monitoring site SM3 was dry between March and June 2007.

- The higher ECs reported during the drought period are due to groundwater baseflow discharges, and an absence of runoff. Bowmans Creek had ceased continuous flow by early 2007, and water was maintained in disconnected pools only by virtue of small volume groundwater baseflow discharges. The total rate of groundwater baseflow was very small, insufficient to maintain continuous flow.

Glennies Creek alluvium:

- The Glennies Creek alluvium also reported variable salinity, with ECs ranging from 522 to 2610 µS/cm. The higher ECs apply to the northern (upstream) part of the alluvium east of the underground mine, and lower ECs from the southern (downstream) section.

- The alluvium ECs are all noticeably higher than the EC of surface flow in Glennies Creek, which during the period ranged between 225 and 903 µS/cm (**Figure 14**). The higher alluvium ECs are believed to be due to upward seepage of groundwater from the Permian into the alluvium.

- Bore WML120B showed a steady fall in EC through the review period (from 1830 to 1020 µS/cm – see **Figure 14**), reflecting a reduction in the component of Permian upward leakage, as a result of lowered groundwater levels in the Permian in the vicinity of LW1.

Hunter River alluvium:

- The one sample of Hunter River alluvium (from bore RA27) reported an EC significantly higher than the Hunter River surface flow (**Figure 14**).

Pikes Gully Seam:

- Salinity of Pikes Gully seam groundwater ranged from 347 to 8700 µS/cm EC. The anomalous value of 347 µS/cm is believed to be due to contamination by rainfall runoff entering the bore at the ground surface.

- The salinity decrease is believed to be due to seepage from the Glennies Creek alluvium induced by dewatering in the underground mine.

Other Permian Coal Measures:

- ECs ranging from 295 to 14700 µS/cm were reported during the period. The value of 295 µS/cm is believed to be anomalous, and may be due to contamination from rainfall entering the bore.

- The 2007 Bowmans Creek alluvium investigation drilling revealed a number of sites where groundwater salinities in the upper parts of the Permian were found to be similar to the overlying alluvium (eg T2-P, T3-P, T4-P, WML111B, WML112B, WML113B).

EC data obtained from underground monitoring are presented as plots vs time on **Figures 15** to **17**. The ECs of seepage inflows to Tailgate 1A (TG1A – the eastern-most gateroad of LW1, and the closest to Glennies Creek) are shown plotted on **Figure 15**. Corresponding ECs at various piezometers in the Glennies Creek valley or between Glennies Creek and the mine are plotted on **Figure 16**. Other underground EC monitoring results are plotted on **Figure 17**.

The ECs of TG1A seepage inflows ranged from less than 1000 µS/cm between cut-throughs (CTs) 11 and 12 (close to bores WML184 and WML185 – see **Figure 1**) to approximately 9000 µS/cm from between CTs 16 and 17 (close to bores WML181 and WML182 – see **Figure 1**). Most seepages showed declining trend in ECs, due to the induced groundwater flow from the Glennies Creek alluvium. The ECs stabilised in most locations along TG1A by around June-July 2007.

After access to TG1A was progressively lost as the longwall advanced northwards, the total seepage from TG1A was monitored at the Longwall Backroad pipe (**Figure 1**) as described below in **Section 2.6**. **Figure 15** shows that the average salinity of seepage into TG1A as measured at the Longwall Backroad Pipe has stabilised at an EC of around 2000 µS/cm.

Table 2.4: Groundwater Quality Monitoring (pH)

BORE	Nov 2006	Jan-Feb 2007	May-Jun 2007	Aug-Nov 2007	Min	Ave	Max	Standard Deviation
Bowmans Creek Alluvium:								
RM01	Dry	Dry	Dry	Dry	-	-	-	-
RM04	-	7.05	6.93	7.41	6.93	7.73	7.41	0.25
RM06	-	7.07	7.09	7.14	7.07	7.10	7.14	0.04
RM07	7.04	7.13	7.01	7.24	7.01	7.10	7.24	0.10
RM09	6.99	7.02	6.79	-	6.79	6.93	7.02	0.13
RM10	6.89	7.01	6.76	7.08	6.76	6.94	7.08	0.14
RA02	Moist	Moist	Moist	Moist	-	-	-	-
PB1	-	7.02	7.77	7.26	7.02	7.35	7.77	0.38
RA8	-	-	-	7.35	-	-	-	-
RA10	-	-	-	7.39	-	-	-	-
RA14	-	-	-	7.08	-	-	-	-
RA16	-	-	-	7.00	-	-	-	-
RA17	-	-	-	7.38	-	-	-	-
RA18	-	-	-	7.31	-	-	-	-
RA30	-	-	-	6.63	-	-	-	-
WML110C	-	-	-	7.13	-	-	-	-
WML112C	-	-	-	8.61	-	-	-	-
WML113C	-	-	-	7.13	-	-	-	-
WML115C	-	-	-	7.39	-	-	-	-
T1-A	-	-	-	7.82	-	-	-	-
T2-A	-	-	-	7.11	-	-	-	-
T3-A	-	-	-	6.97	-	-	-	-
T4-A	-	-	-	7.14	-	-	-	-
T5	-	-	-	7.04	-	-	-	-

BORE	Nov 2006	Jan-Feb 2007	May-Jun 2007	Aug-Nov 2007	Min	Ave	Max	Standard Deviation
T6	-	-	-	6.96	-	-	-	-
T7	-	-	-	7.09	-	-	-	-
T9	-	-	-	7.70	-	-	-	-
T10	-	-	-	7.04	-	-	-	-
Total Bowmans Creek Alluvium:					**6.63**	**7.17**	**8.61**	**0.34**
Hunter River Alluvium:								
RA27	-	-	-	6.94	-	-	-	-
Glennies Creek Alluvium:								
WML120B	-	7.08	7.24	7.10	7.08	7.14	7.24	0.09
WML129	-	7.27	7.24	7.33	7.24	7.28	7.33	0.05
WML148	-	-	-	7.24	-	-	-	-
WML155	-	-	-	6.92	-	-	-	-
WML157	-	-	-	7.77	-	-	-	-
WML158	-	-	-	7.63	-	-	-	-
Total Glennies Creek Alluvium:					**6.92**	**7.28**	**7.77**	**0.25**
Permian Coal Measures Overburden:								
RM02	Moist	6.59	6.64	Lost	6.59	6.61	6.64	0.04
RM05	-	6.46	6.46	6.85	6.46	6.59	6.85	0.23
T1-P	-	-	-	7.12	-	-	-	-
T2-P	-	-	-	6.77	-	-	-	-
T3-P	-	-	-	11.97	-	-	-	-
T4-P	-	-	-	7.69	-	-	-	-
WML108B	-	-	6.35	-	-	-	-	-
WML109B	-	-	6.74	-	-	-	-	-
WML110B	-	-	7.41	7.40	7.40	7.40	7.41	0.01
WML111B	-	-	-	7.48	-	-	-	-
WML112B	-	-	8.33	8.89	8.33	8.86	8.89	0.40
WML113B	-	-	-	7.72	-	-	-	-
WML114B	-	-	-	7.34	-	-	-	-
WML115B	-	-	-	10.04	-	-	-	-
Total Coal Measures Overburden:					**6.35**	**7.59**	**11.97**	**1.41**
Pikes Gully Seam:								
WML 20	8.21	7.48	7.72	8.16	7.48	7.89	8.21	0.35
WML 21	8.19	7.89	7.95	8.00	7.89	8.01	8.19	0.13
WML119	-	7.74	5.96	5.29	5.29	6.33	7.74	1.27
WML120A	-	7.11	7.16	7.69	7.11	7.32	7.69	0.32
WML181	-	-	6.16	-	-	-	-	-
WML182	-	-	6.80	6.91	6.80	6.85	6.91	0.08
WML183	-	-	7.04	6.81	6.81	6.93	7.04	0.16
WML184	-	-	-	6.96	-	-	-	-
WML185	-	-	-	6.68	-	-	-	-
WML186	-	-	-	6.76	-	-	-	-
Pikes Gully Seam:					**5.29**	**7.21**	**8.21**	**0.78**
Other Major Coal Seams:								
RSGM1	6.90	6.98	7.21	7.14	6.90	7.06	7.21	0.37

BORE	Nov 2006	Jan-Feb 2007	May-Jun 2007	Aug-Nov 2007	Min	Ave	Max	Standard Deviation
GM1	7.85	7.81	6.97	7.39	6.97	7.51	7.85	0.41
GM3B	Dry	Dry	Dry	Dry	-	-	-	-
Other Major Coal Seams:					**6.90**	**7.28**	**7.85**	**0.37**

The groundwater in the alluvium is near-neutral (pH range 6.63 to 8.61). Likewise the coal measures groundwater is generally near-neutral, with most pH values lying within a similar range. However, samples from WML119 in May-June and August-November 2007 reported pHs slightly below 6.

2.6 Groundwater Mine Inflows

Approximately 0.5 ML/d (6 L/s) is pumped from the open cut mine on average. This comprises rainfall captured by the mine catchment, including rainfall infiltration to the in-pit waste, as well as groundwater inflows. Total groundwater inflows to the open cut are estimated to be only a small proportion of the total, probably less than 25% of the total or 0.13 ML/d (1.5 L/s).

The underground water balance has been closely monitored since the commencement of underground mining. Water balance components are determined by a combination of V-notch weirs, in-line flow-meters, and timing of filling of storage tanks and sumps.

Imports to the underground mine include both groundwater inflows and water imported for operation of the longwall. Exports include water pumped directly into the mine water supply system from a vertical borehole accessing a sump at the low-point at the SW corner of LW1 (LW1 Backroad Sump); and water pumped via pipelines along the underground roadways to a storage dam in Arties Pit beside the mine portal.

Net groundwater inflows to the underground mine have been determined from the mine water balance to have ranged up to approximately 6.0 L/s (at end September 2007), but to have averaged 4.6 L/s (0.4 ML/d) over the 2006-2007 review period. The average total inflow rate predicted in the EIS for this stage of underground mining was 0.45 ML/d (5.2 L/s). Inflows have therefore been at or below the EIS predictions (**Figure 18**).

Most water inflow has occurred from seepage into the development headings, with only moderate additional inflows occurring during subsequent longwall extraction. The largest visible seepage inflows were observed to occur along the eastern rib of LW1 tailgate A (TG1A), the closest roadway to Glennies Creek. Smaller inflows have occurred from rib and roof seepages in other roadways. The northern portions of LW1 and LW2 have been dry, as they are above the water table. Seepage has continued to occur in the NW mains, and may partly comprise water recirculating from the adjacent Arties Pit storage dam.

The seepage inflows to the eastern rib of TG1A have been closely monitored, initially by means of small localised V-notch weirs at intervals along the roadway, and subsequently by a larger V-notch weir located at the discharge from a pipeline at the LW1 backroad, once physical access to TG1A was lost as a result of mining. The LW1 Backroad Pipeline now collects all seepage into TG1A. This is achieved by the seepage being retained within the TG1A roadway by cut-off walls across all cut-throughs to prevent flow across into the LW1 goaf, and the seepage water then flows down to the southern end of TG1A, from where it flows via a pipeline to the LW1 Backroad (**Figure 1**).

The total seepage inflows from the Glennies Creek alluvium have ranged from 1.5 to 2.2 L/s, with an average inflow rate for the 2006-2007 year of less than 1.8 L/s. The average seepage rate into the underground mine predicted in the EIS for this stage of mining was 2.0 L/s. Hence seepage inflows from Glennies Creek alluvium have been at or below the rates predicted in the EIS (**Figure 18**).

No increase in seepage rates to TG1A were observed to occur during or after longwall extraction from LW1, indicating that there has not been any change in permeability of the barrier between Glennies Creek alluvium and LW1. The potential for such an increase in permeability within this barrier as a result of subsidence-induced horizontal movement was recognised during the studies in support of the LW1-4 SMP application, but was considered to have a low likelihood of occurrence. The absence of a noticeable increase in seepage inflows, together with stable groundwater levels in monitoring bores, and surveys showing no significant lateral movement, all indicate that no change in permeability has occurred in the barrier.

Based on the separate inflow rates to the open cut and underground mines described above, the total groundwater inflow to the mining operation in the reporting period was 0.58 ML/d (6.7 L/s). This represents an annual total of 212 ML, compared with the licensed capacity of 110 ML under Part V licences 20BL169508, 20BL169937 and 20BL171364. The application for Licence 20BL169937 in 2006 was for 700ML which was based on the groundwater inflows predicted in the EIS[1]. However the Department of Natural Resources issued a licence for only 100ML, as they considered that the 700ML was high and ongoing monitoring and further review of inflows were to be made, at which time application for an increase in licence volume by Ashton Coal could be made. Based on the current review of groundwater inflows, Ashton Coal will be applying for an increase in the Part V licence volume.

3 GROUNDWATER MODEL REVIEW

In accordance with Consent Condition 4.14, the performance of the groundwater system in response to mining operations was compared with impacts predicted in the EIS, based on the groundwater modelling undertaken in the EIS studies (HLA, 2001). The actual impacts were also compared with impacts predicted in the groundwater report accompanying the LW1-4 SMP Application (Dundon and Associates, 2006). A report on this comparison was issued in December 2007 (Dundon and Associates, 2007).

The groundwater model used for the EIS studies is currently being modified to allow better definition of subsidence related impacts of underground mining. The modifications include re-definition of model layers, including assignment of separate

[1] The maximum groundwater inflow predicted in the EIS was 1.9 ML/d (693 ML/a) in Years 7 to 9 – see page 17 and Figure 11 of Appendix H of the EIS (HLA, 2001). The EIS predicted total inflow rate for Mine Year 4 (equivalent to the current reporting period) was 0.62 ML/d (225 ML/a), which is slightly in excess of the actual inflow rate.

model layers for the main coal seams and the interburden (previously each seam and its overburden were treated as a single layer), and the subdivision of the Pikes Gully seam overburden into several layers (previously the Pikes Gully seam and its overburden constituted a single layer).

A comparison of the layer setup for the EIS model and the re-structured model is shown in **Table 3.1**.

Table 3.1: Groundwater Model Layer Structure

Geology (coal seams shown in bold type)	EIS (HLA, 2001)		Revised Model (Dundon and Associates, 2008)	
	Layer		Layer	
Alluvium	1	includes Ravensworth spoil	1	includes weathered coal measures
Upper Permian (**Lemington** and **Bayswater** seams and interburden)	2		2	
			3	
			4	
			5	
Overburden (Lem – PG)	3		6	
Pikes Gully			7	
Interburden PG – UL)	4		8	
Upper Liddell			9	
Interburden (UL – ULL)	5		10	
Upper Lower Liddell			11	
Interburden (ULL – LB)	6		12	
Lower Barrett			13	
Basal sandstone and siltstone (lower Foybrook Formation)	7		14	

Comparison of actual impacts with EIS and SMP predictions showed the following (Dundon and Associates, 2007):

- Total groundwater inflows to the underground have been at or below inflow rates predicted in the EIS (see **Section 2.6** above).
- Seepage inflows to the underground mine from Glennies Creek alluvium have been at or below the EIS predictions (see **Section 2.6** above).
- Groundwater levels in the Glennies Creek alluvium have declined by less than the magnitude predicted in the EIS (total drawdown of 0.5m at WML120B, compared with a drawdown of 1.3m predicted in the vicinity of that bore in the EIS).
- Rainfall recharge was not observed to increase significantly through open surface subsidence cracks above LW1 during the intense June 2007 rainfall event.

The comparison of actual impacts with the EIS and SMP predictions has been addressed in greater detail in Dundon (2007).

Re-calibration of the re-structured model will be completed during Q1 2008.
The groundwater model will be calibrated both against the pre-underground mining groundwater conditions (steady-state calibration) and against the impacts of mining of LW1 and LW2 to date (transient calibration). The model will then be used for prediction of potential impacts for various mining options post LW4, and will periodically be used to check ongoing performance of the groundwater system against EIS and SMP predictions, in accordance with Consent Condition 4.14.

4 REFERENCES

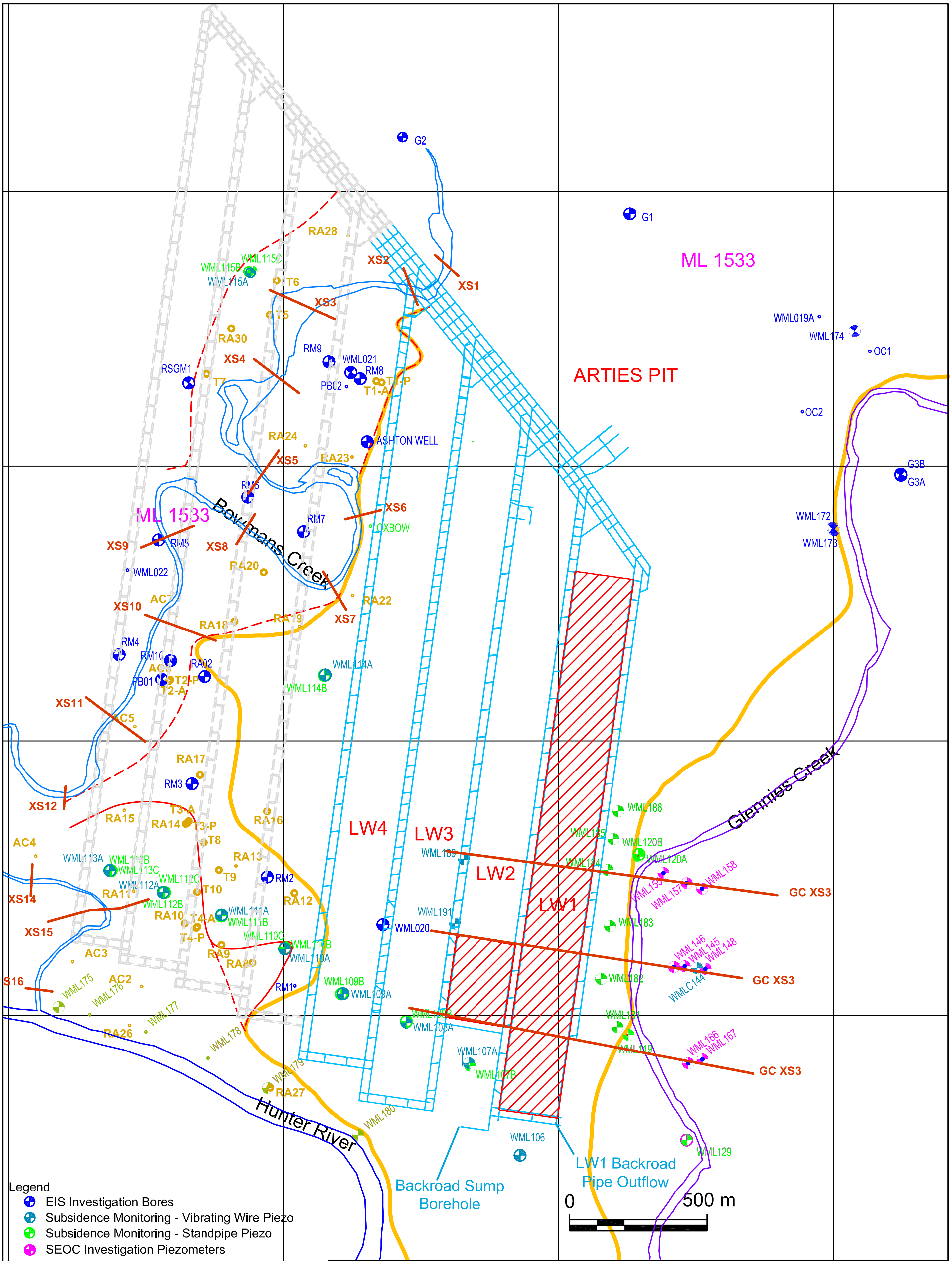
HLA-Envirosciences, 2001. *Environmental Impact Statement, Ashton Coal Project:* Appendix H – Groundwater Hydrology and Impact Report.

Peter Dundon and Associates Pty Ltd, 2006. *Ashton Coal Mine Longwall Panels 1-4, Subsidence Management Plan – Groundwater Assessment.*

Peter Dundon and Associates Pty Ltd, 2007. *Ashton Coal Mine Groundwater Impacts of Longwall 1, Comparison with EIS and SMP Predictions.*

Peter Dundon and Associates Pty Ltd, 2008. *Ashton Coal Mine Groundwater Model Review – Calibration and Predictive Modelling* (in preparation).

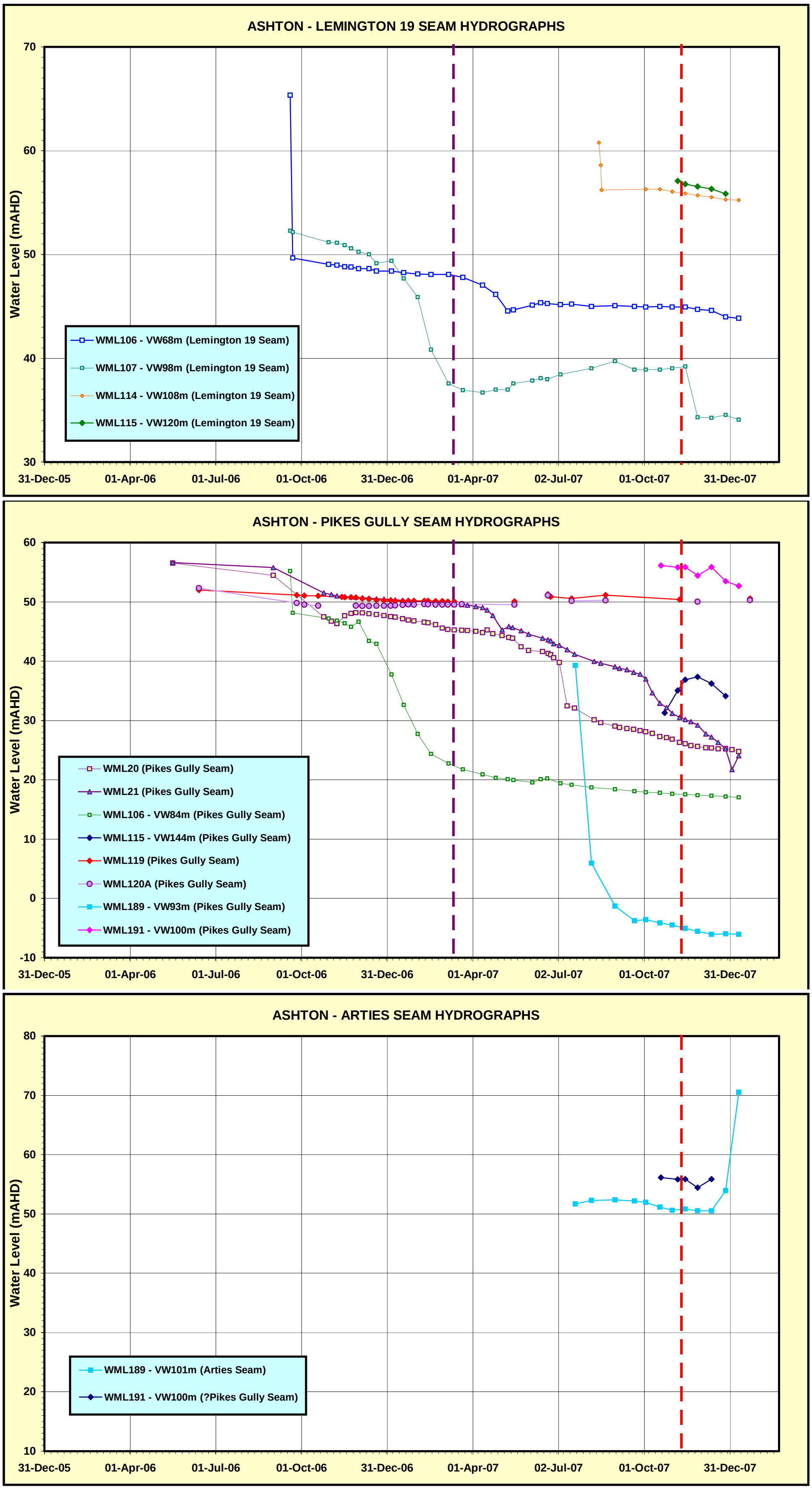
Strata Control Technology (SCT), 2006. *Subsidence Assessment for Ashton Coal Mine Longwalls 1-4.*



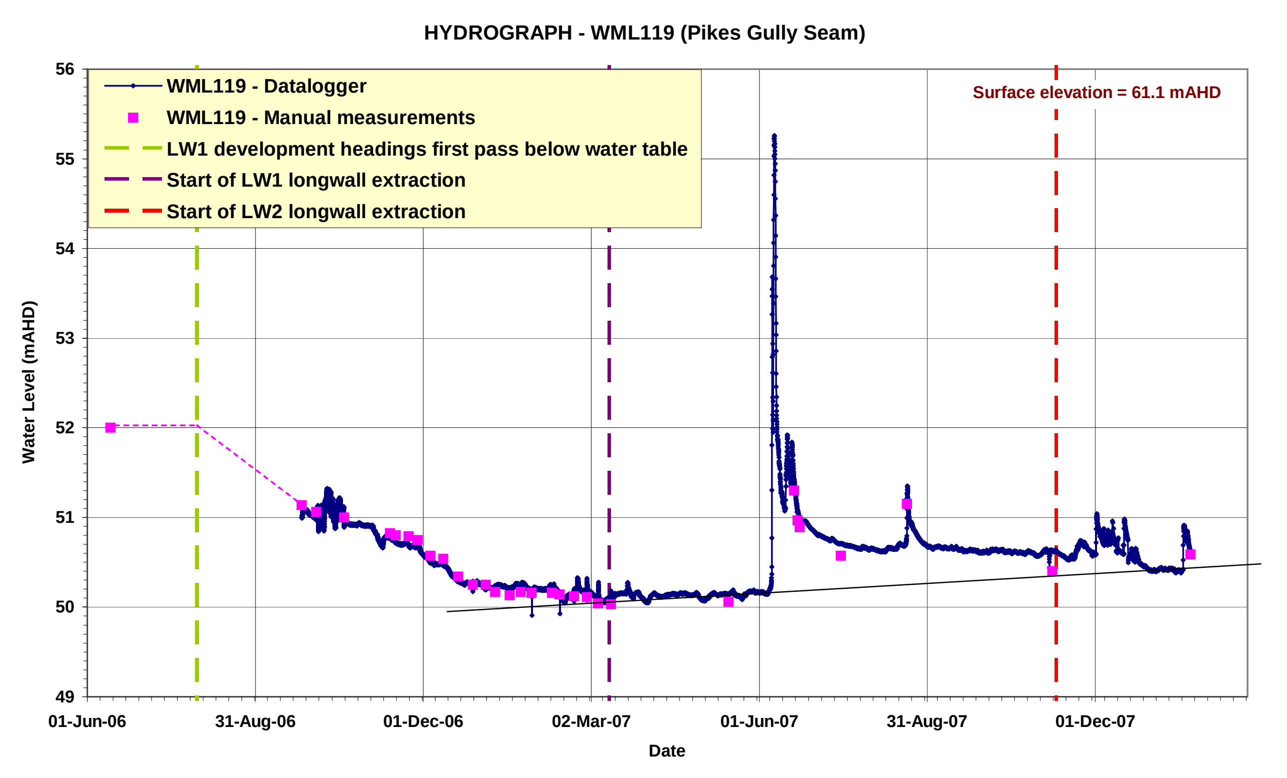
Legend

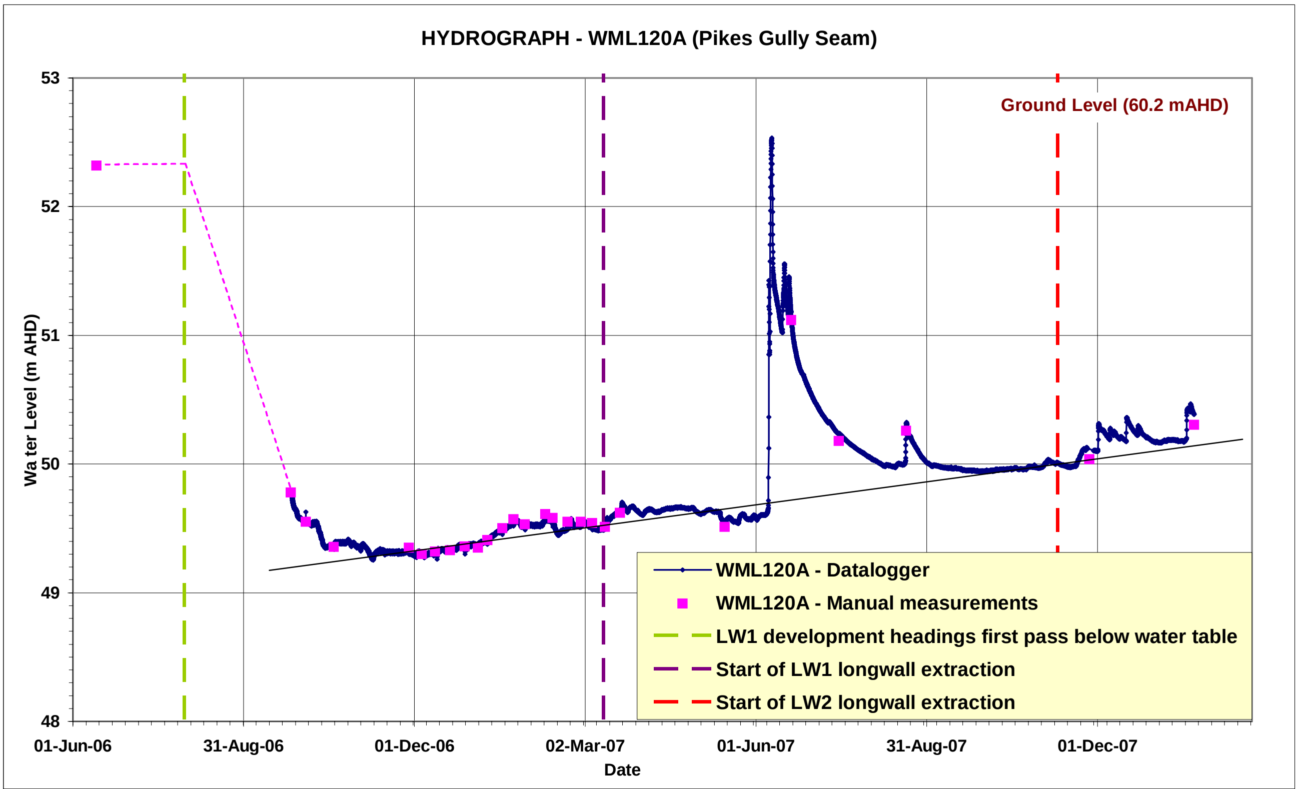
- EIS Investigation Bores
- Subsidence Monitoring - Vibrating Wire Piezo
- Subsidence Monitoring - Standpipe Piezo
- SEOC Investigation Piezometers
- Bowmans Creek Alluvium Investigation Bores
- Hunter River Alluvium Piezometer
- LW1 - Glennies Ck Barrier Piezometers
- Abandoned / Lost Bore
- Extent of Alluvium
- Possible Locations of Edge of Saturated Alluvium

Date: 30 January 2008	Scale: as shown	**Ashton Coal Operations Ltd**	
Initials: PJD	Job No: 05-0166	**GROUNDWATER MONITORING LOCATIONS**	
Drawing No: 05-0166-130d	Revision: D		
Peter Dundon and Associates Pty Limited			**Figure 1**

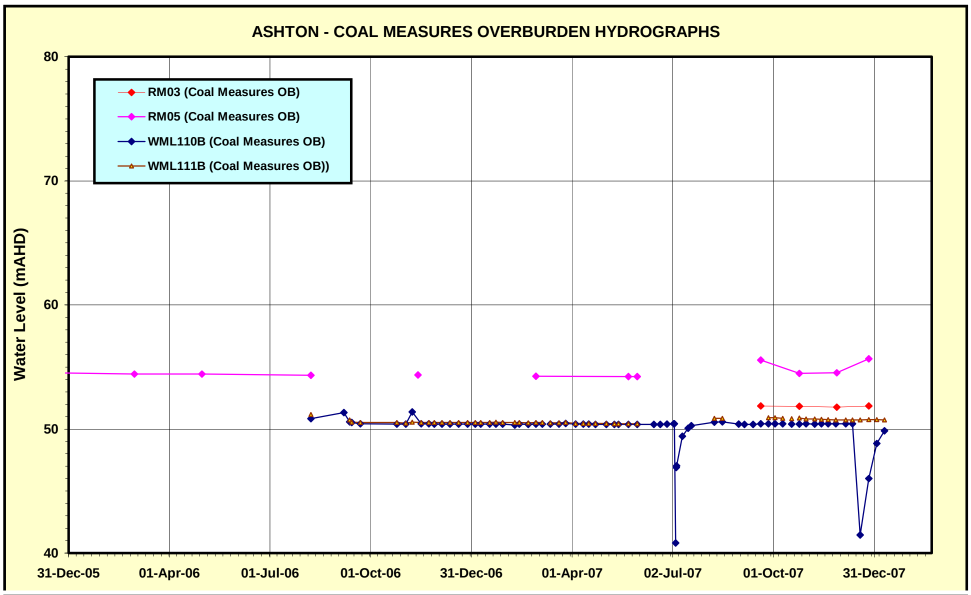


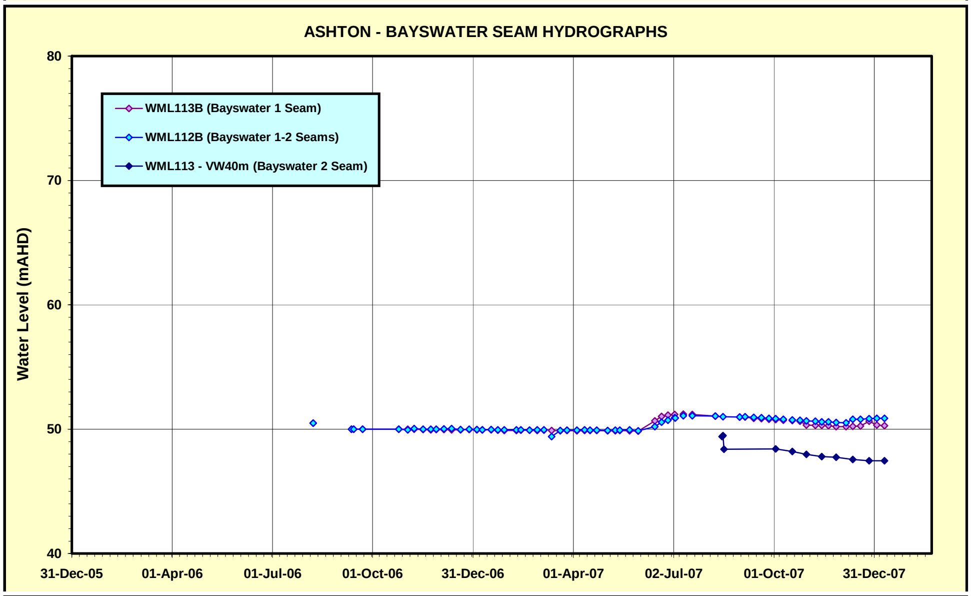
Date: 21 January 2008	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**GROUNDWATER LEVEL HYDROGRAPHS**
Drawing No: 05-0166-144	Rev: 0	**Lemington 19 Seam** **Pikes Gully Seam** **Arties Seam**
Peter Dundon and Associates Pty Limited		**Figure 2**

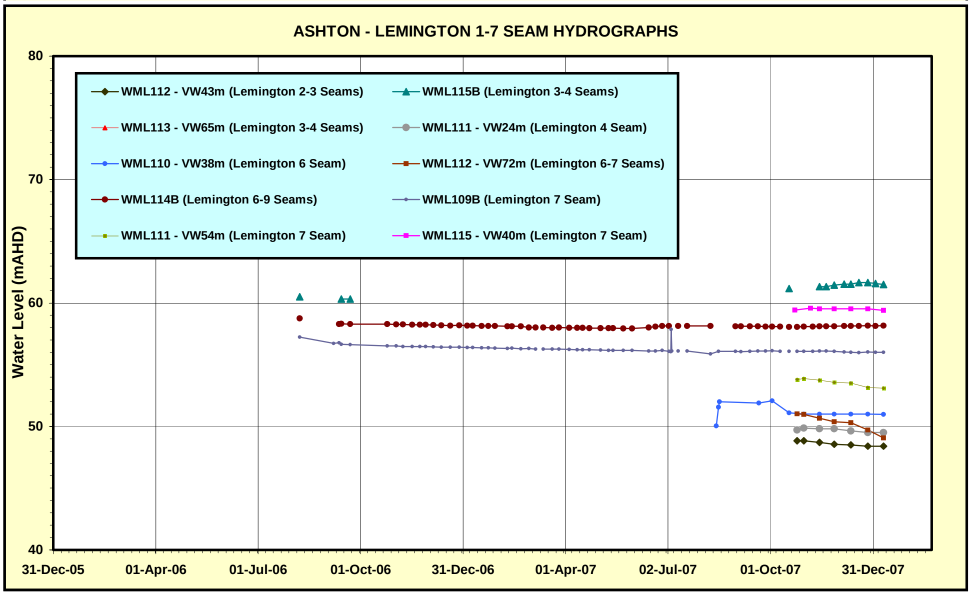




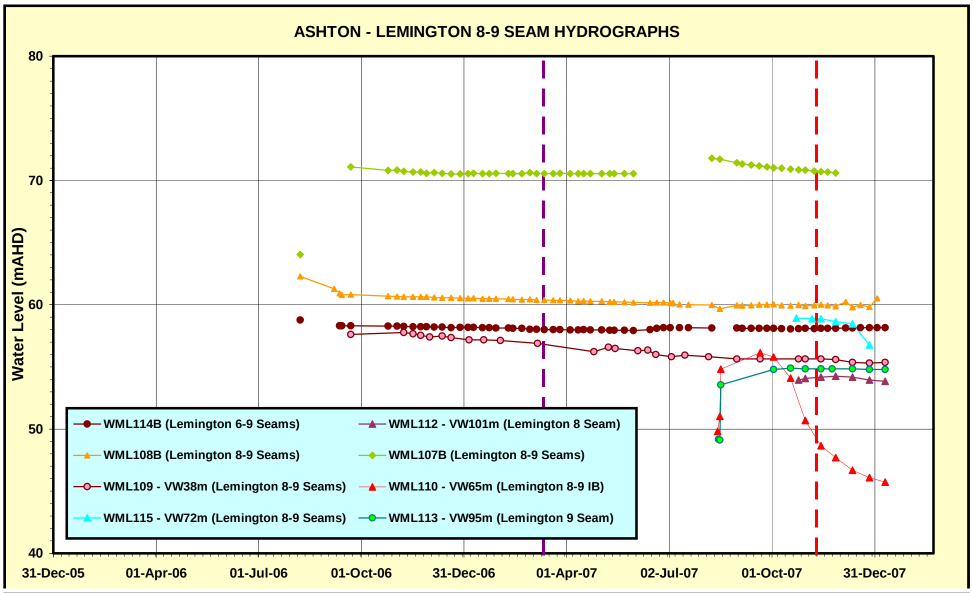
Date: 21 January 2008	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**GROUNDWATER LEVEL HYDROGRAPHS** **Datalogger WML119** **Datalogger WML120A**
Drawing No: 05-0166-151	Rev: 0	
Peter Dundon and Associates Pty Limited		**Figure 3**

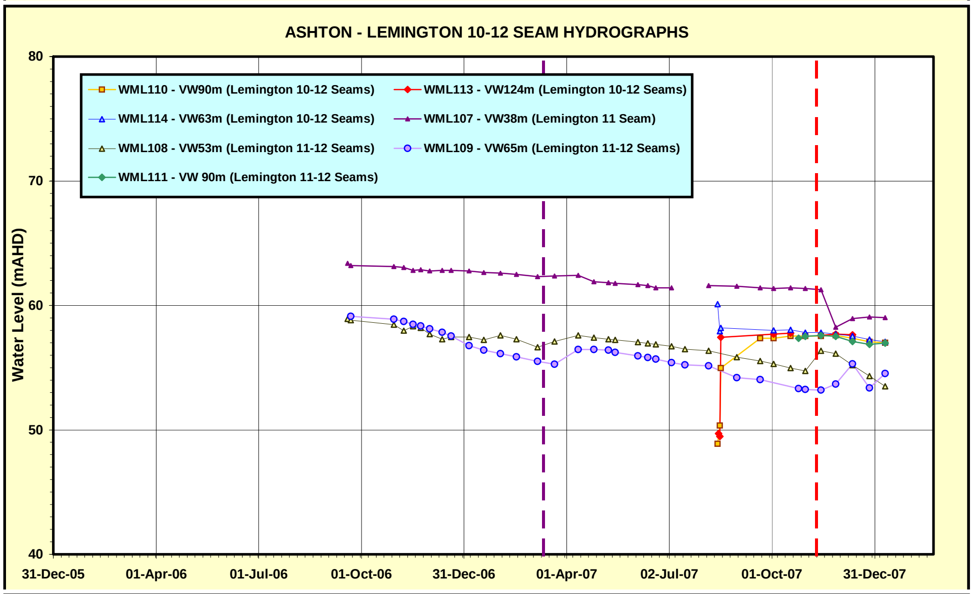


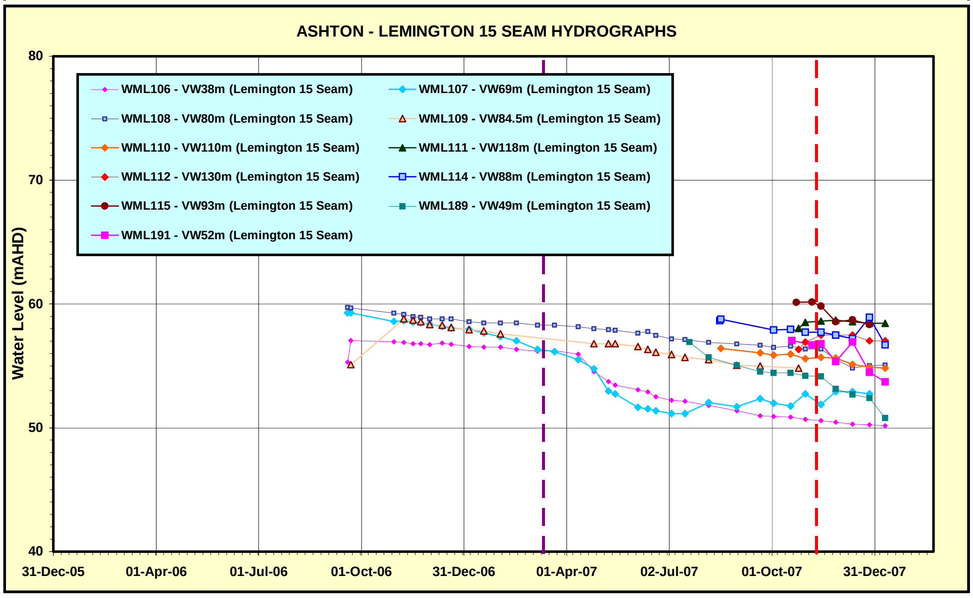




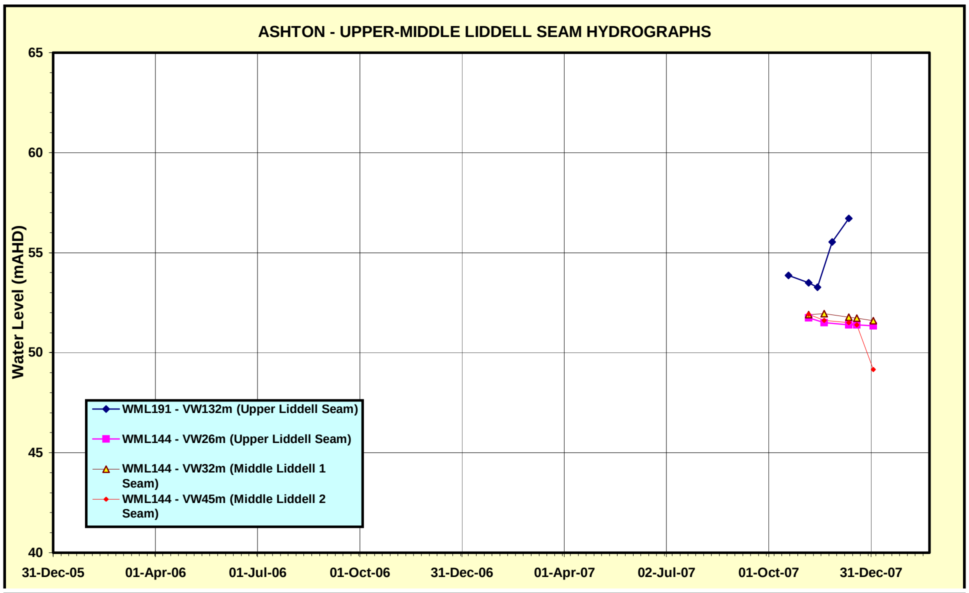
Date: 21 January 2008	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**GROUNDWATER LEVEL HYDROGRAPHS**
Drawing No: 05-0166-142	Rev: 0	**Coal Measures OB** **Bayswater Seam**
Peter Dundon and Associates Pty Limited		**Lemington 1-7 Seams** — **Figure 4**

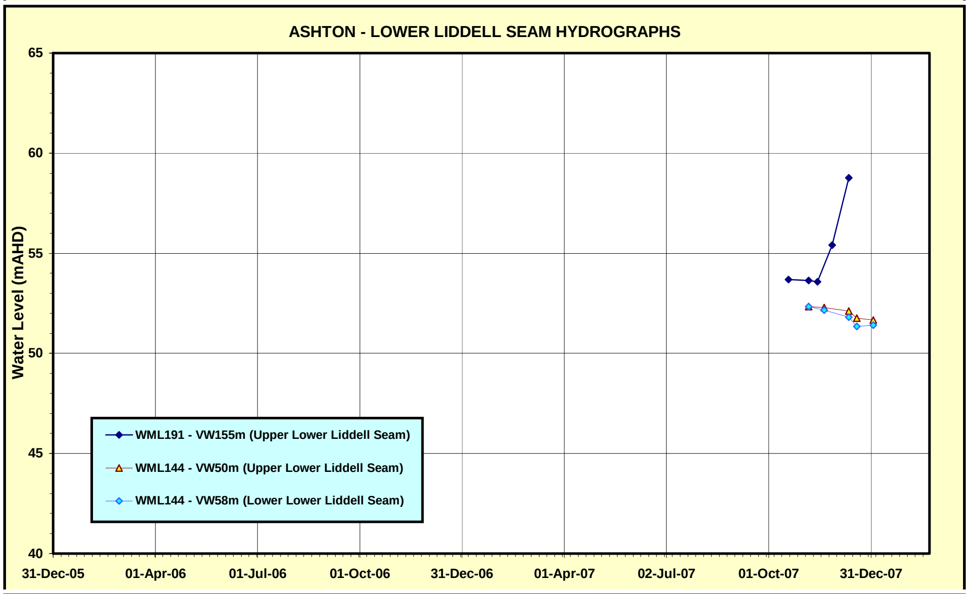


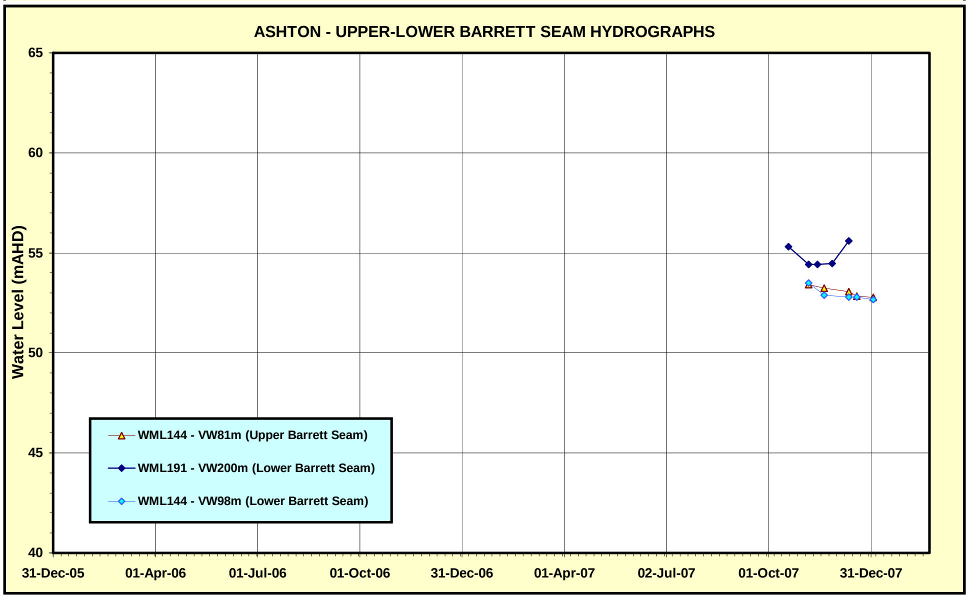




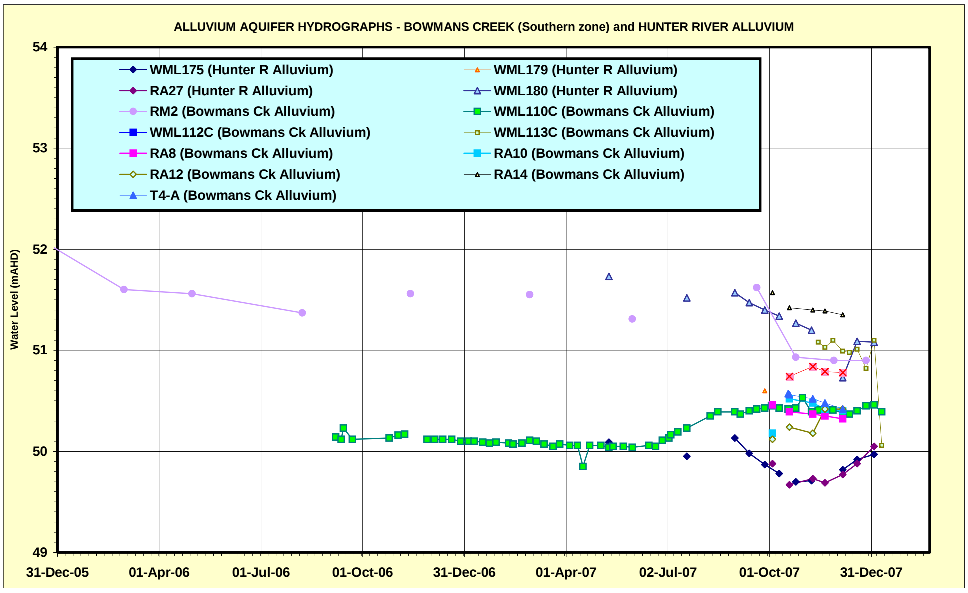
Date: 21 January 2008	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**GROUNDWATER LEVEL HYDROGRAPHS**
Drawing No: 05-0166-143	Rev: 0	**Lemington 8-9 Seams Lemington 10-12 Seams Lemington 15 Seams**
Peter Dundon and Associates Pty Limited		**Figure 5**

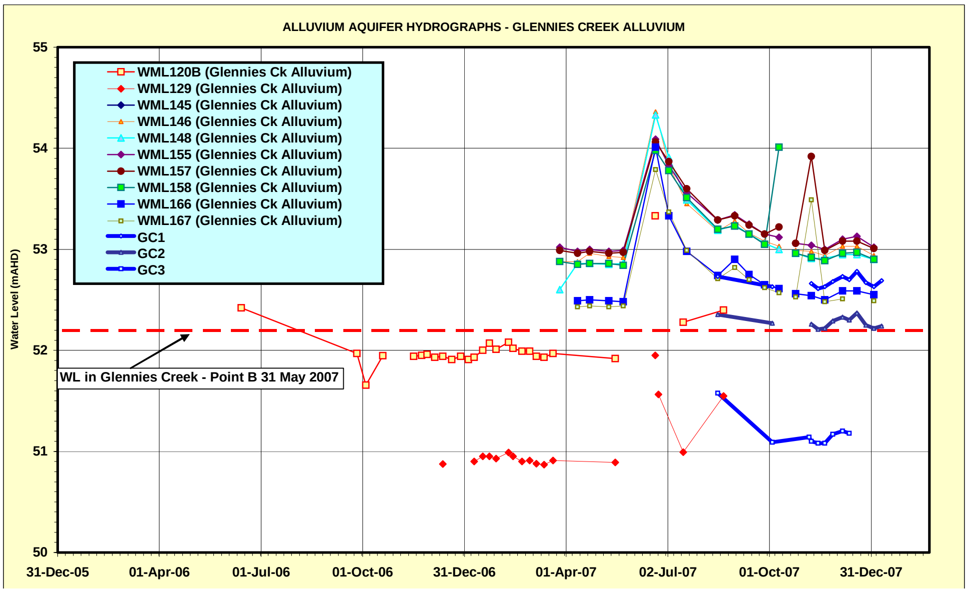


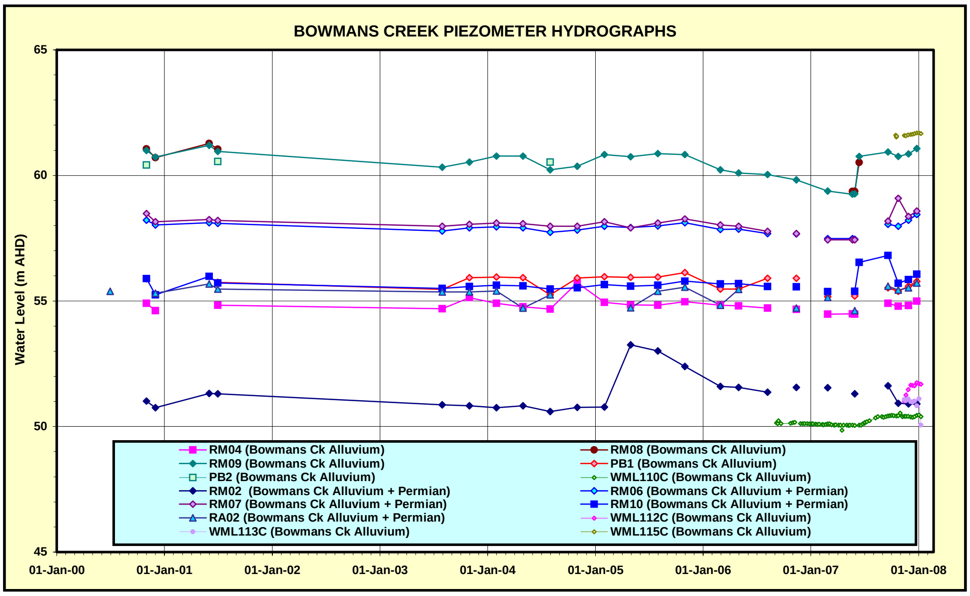




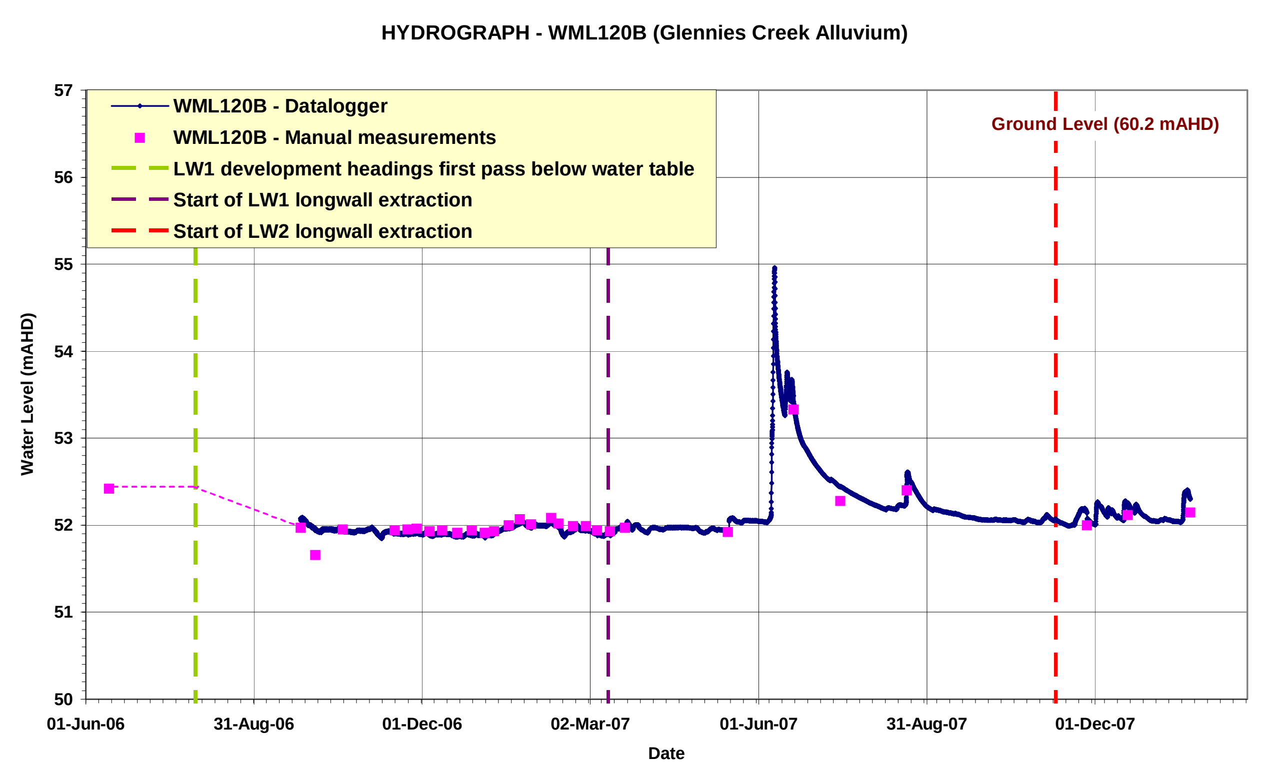
Date: 21 January 2008	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**GROUNDWATER LEVEL HYDROGRAPHS**
Drawing No: 05-0166-145	Rev: 0	**Upper-Middle Liddell Seams** **Lower Liddell Seams**
Peter Dundon and Associates Pty Limited		**Barrett Seams** — **Figure 6**

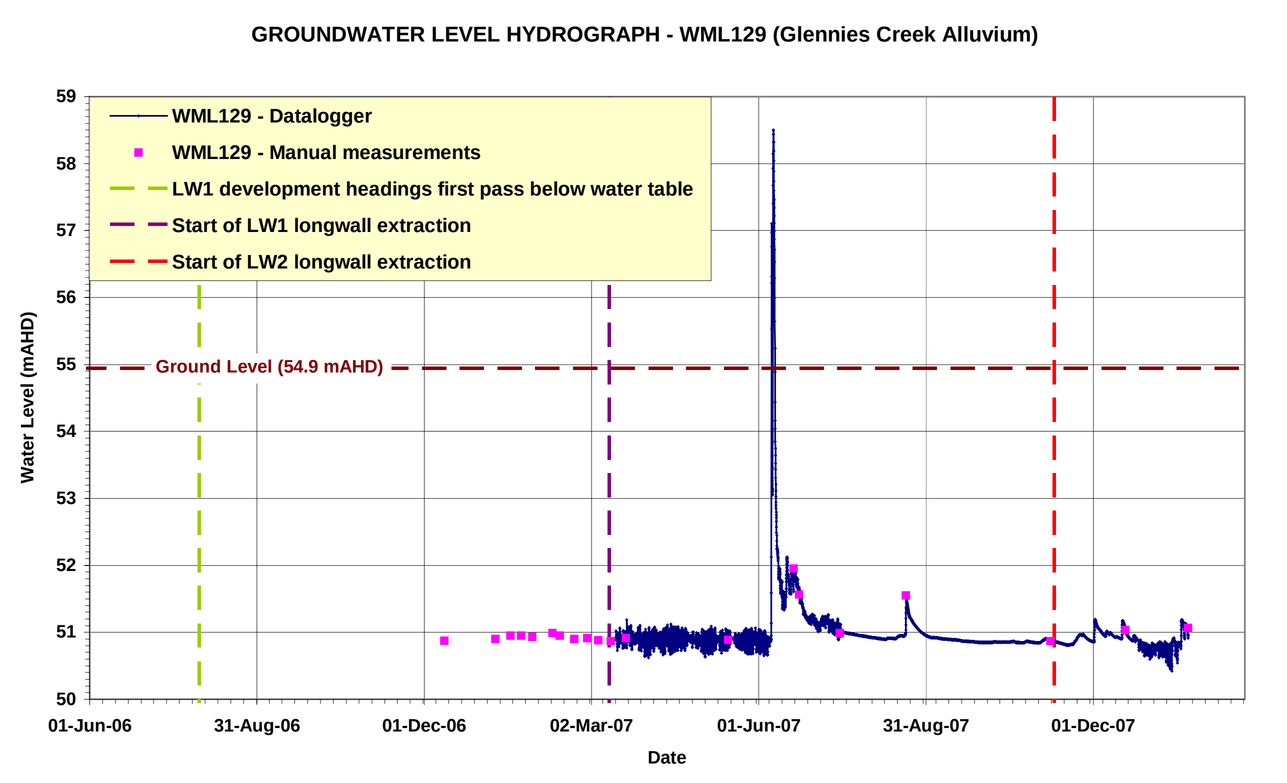




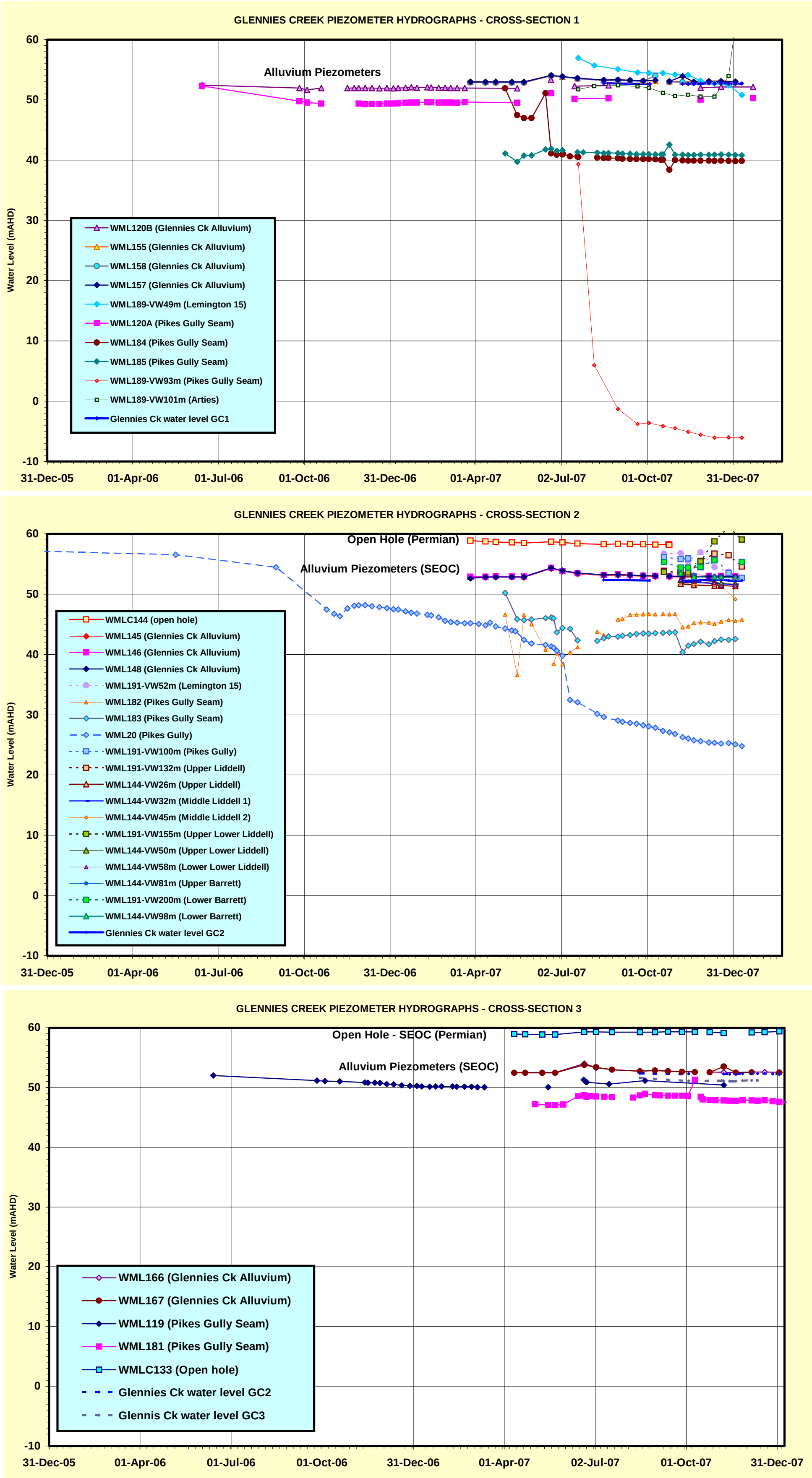


Date: 21 January 2008	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**GROUNDWATER LEVEL HYDROGRAPHS**
Drawing No: 05-0166-146	Rev: 0	**Hunter River Alluvium** **Glennies Creek Alluvium** **Bowmans Creek Alluvium**
Peter Dundon and Associates Pty Limited		**Figure 7**

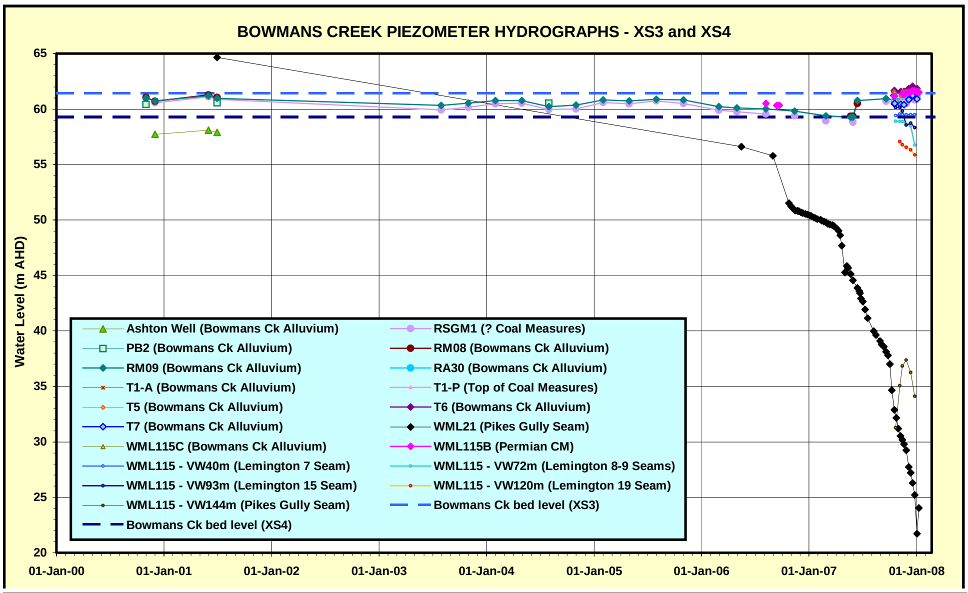


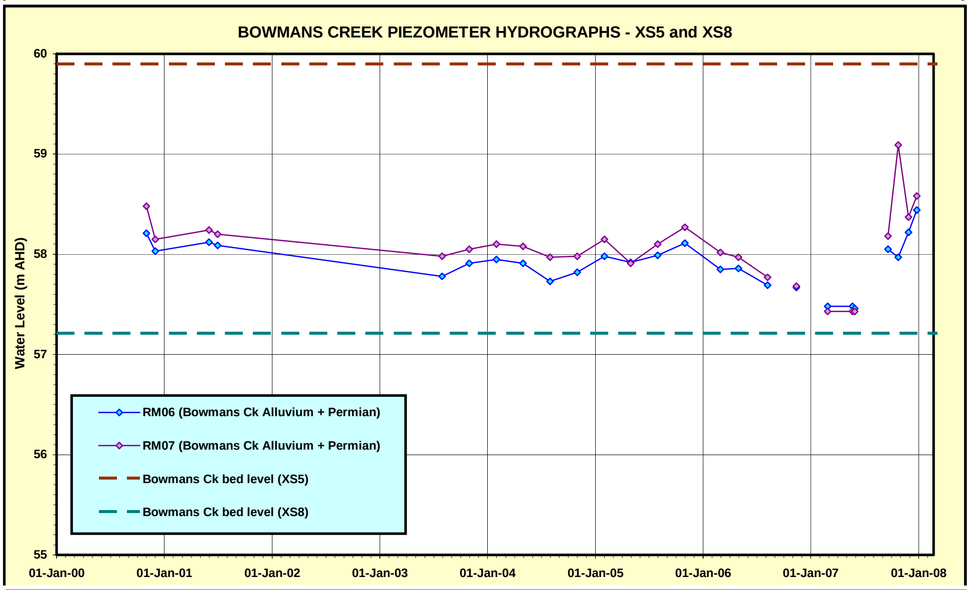


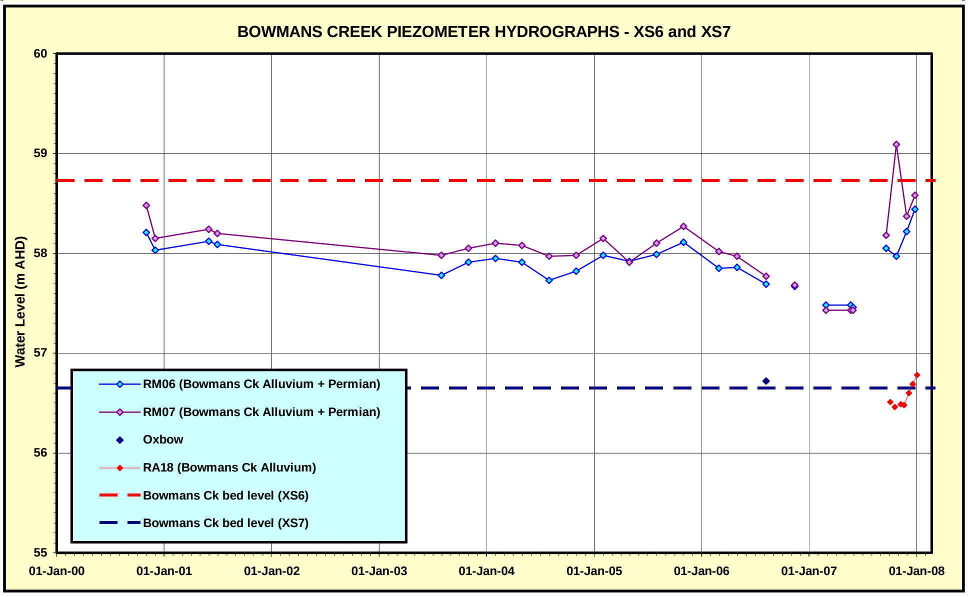
Date: 21 January 2008	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**GROUNDWATER LEVEL HYDROGRAPHS** **Datalogger WML120B** **Datalogger WML129**
Drawing No: 05-0166-152	Rev: 0	
Peter Dundon and Associates Pty Limited		**Figure 8**



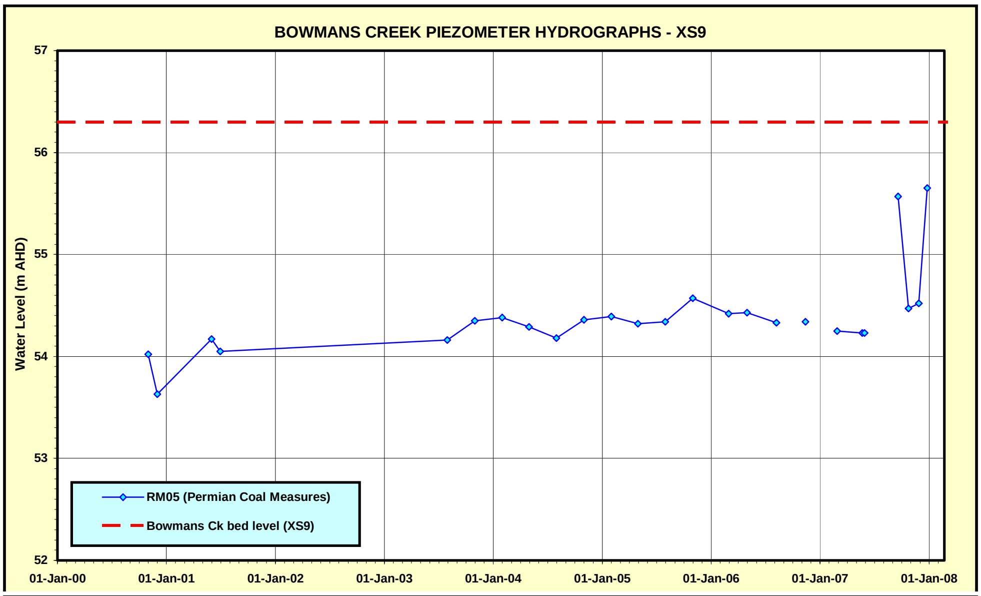
Date: 21 January 2008	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**GROUNDWATER LEVEL HYDROGRAPHS**
Drawing No: 05-0166-147	Rev: 0	**Glennies Creek Cross Sections 1-3**
Peter Dundon and Associates Pty Limited		**Figure 9**

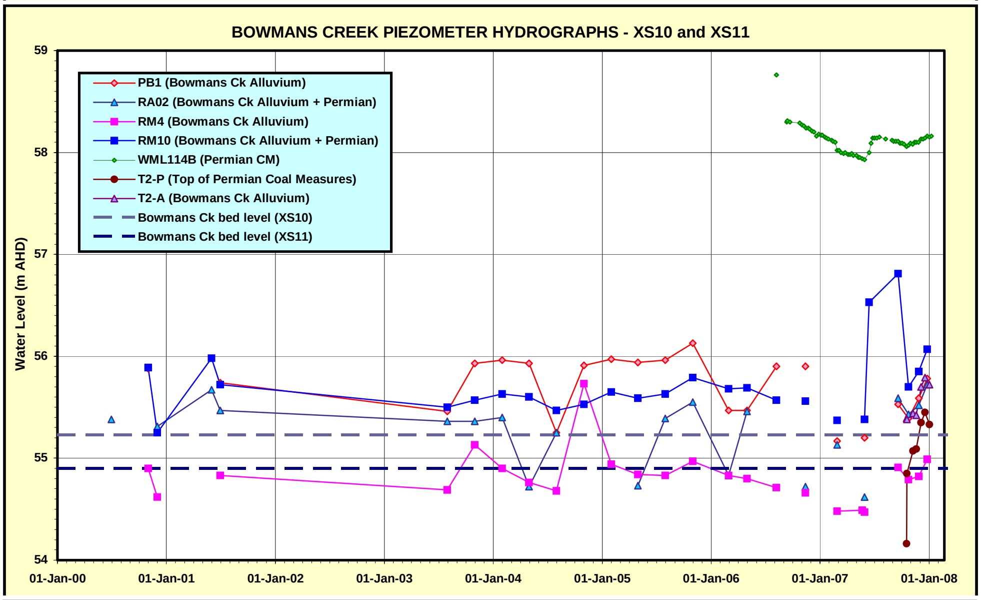


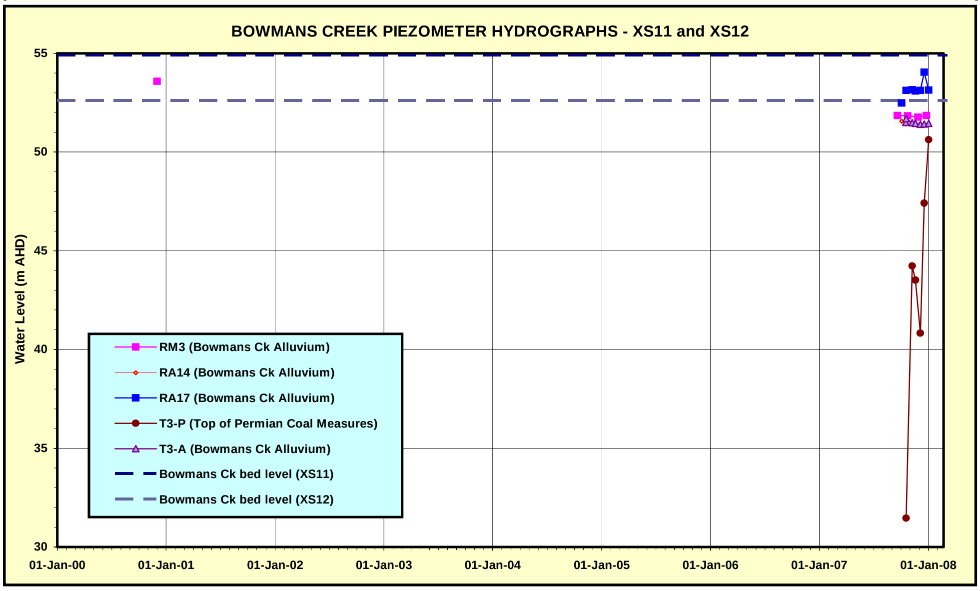




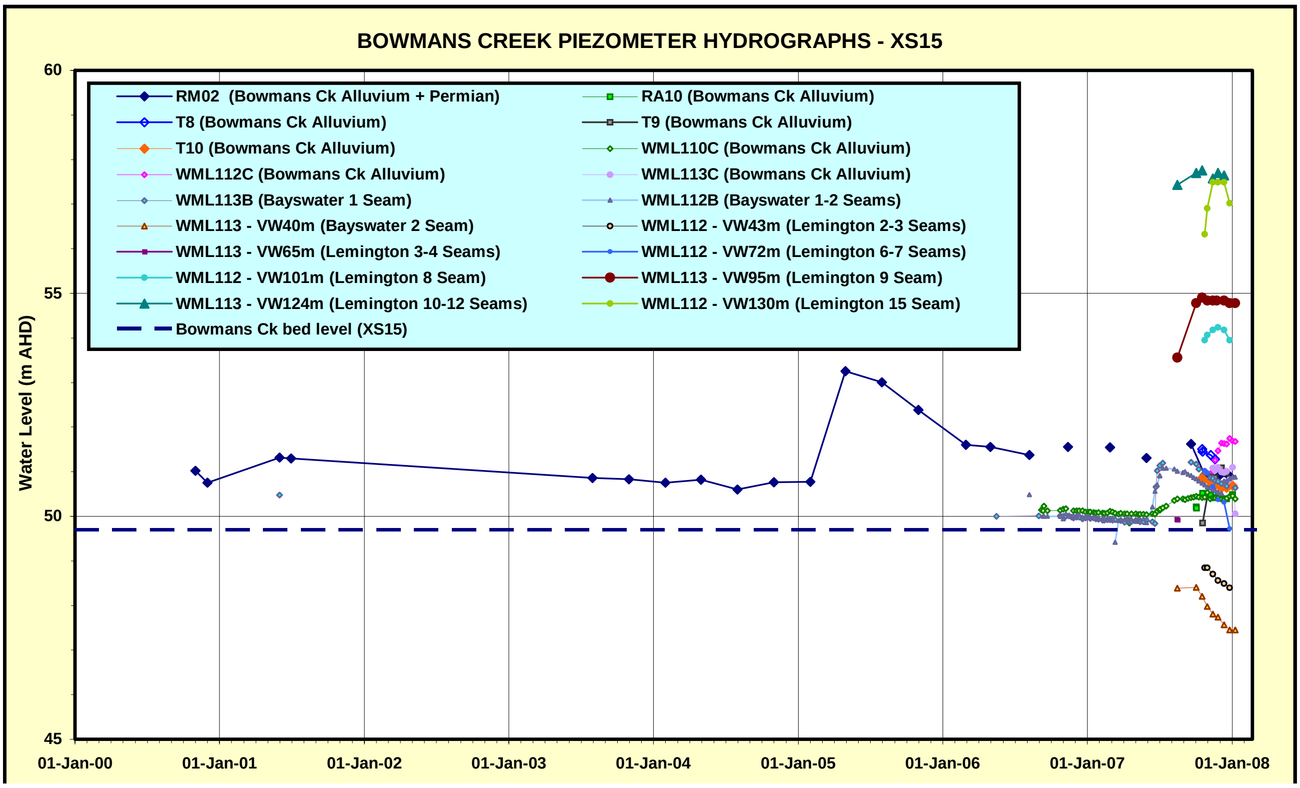
Date: 21 January 2008	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**GROUNDWATER LEVEL HYDROGRAPHS**
Drawing No: 05-0166-148	Rev: 0	**Bowmans Creek XS3-4** **Bowmans Creek XS5-8** **Bowmans Creek XS6-7**
Peter Dundon and Associates Pty Limited		**Figure 10**

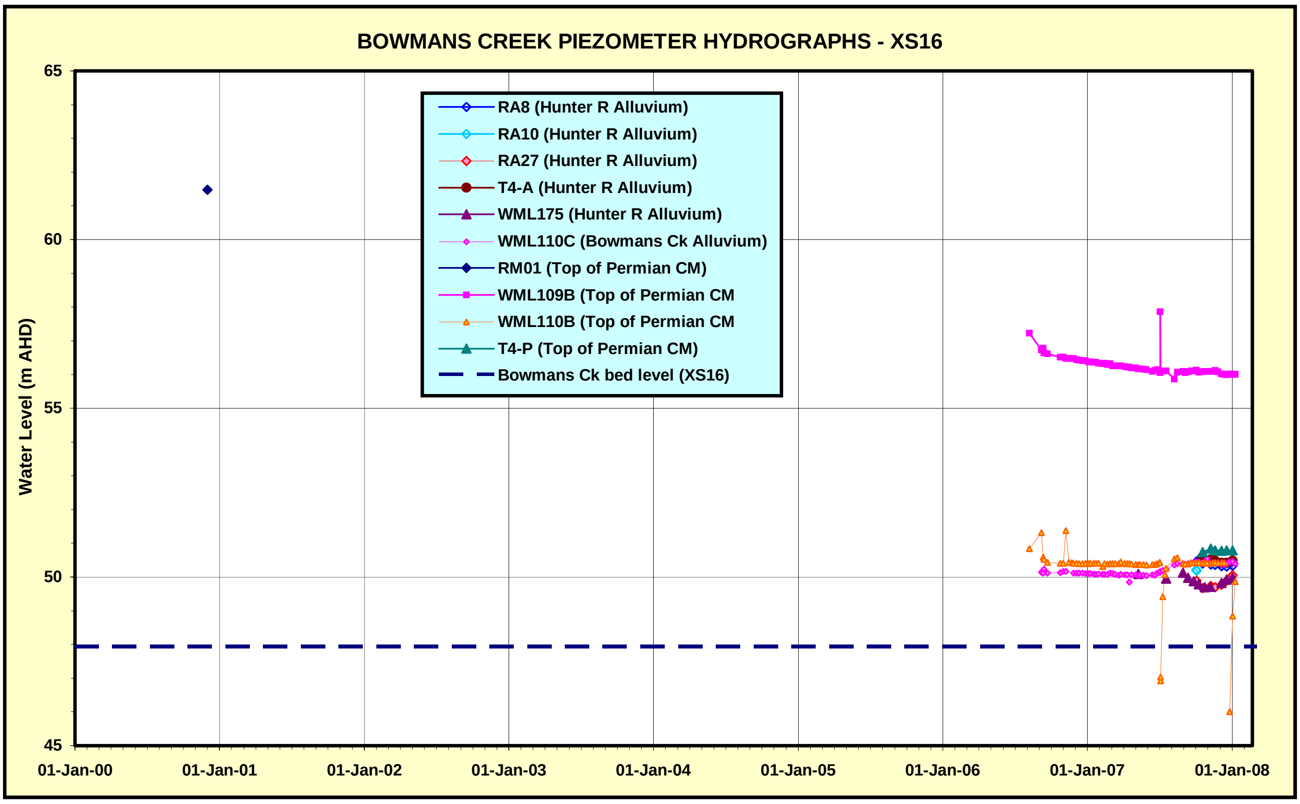




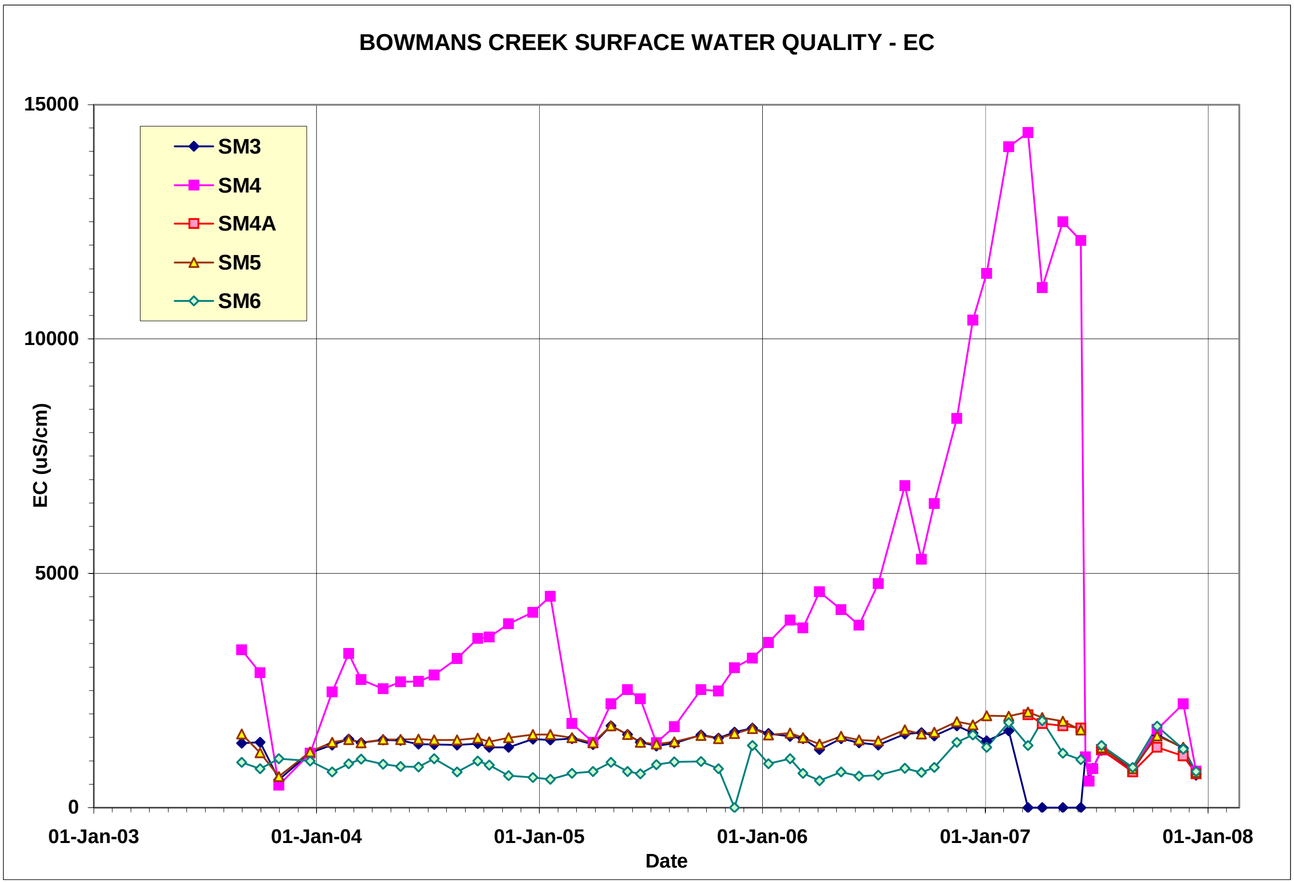


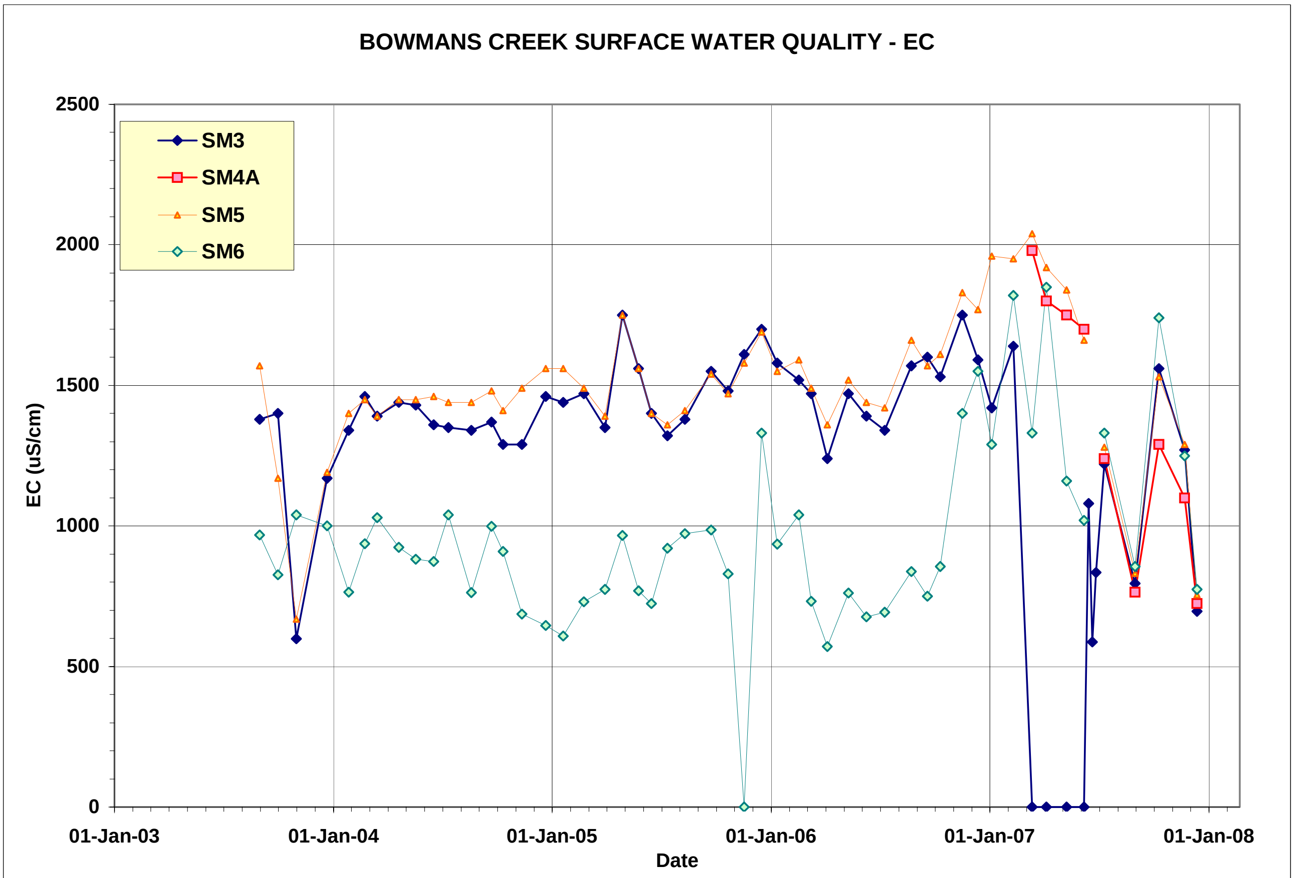
Date: 21 January 2008	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**GROUNDWATER LEVEL HYDROGRAPHS**
Drawing No: 05-0166-149	Rev: 0	**Bowmans Creek XS9** **Bowmans Creek XS10-11** **Bowmans Creek XS11-12**
Peter Dundon and Associates Pty Limited		**Figure 11**



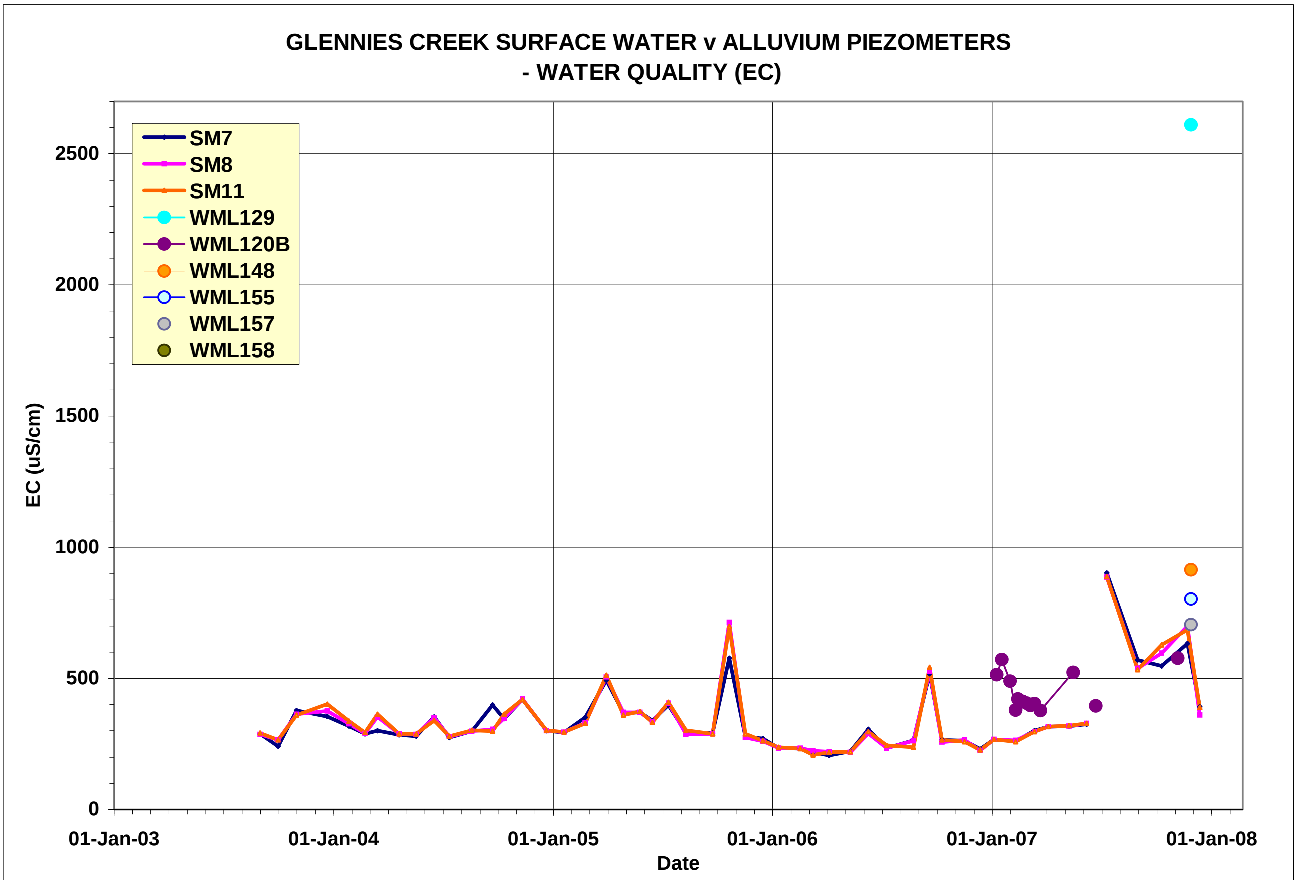


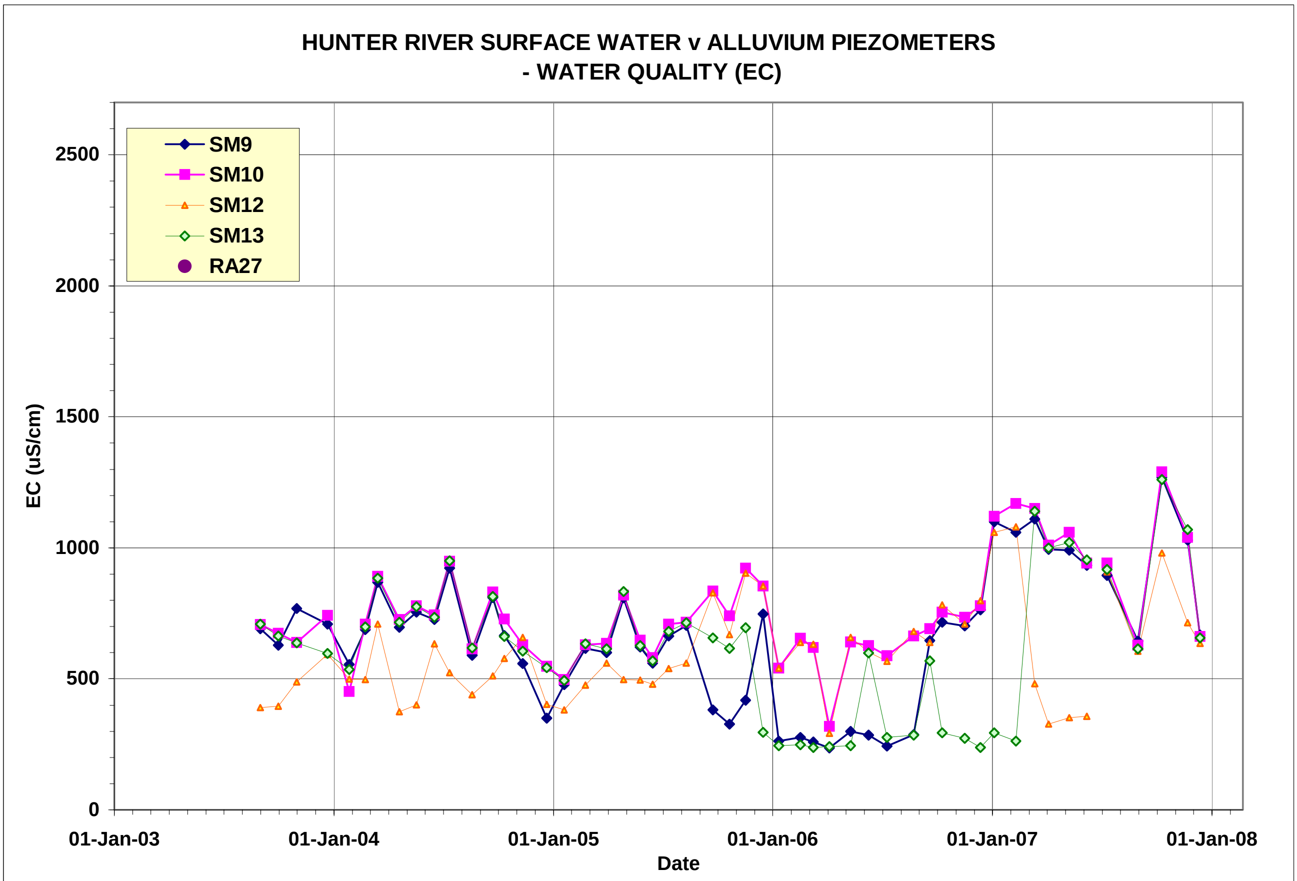
Date: 21 January 2008	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**GROUNDWATER LEVEL HYDROGRAPHS**
Drawing No: 05-0166-150	Rev: 0	**Bowmans Creek XS15** **Bowmans Creek XS16**
Peter Dundon and Associates Pty Limited		**Figure 12**





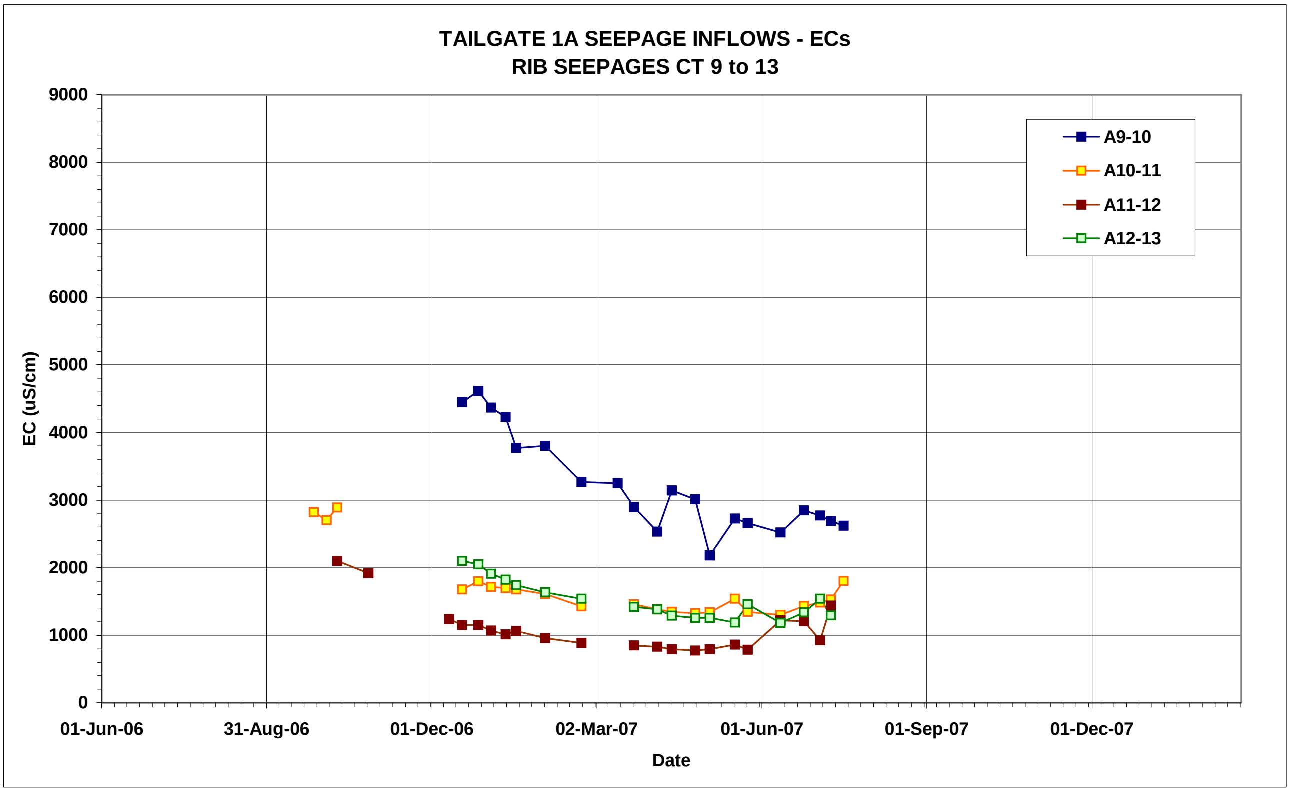
Date: 21 January 2008	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**SURFACE WATER QUALITY** **Bowmans Creek - EC**
Drawing No: 05-0166-153	Rev: 0	
Peter Dundon and Associates Pty Limited		**Figure 13**

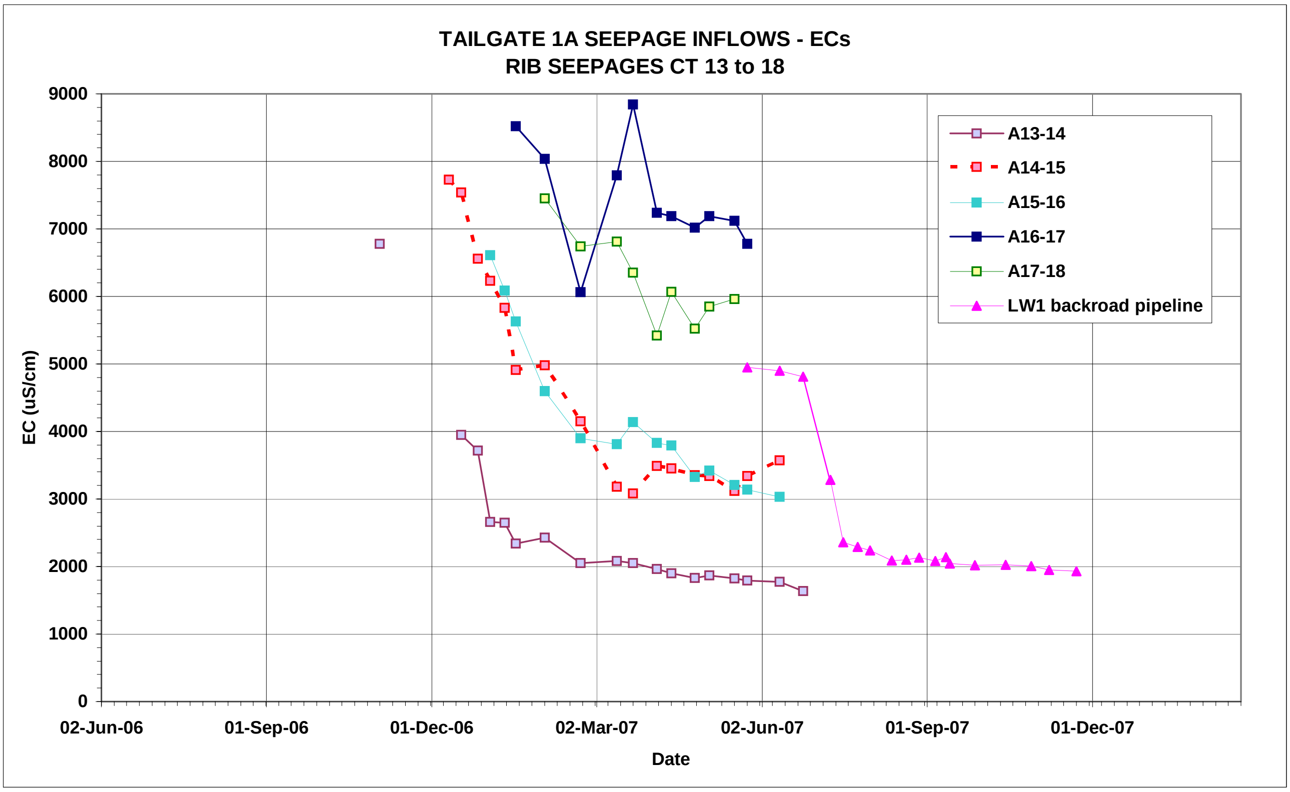




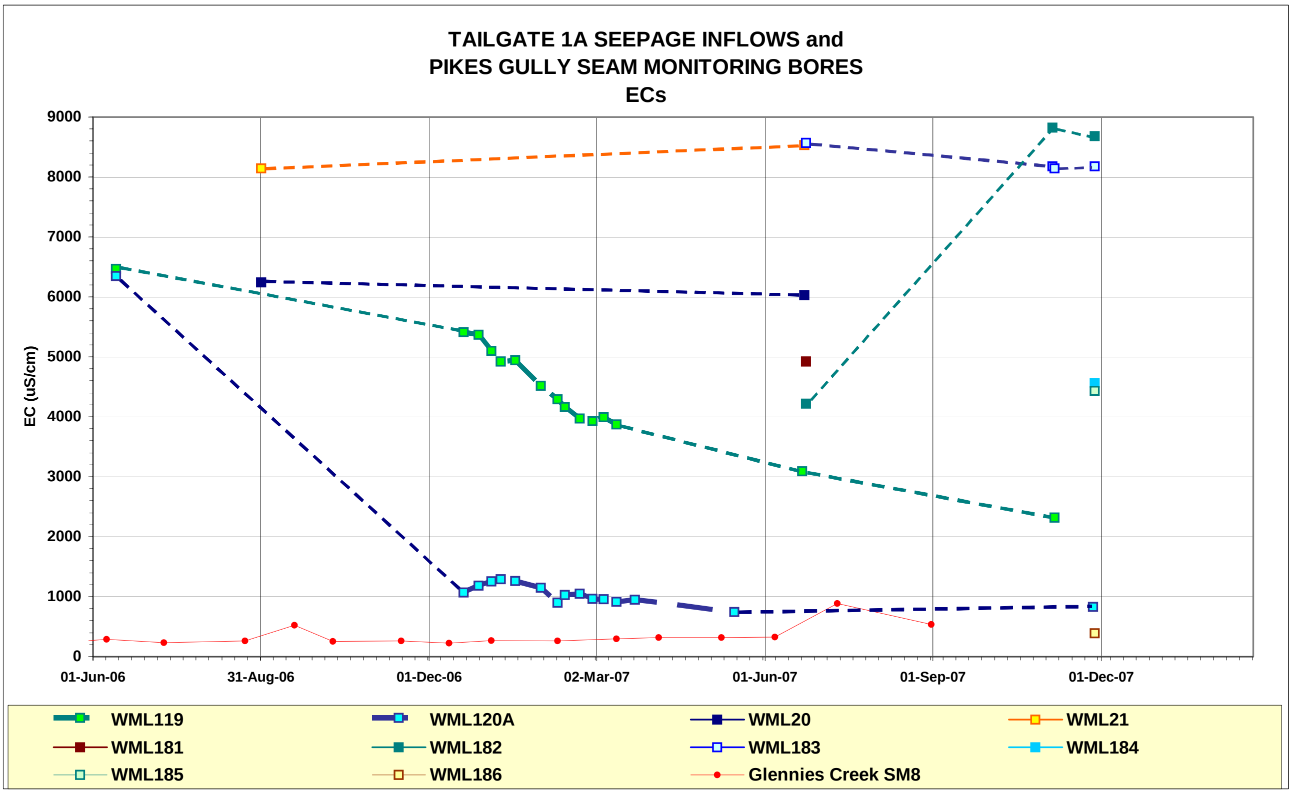
Date: 21 January 2008	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**SURFACE WATER vs GROUNDWATER QUALITY**
Drawing No: 05-0166-154	Rev: 0	**Glennies Creek - EC**
Peter Dundon and Associates Pty Limited		**Hunter River - EC**

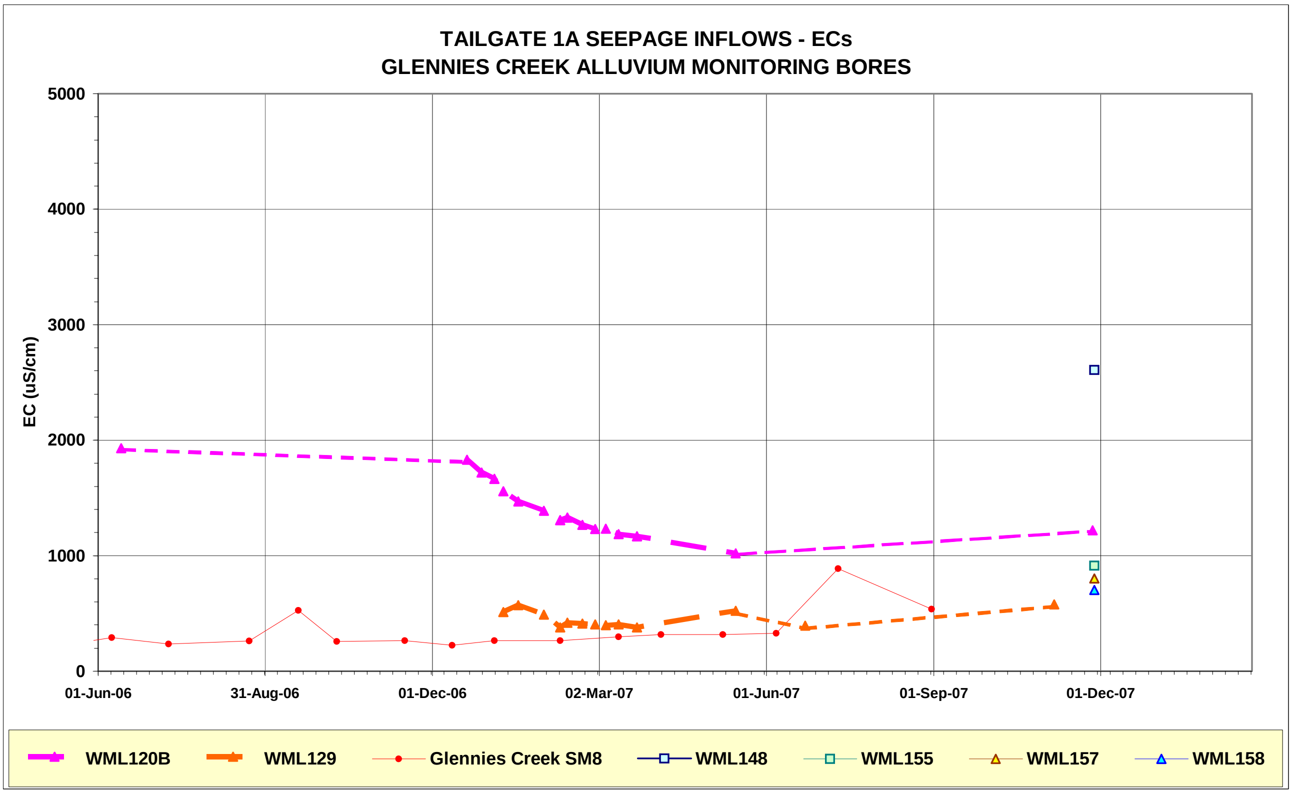
Figure 14



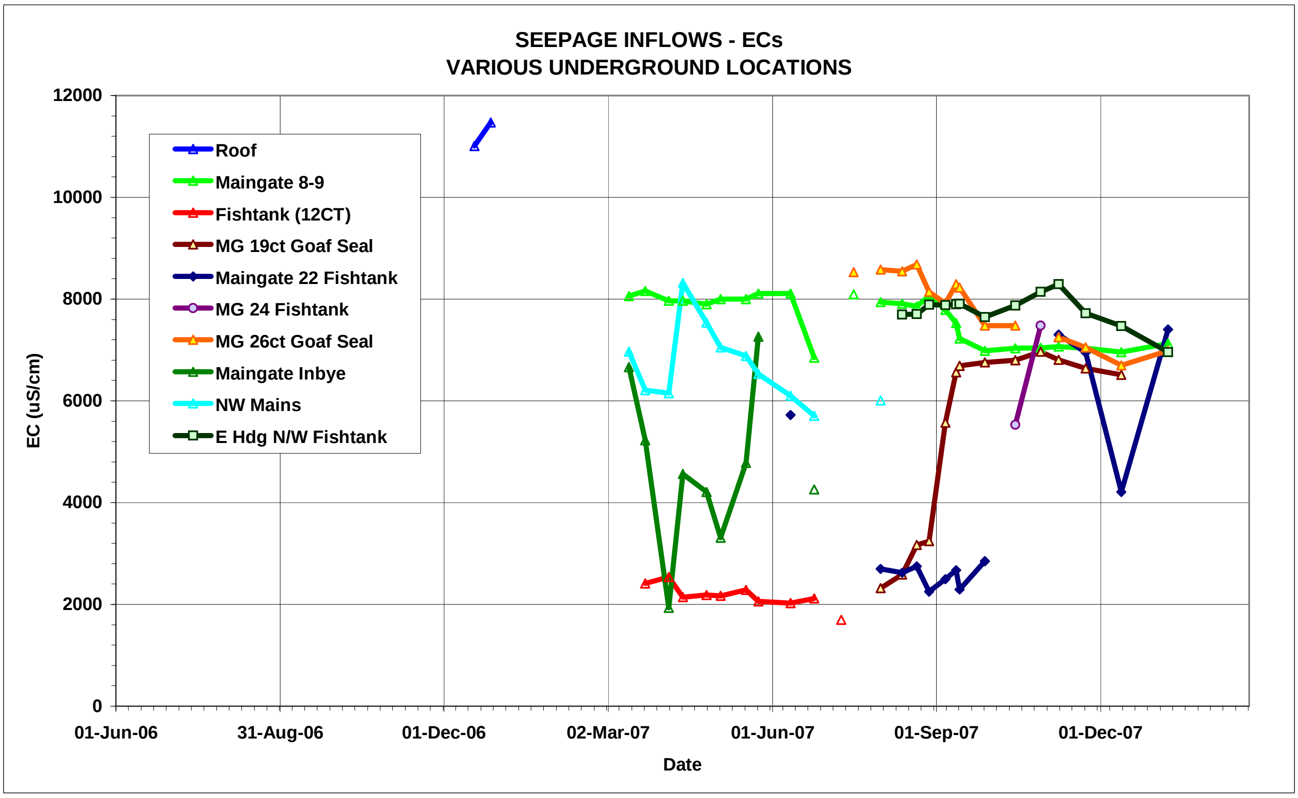


Date: 5 December 2007	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**ASHTON UNDERGROUND MINE LONGWALL 1 TG1-A SEEPAGES ECs**
Drawing No: 05-0166-137	Rev: 0	
Peter Dundon and Associates Pty Limited		**Figure 15**

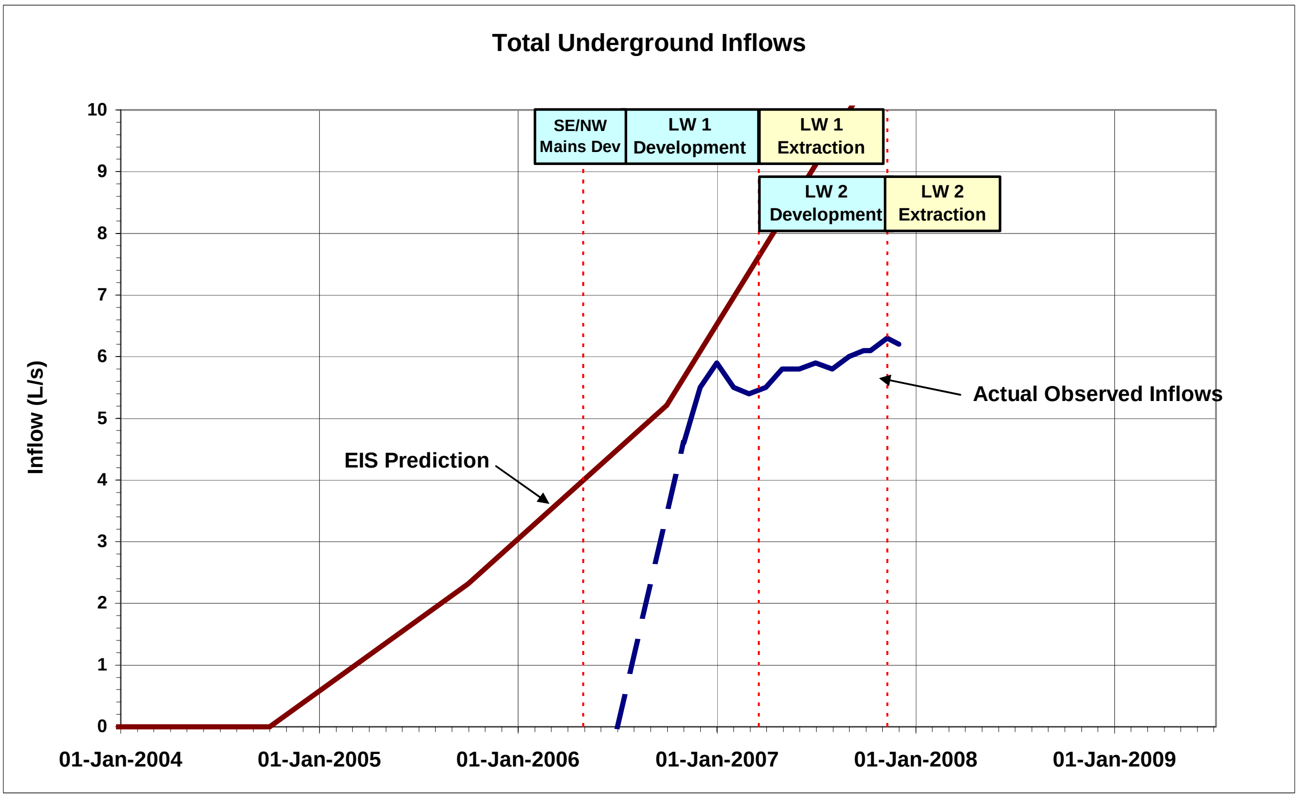


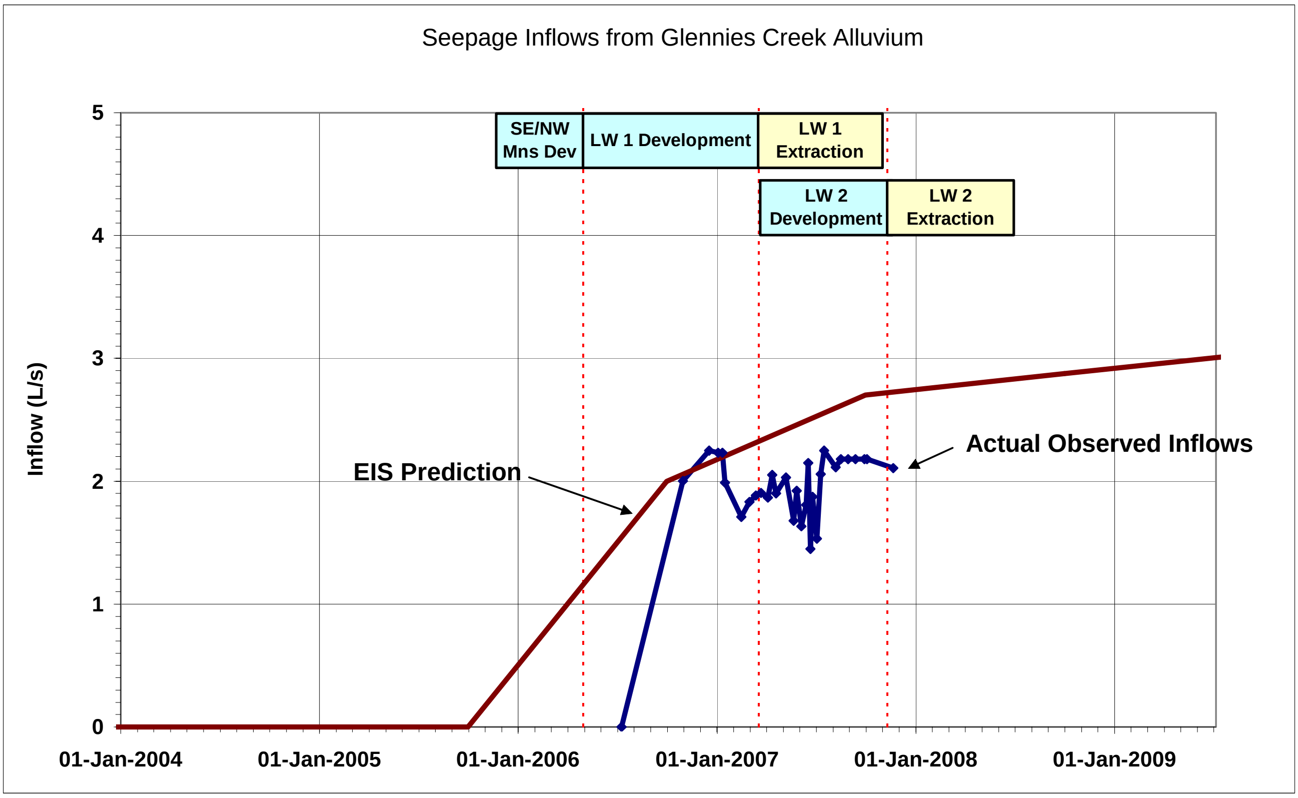


Date: 11 December 2007	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**ASHTON UNDERGROUND MINE LONGWALL 1 MONITORING BORE ECs**
Drawing No: 05-0166-138a	Rev: A	
Peter Dundon and Associates Pty Limited		**Figure 16**



Date: 30 January 2008	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**ASHTON UNDERGROUND MINE VARIOUS GROUNDWATER SEEPAGE INFLOWS ECs**
Drawing No: 05-0166-156	Rev: 0	
Peter Dundon and Associates Pty Limited		**Figure 17**





Date: 11 December 2007	Scale: as indicated	**Ashton Coal Operations Ltd**
Initials: PJD	Job No: 05-0166	**ASHTON UNDERGROUND MINE GROUNDWATER INFLOWS vs EIS PREDICTIONS**
Drawing No: 05-0166-135b	Rev: B	
Peter Dundon and Associates Pty Limited		**Figure 18**

APPENDIX 3

BLAST MONITORING DATA

2006 – 2007 Blast Vibration and Overpressure Results							
				St Clements Church		Camberwell Village	
Shot No	**Date**	**Time**	**Location**	**Vibration**	**Overpressure**	**Vibration**	**Overpressure**
1	09-Sep-06	09:34:44	LB_S2N, LB_PS	1	106	2	108
2	09-Sep-06	09:48:02	LB_S2N/2	0	109	0	102
3	11-Sep-06	12:20:21	ULLD_S3F3	1	104	2	107
4	14-Sep-06	16:34:27	ULLD_S3F4	0	88	0	92
5	14-Sep-06	16:41:33	ULLD_PS	1	104	**3**	104
6	16-Sep-06	10:13:38	ULLD_S2 Ramp	0	112	0	112
7	19-Sep-06	12:10:09	ULLD_S3_5	1	111	2	110
8	19-Sep-06	12:23:01	ULD_S4	1	113	1	112
9	21-Sep-06	9:34:44	LB_10_holes	0	106	0	107
10	26-Sep-06	12:05:36	ULLD_S3G	1	115	2	117
11	28-Sep-06	16:29:35	LLLD S3A	0	96	0	98
12	28-Sep-06	16:39:19	LB SLO	1	108	**3**	113
13	30-Sep-06	09:35:55	ULD_S4A	1	106	0	106
14	03-Oct-06	16:31:47	LLLD_S3C	0	100	0	108
15	05-Oct-06	16:31:29	LLLD_S3B	0	108	0	105
16	07-Oct-06	12:05:48	ULLD_S3H	1	112	2	113
17	10-Oct-06	12:10:42	LLLD_Bridge	0	97	0	105
18	10-Oct-06	12:20:18	LB_SLO2	0	105	1	105
19	11-Oct-06	16:48:06	MLD RL88, MLD PS	1	**116**	**NA**	**NA**
20	11-Oct-06	16:54:13	LLLD Bridge	**NA**	**NA**	**NA**	**NA**
21	12-Oct-06	12:53:58	LLLD_S3D	0	106	0	108
22	17-Oct-06	12:07:28	LLLD_S3E	0	107	0	108
23	20-Oct-06	12:54:25	LLLD_S3Nth	0	113	1	112
24	20-Oct-06	13:03:28	LB_S2_2pass	0	106	0	105

2006 – 2007 Blast Vibration and Overpressure Results							
				St Clements Church		Camberwell Village	
Shot No	**Date**	**Time**	**Location**	**Vibration**	**Overpressure**	**Vibration**	**Overpressure**
25	21-Oct-06	11:37:20	LLLD_S3e	0	110	0	110
26	24-Oct-06	12:11:46	ULLD_S3i	1	111	2	113
27	27-Oct-06	12:42:19	LB_North	1	**119**	2	120
28	31-Oct-06	12:10:55	UB_B1	1	**116**	1	114
29	02-Nov-06	12:41:18	LLLD_S3 south	0	109	1	107
30	02-Nov-06	12:49:36	LLLD_S3 strip	0	108	0	108
31	02-Nov-06	12:58:24	MLD_S4B1	0	114	1	113
32	08-Nov-06	12:10:37	UB_S3_B2	0	106	1	107
33	16-Nov-06	12:15:05	LB_S2_B4	0	106	1	107
34	16-Nov-06	12:29:15	LLLD_S3_B12/13	0	109	1	109
35	16-Nov-06	12:41:18	MLD_S4_B2	1	107	1	106
36	20-Nov-06	13:04:01	UB_S3_B4	0	112	1	111
37	21-Nov-06	12:17:47	LLLD_S3_B8	0	107	0	104
38	24-Nov-06	12:48:15	UB_S3B5	1	102	1	105
39	24-Nov-06	13:05:58	MLD_S4B3	0	107	1	107
40	30-Nov-06	09:21:25	LB_S2 11m depth, LB_S2 Full depth	0	104	2	104
41	30-Nov-06	09:29:30	ULD_S4 tri	1	110	1	106
42	30-Nov-06	09:36:17	MLD_S4B5E	1	112	1	111
43	05-Dec-06	12:16:07	LB_S2B2W	1	105	1	106
44	05-Dec-06	12:23:29	ULD_S4B4W	1	110	1	109
45	06-Dec-06	12:07:00	ULD_S4B7W	2	115	1	112
46	11-Dec-06	12:08:22	UB_S3	2	111	2	111
47	13-Dec-06	12:10:26	LLLD_S3B3W	0	99	0	100
48	13-Dec-06	12:22:50	ULD_S4B6W	1	112	1	110

2006 – 2007 Blast Vibration and Overpressure Results							
				St Clements Church		Camberwell Village	
Shot No	Date	Time	Location	Vibration	Overpressure	Vibration	Overpressure
49	14-Dec-06	12:11:33	LB_S2B3W	0	99	1	98
50	20-Dec-06	12:15:27	LB_S2B3E	0	107	1	107
51	21-Dec-06	12:51:20	MLD_S4B2W	0	108	0	109
52	22-Dec-06	12:06:21	LB_S3_B3W	0	99	1	100
53	02-Jan-07	12:40:30	UB_S3B5W	0	112	1	110
54	06-Jan-07	11:38:54	LB_S3B2E	1	106	2	108
55	10-Jan-07	12:50:28	UB_S3B3W	1	114	2	112
56	13-Jan-07		LB_S3B2E	**NA**	**NA**	**NA**	**NA**
57	17-Jan-07		LB_S3B1	**NA**	**NA**	**NA**	**NA**
58	19-Jan-07	12:10:18	ULD_S4B3W	1	105	1	105
59	19-Jan-07	13:11:02	MLD_S4B2	1	108	1	108
60	25-Jan-07	09:39:44	LB_S2B3W	0	98	0	100
61	25-Jan-07	09:44:54	MLD_S4B4E	1	107	2	108
62	01-Feb-07	12:52:55	MLD_S4B1	1	107	1	106
63	01-Feb-07	13:08:36	MLD_S4B8E	1	110	2	108
64	05-Feb-07	13:06:37	MLD_S4B5E	1	105	1	105
65	07-Feb-07	12:07:16	MLD_S4B5-6W	0	**NA**	1	109
66	09-Feb-07	12:07:01	MLD-S4B6E	1	113	1	109
67	13-Feb-07	09:20:58	LB_S3B3W	0	105	1	107
68	16-Feb-07	12:14:38	MLD-S4B3W	1	111	1	108
69	20-Feb-07	12:26:27	Floor sump/PS	0	112	1	117
70	20-Feb-07	12:32:56	MLD_S4B8W_PS	1	108	2	108
71	20-Feb-07	12:38:50	LB_S3B4W	1	96	1	99
72	24-Feb-07	11:43:36	LB_S3B3E2	0	108	1	112
73	26-Feb-07	12:14:47	MLD_S4B4W	1	106	1	104

2006 – 2007 Blast Vibration and Overpressure Results							
				St Clements Church		Camberwell Village	
Shot No	**Date**	**Time**	**Location**	**Vibration**	**Overpressure**	**Vibration**	**Overpressure**
74	01-Mar-07	12:05:41	MLD-S4B7W, MLD-KNOB	2	114	**NA**	**NA**
75	05-Mar-07	12:02:56	MLD-S4B8W	**3**	**116**	**NA**	**NA**
76	06-Mar-07		MLD-KNOB2	0	**NA**	**NA**	**NA**
77	07-Mar-07	12:27:33	MLD-S4B2W2	1	109	1	109
78	07-Mar-07	12:31:36	MLD-S4C	0	109	0	108
79	07-Mar-07	12:42:20	MLDS4B8S-PS	0	97	**NA**	**NA**
80	09-Mar-07	12:07:48	MLD-S4C(NORTH)	1	97	0	97
81	10-Mar-07	12:38:07	MLD-S4B8S1	0	103	0	103
82	12-Mar-07	12:01:17	MLD-S4B8S2	1	106	1	103
83	12-Mar-07	12:06:07	MLD-S4B8S3	2	107	1	104
84	13-Mar-07	11:58:57	MLD-S4B8S4	1	105	**NA**	**NA**
85	14-Mar-07	12:05:42	MLD-S4B3WKNOB	1	111	1	107
86	15-Mar-07	13:04:49	ULLD-S4B1W	1	107	1	106
87	15-Mar-07	13:07:50	PS-S5NORTH	0	103	0	104
88	16-Mar-07	12:06:45	LB-S3B4E	0	106	0	109
89	17-Mar-07	09:29:15	LB-S3B4E2	0	110	2	113
90	19-Mar-07	12:41:44	ULLD-S4B3E	1	99	1	101
91	22-Mar-07	12:05:05	MLD-S4B3WKnob2	1	109	2	106
92	27-Mar-07	12:08:05	ULD-S4B7A	0	102	0	103
93	29-Mar-07	12:04:34	ULLD-S4B4E	1	111	2	111
94	29-Mar-07	12:09:10	MLD-S4B4KNOB	0	107	0	111
95	02-Apr-07	12:01:13	ULLD-S4B2W	1	104	2	100
96	03-Apr-07	12:02:09	PRE-SPLIT/SUMP FLOOR	0	**NA**	0	108
97	03-Apr-07	12:04:47	LB-S3B3W2	1	101	2	103
98	04-Apr-07	12:03:20	ULLD-S4B5EN	1	103	2	105

2006 – 2007 Blast Vibration and Overpressure Results							
				St Clements Church		Camberwell Village	
Shot No	Date	Time	Location	Vibration	Overpressure	Vibration	Overpressure
99	05-Apr-07	16:29:28	ULLD-S4B5ES	1	102	2	103
100	11-Apr-07	12:06:33	LB-S3B4E	0	97	2	102
101	11-Apr-07	12:11:21	MLD-S4B6E	1	107	2	106
102	12-Apr-07	12:08:05	MLD-S4B8W2-1	2	110	**4**	111
103	13-Apr-07	16:34:17	MLD-S4B6E2	2	104	2	104
104	13-Apr-07	16:36:55	MLD-S4B8W2-2	**3**	109	2	115
105	17-Apr-07	12:04:07	LB-S3B4E2	1	103	2	103
106	18-Apr-07	13:02:59	MLD-S4B5W2	1	102	1	102
107	18-Apr-07	13:06:24	MLD-S4B4WKNOB	2	106	2	105
108	18-Apr-07	16:32:00	ULD-S4B8S	1	111	2	110
109	20-Apr-07	11:55:34	ULD-S4B8S2	2	107	**3**	108
110	23-Apr-07	16:30:47	ULD-S4B8S3	2	109	2	110
111	24-Apr-07	12:35:57	ULD-S5B8E	1	107	1	106
112	26-Apr-07	12:04:45	ULD-S5B6E	2	**122**	2	**122**
113	27-Apr-07	13:08:19	MLD-S4B4WKNOB	1	103	1	101
114	1-May-07	09:01:52	ULLD-S4B4WN	1	112	1	114
115	2-May-07	11:12:36	ULD-S5B6W	1	112	1	106
116	3-May-07	09:08:11	ULLD-S4B3W	2	107	1	107
117	4-May-07	09:15:47	ULD-S5B5E	1	113	2	117
118	9-May-07	12:02:43	ULD-S4B8S-3	2	111	2	109
119	9-May-07	12:05:28	MLD-S4B8S-1	1	111	1	113
120	10-May-07	11:01:27	ULD-S5B5W	1	106	2	107
121	11-May-07	16:01:52	UBS-S3B4W	1	100	1	99
122	14-May-07	12:34:34	MLD-S4B7E	2	108	**4**	105
123	15-May-07	12:11:36	ULLD-S4B5W	1	105	2	105

2006 – 2007 Blast Vibration and Overpressure Results							
				St Clements Church		Camberwell Village	
Shot No	**Date**	**Time**	**Location**	**Vibration**	**Overpressure**	**Vibration**	**Overpressure**
124	16-May-07	16:36:21	MLD-S4B8W3-1	2	108	2	107
125	17-May-07	16:34:30	MLD-S4B8W3-2	2	108	**3**	109
126	21-May-07	12:59:37	MLD-S3RAMP	0	102	0	101
127	23-May-07	09:03:46	MLD-S4B8W3-3	0	105	1	103
128	23-May-07	09:10:46	UB-PS3SOUTH	2	112	2	113
129	25-May-07	11:31:13	ULD-S5B7E	1	108	1	103
130	28-May-07	12:06:49	UB-S3B5	1	109	2	107
131	30-May-07	16:34:25	LLLD-S4B5E	0	104	2	113
132	1-Jun-07	09:13:41	ULLD-S4B5W	1	108	1	105
133	4-Jun-07	12:39:41	ULLD-S4B1E	0	106	2	105
134	6-Jun-07	12:41:39	ULD-S4B8S2-3	1	104	1	114
135	6-Jun-07	12:45:39	ULLD-S4B6E	1	**118**	1	107
136	6-Jun-07	12:52:35	ULLD-S4B2E	0	107	1	107
137	7-Jun-07	12:00:54	MLD-S4B8S2-1	1	102	1	101
138	16-Jun-07	09:39:19	ULD-S5B2-4E	0	115	1	114
139	20-Jun-07	09:18:37	UB-S3B5W	1	112	**3**	108
140	22-Jun-07	12:13:00	MLD-S4B8S270A	1	114	2	116
141	27-Jun-07	09:21:41	ULD-S5B3W	0	**116**	1	116
142	28-Jun-07		MLD-S4B8S70W	1	**116**	0	116
143	4-Jul-07	09:10:59	LLD-S4B3W	0	**NA**	0	**NA**
144	4-Jul-07	09:19:09	MLD-S4B6W2-1	1	113	2	118
145	4-Jul-07	09:26:57	ULD-S5B2-3W	1	**126**	1	**132**
146	7-Jul-07	10:23:04	ART-S6B5E	1	111	1	110
147	9-Jul-07	12:35:21	LLLD-S4B1-2E	0	98	1	107
148	12-Jul-07	12:58:02	LLLD-S4B1-2E	0	97	1	93

2006 – 2007 Blast Vibration and Overpressure Results							
				St Clements Church		Camberwell Village	
Shot No	**Date**	**Time**	**Location**	**Vibration**	**Overpressure**	**Vibration**	**Overpressure**
149	12-Jul-07	13:08:16	PS-ULD-S6N	0	102	1	98
150	13-Jul-07		MLD-S4B6W2-2		**NA**	**NA**	**NA**
151	13-Jul-07	12:43:41	ULD-S5GAP	1	107	1	109
152	13-Jul-07	12:49:58	LLLD-S4B1-2EB	**3**	108	1	110
153	18-Jul-07	12:21:58	LLLD-S4B1-2E2	0	**NA**	0	**NA**
154	18-Jul-07	12:27:47	LLLD-S4B1-2W	0	**NA**	0	**NA**
155	19-Jul-07	12:47:43	LLLD-S4B1-2WN	0	109	0	108
156	19-Jul-07	12:54:32	MLD-S4B8S60A	**3**	111	**4**	111
157	20-Jul-07	12:08:10	ART-S6B4E70	1	113	1	111
158	24-Jul-07	12:16:46	LLLD-S4B1-2WC	0	**116**	0	115
159	24-Jul-07	12:26:31	MLD-S4B8S60B	2	109	2	108
160	25-Jul-07	12:15:07	LLLD-S4B1-2WS	0	102	0	115
161	26-Jul-07	12:07:05	MLD-S4B8S60C	1	108	2	107
162	27-Jul-07	12:08:45	ART-S6B5W70	1	112	1	109
163	31-Jul-07	12:22:28	ULLD-S4B4RAMP	1	108	2	107
164	2-Aug-07	09:27:00	UB-S3PS	0	115	0	115
165	2-Aug-07	09:30:49	UB-S3B2E	1	107	1	109
166	2-Aug-07	09:38:32	ART-S6B3E	0	110	1	107
167	3-Aug-07	12:14:00	PG-S7B2	1	110	1	104
168	9-Aug-07	09:29:18	ART-S7B3	1	110	1	109
169	9-Aug-07	09:32:49	MLD-S5B4E	1	108	1	104
170	13-Aug-07	10:31:00	PS_UBS4North	0	**NA**	0	**NA**
171	13-Aug-07	10:33:01	LLLD-S4B1-2WC	0	102	2	105
172	13-Aug-07	10:37:12	UB-S4B5E	1	108	1	105
173	13-Aug-07	10:41:48	ART-S7B3W	0	105	1	103

2006 – 2007 Blast Vibration and Overpressure Results							
				St Clements Church		Camberwell Village	
Shot No	Date	Time	Location	Vibration	Overpressure	Vibration	Overpressure
174	14-Aug-07	12:11:31	MLD-S4B8SC	2	106	2	108
175	17-Aug-07	10:05:54	UB_S3B1-2	1	114	2	110
176	18-Aug-07	9:30	LLLD_S4B4E	0	**NA**	0	**NA**
177	18-Aug-07	9:40:00	LLLD_S4B4E	0	**NA**	0	**NA**
178	22-Aug-07	12:00	LLLD-S4B4E2	0	**NA**	0	**NA**
179	22-Aug-07	12:05:00	LLLD-S4B4E2	0	**NA**	0	**NA**
180	24-Aug-07	13:07:13	PS-ARTS8B2	1	103	1	102
181	28-Aug-07	09:16:04	PG-S8B2E	1	109	2	108
182	30-Aug-07	12:02:45	UB-S3B2-3E	1	106	1	102
183	30-Aug-07	12:05:45	LLLD-S4B4-5W	0	103	1	101
184	30-Aug-07	12:12:05	UB-S3B2-3W	1	103	1	102
185	1-Sep-07	09:02:16	ULD-S6B5E	1	106	2	107
Total Blasts 130			**Number Blasts Recorded**	182	170	182	170
			% Blasts Recorded	98%	92%	98%	92%
			Maximum	3	126		132
			Average	1	107		108
			Minimum	0	88		92
			No > 2 mm/s	4		9	
			% > 2 mm/s	2.2%		4.3%	
			No > 5 mm/s	0		0	
			% > 5 mm/s	0%		0%	
			No > 10mm/s	0		0	
			No > 115 dBL		9		10
			% > 115 dBL		4.9%		5.4%
			No > 120 dBL		2		2

APPENDIX 4

Noise Monitoring Reports

8 February 2008

Ref: 05148/2486

Ms. Lisa Richards
Ashton Coal Operations Limited
P.O. Box 699
Singleton NSW 2330

RE: 2006/2207 ANNUAL NOISE MONITORING REPORT

This letter report presents a summary of the results of quarterly noise compliance monitoring conducted for the Ashton Coal Project (ACP) in November 2006 and February, April and August 2007.

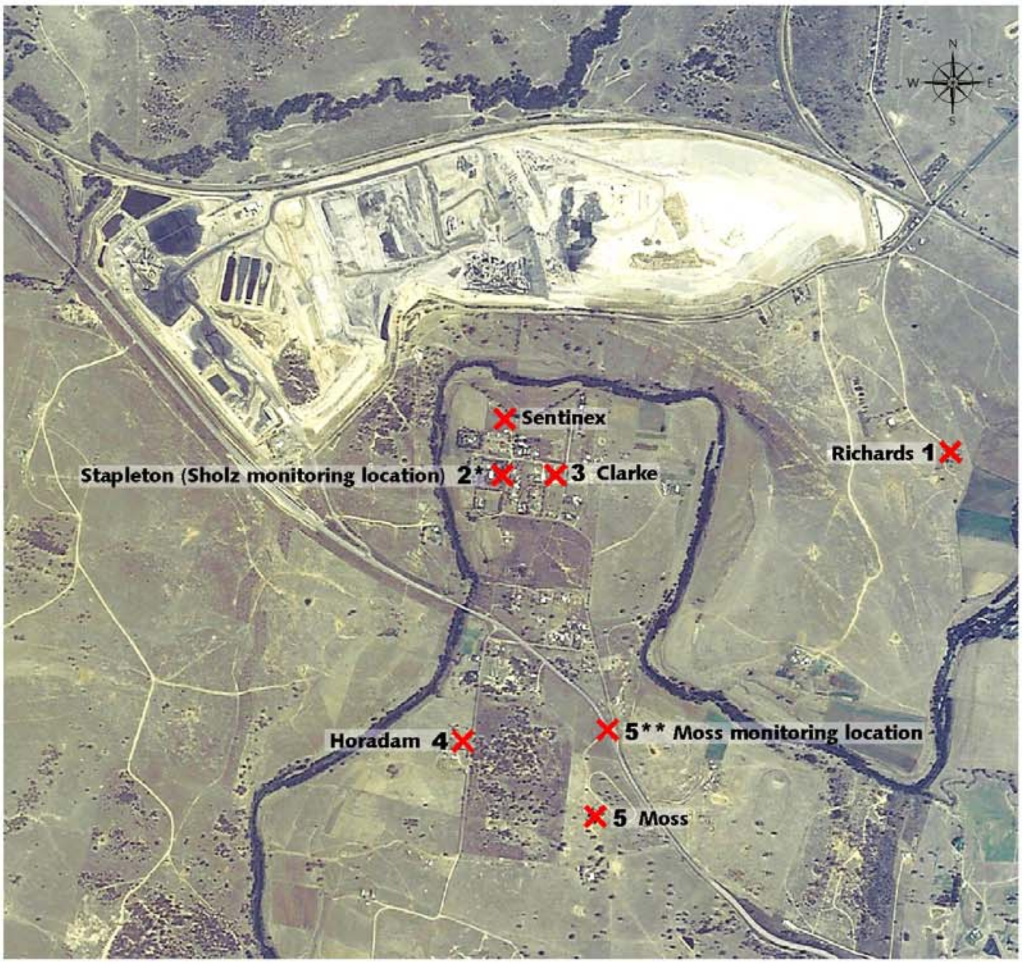
ACP environmental licence conditions indicate that compliance with noise emission criteria is not applicable under atmospheric conditions where winds speeds are higher than 3m/s and/or there is a temperature inversion of greater than +3° C/100m.

Noise measurements of fifteen minutes duration were taken in one third-octave bands at five representative receiver locations in the vicinity of the mine a shown in **Figure 1**. The results of the monitoring surveys are shown in detail in an attachment to this letter.

In summary the results of the monitoring show that, under the applicable atmospheric conditions, there was a total of five exceedances of the noise goal throughout the entire year.

Two exceedances were recorded in November 2006, one at each of the Stapleton and Clark residences in Camberwell village during the evening. Noise levels 2 and 1 dB(A), respectively, above the noise goal were attributable to emissions from all general mining activities on the site including haul truck engine revs, dumping, reverse beepers, dozer tracks, brake retards etc. At the time of the exceedances winds were light, generally from the north east which is moderately noise enhancing for the two receivers.

The other three exceedances were recorded in August 2007, one at each of the Stapleton, Horadam and Moss residences during the evening. Noise levels 11, 10 and 7 dB(A), respectively, above the noise goal were mainly attributable to emissions from haul trucks and general mine hum. At the time of the exceedances winds were moderate from the north, north west which is significantly noise enhancing for all of the receivers.



Not to scale - for diagrammatic purposes only

LEGEND:

Noise monitoring location

FIGURE 1

Ashton Coal Project
Noise Monitoring Location

KG4086_FIG1.cdr

MARCH 2007

24 November 2006

Ref: 05148/2029

Ms. Lisa Richards
Ashton Coal Operations Limited
P.O. Box 699
Singleton NSW 2330

RE: 2006-07 QUARTER 1
NOVEMBER 2006 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Ashton Coal Project (ACP) on Monday 20th November 2006 between 5.00 pm and 10.00 pm and Tuesday 21st November 2006 between 7.00 and 9.00 a.m.

Noise measurements of fifteen minutes duration were taken in one third-octave bands at the following locations:

Location 1:	Richards
Location 2:	Scholz *
Location 3:	Clark
Location 4:	Horadam
Location 5:	Moss **

*Note that to avoid disruptions to the community, the noise measurements at the Scholz residence were relocated along the street to a location in front of the Stapelton residence.

**The measurement at the Moss residence is taken at the entrance gate to the property.

A total of four separate sets of measurements were made over the “circuit”. ACP activities were visible at monitoring locations 2, 3 and 5 and were audible at all locations at times throughout the monitoring period. The early evening of November 20 was hot and hazy with a breeze from the north and north east blowing at between approximately 3 and 4m/s. The wind speed decreased throughout the evening period.

The morning of November 21 was mild and clear with no cloud cover. At the start of the survey there was a breeze at around 3m/s from the west north west. The breeze increased throughout the morning to make additional noise measurements invalid.

Wind speed information detailed above was obtained from the nearby meteorological station at Camberwell mine. Due to technical problems temperature inversion data was not available for the monitoring period.

Noise emission levels were measured with a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instrument was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator Prior to and at the completion of measurements.

Measured noise levels for each monitoring circuit are summarised in the following tables. The total measured Leq is shown in the tables. Contributions from ACP were determined by deleting environmental and other non-ACP sources from the measured time-traces and re-calculating noise levels percentiles using the Bruel & Kjaer Evaluator Type 7820 software. To avoid undue influence of noise from traffic on roads adjacent to some measurement locations, where practical this noise has been excluded from the measurements prior to further analysis.

The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal for mining operations at ACP is **38 dB(A) Leq (15 min)** for all operating times during the day and evening. Where mine noise from ACP exceeds the noise goal it is shown in bold. Exceedences of the EPL and Development Consent criteria are shown in red.

Table 1
ACP Noise Monitoring Results – 20 November 2006

Location	Time	dB(A) Leq	Comments	WS and Direction	Inversion ^{O}C/ 100m	ACP Noise Sources
Richards	6.05 pm	37	Mines other than ACP (37), birds (<30)	2.86 ENE	NA	
Stapleton	5.40 pm	43	Birds and insects (43), traffic on New England Highway (31), ACP (31)	3.55 ENE	NA	
Clark	5.20 pm	36	ACP (34), birds and insects (31)	3.99 ESE	NA	
Horadam	6.30 pm	55	Traffic on New England Highway (55), ACP inaudible	2.91 ENE	NA	
Moss	6.47 pm	58	Traffic on New England Highway (58), ACP inaudible	3.35 ENE	NA	

Table 2
ACP Noise Monitoring Results – 20 November 2006

Location	Time	dB(A) Leq	Comments	WS and Direction	Inversion ^{O}C/ 100m	ACP Noise Sources
Richards	7.40 pm	38	Mines other than ACP (37), birds and insects (33)	3.13 ENE	NA	
Stapleton	7.17 pm	46	Birds and insects (45), train (38), ACP (36), traffic on New England Highway (30)	4.05 ENE	NA	
Clark	8.05 pm	39	ACP (36), insects (36), traffic on New England Highway (28)	2.66 ENE	NA	
Horadam	8. 37 pm	52	Traffic on New England Highway (51), insects (46), ACP inaudible	1.97 ENE	NA	
Moss	8.21 pm	47	Traffic on New England Highway (46), insects (39),	1.94 ESE	NA	

			ACP audible (estimated contribution <35)			

Table 3
ACP Noise Monitoring Results – 20 November 2006

Location	Time	dB(A) Leq	Comments	WS and Direction	Inversion °C/ 100m	ACP Noise Sources
Richards	9.07 pm	40	Mines other than ACP (37), insects (36), train (30), ACP inaudible	1.44 ENE	NA	
Stapleton	9.24 pm	45	ACP (40), traffic on New England Highway (39), insects (39), train (32)	1.67 ENE	NA	
Clark	9.45 pm	44	Traffic on New England Highway (40), ACP (39), insects (38), train (33)	0.5 NNE	NA	

Table 4
ACP Noise Monitoring Results – 21 November 2006

Location	Time	dB(A) Leq	Comments	WS and Direction	Inversion °C/ 100m	ACP Noise Sources
Richards	7.27 am	44	ACP (42), birds, insects and farm animals (37), traffic on New England Highway (35)	4.17 WNW	NA	
Stapleton	8.00 am	50	Traffic on New England Highway (47), birds and insects (45), exploration drill (43), ACP (42)	3.06 WNW	NA	
Clark	7.00 am	52	Traffic on New England Highway (48), birds and insects (45), exploration drill (44), ACP (43)	3.17 WNW	NA	
Horadam	8.20 am	52	Traffic on New England Highway (52), Birds and insects (38), wind on mic (40), ACP audible but not measurable	3.64 WSW	NA	
Moss	8.45 am	53	Traffic on New England Highway (52), wind on mic (45), ACP inaudible	2.52 WSW	NA	

The results show that total noise emissions from ACP were above the noise goals at several locations throughout the survey period. On these occasions the noise was from all general mining activities on the site including haul truck engine revs, dumping, reverse beepers, dozer tracks, brake retards etc. Noise from a dozer working in the vicinity of the shovel was evident at each of the Clark and Stapleton residences during the evening and morning and at the Richards residence in the morning. On the morning of November 21 an exploration drill rig was audible working on the top of the hill near Glennies Creek Road. At the Horadam and Moss residences where the noise was audible it was as a mine hum with individual sources not discernable.

ACP environmental licence conditions indicate that compliance with noise emission criteria is not applicable under atmospheric conditions where winds speeds are higher than 3m/s and/or there is a temperature inversion of greater than +3° C/100m.

Data obtained from the weather station showed, as indicated above, that throughout the survey period the wind was from the east north east on November 20 and the west north west and west south west on November 21. The wind speed decreased throughout the evening survey (November 20). At the commencement of the survey in morning of November 21 the average wind speed was just above 3m/s. The wind speed generally increased throughout the morning.

The results in Table 3 show a minor (1 and 2 dB(A)) exceedance of the noise goal at the Clark and Stapleton residences during the late evening of November 20. At this time the wind ranged between

0.5 and 1.7m/s form the north north east. These conditions are noise enhancing in relation to the two residences.

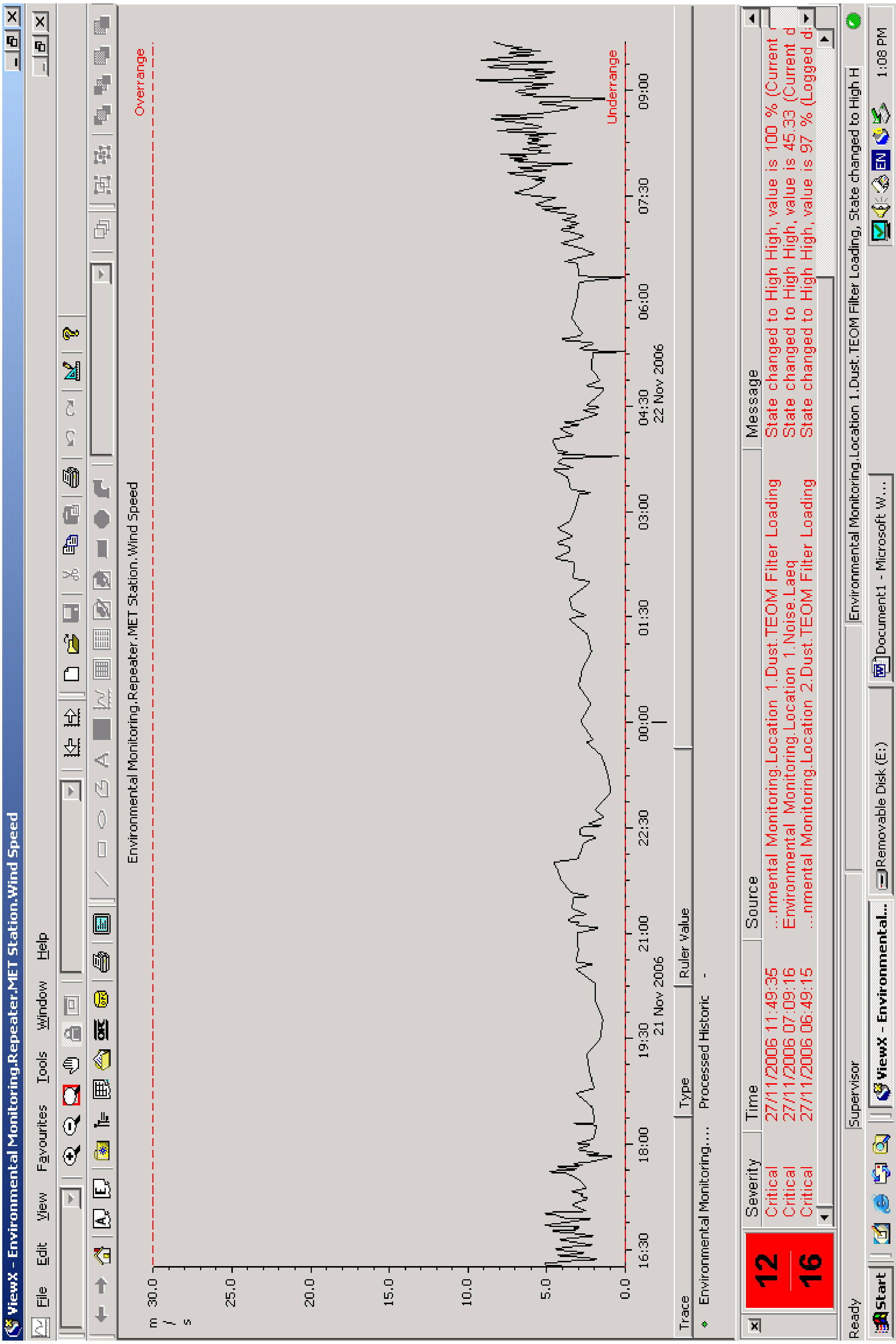
The results in Table 4 show an exceedance at each of the Richards, Clark and Stapleteon residences during the morning of November 21. These exceedances correspond to a time when the wind speed for the 15 minute monitoring period was greater than 3m/s.

Data from those times where ACP operations were audible was analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please do not hesitate to contact the undersigned.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:	Review:
………………………………..	………………………………..
Ross Hodge	Neil Pennington
Acoustical Consultant	Acoustical Consultant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2 March 2007

Ref: 05148/2134

Ashton Coal Operations Limited
P.O. Box 699
Singleton NSW 2330

RE: 2006-07 QUARTER 2
FEBRUARY 2007 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Ashton Coal Project (ACP) between approximately midday on Wednesday 28th February and 7.00 a.m. on Thursday 1st March 2007.

Noise measurements of fifteen minutes duration were taken in one third-octave bands at the following locations:

Location 1:	Richards
Location 2:	Scholz *
Location 3:	Clark
Location 4:	Horadam
Location 5:	Moss **

*Note that to avoid disruptions to the community, the noise measurements at the Scholz residence were relocated along the street to a location in front of the Stapelton residence.

**The measurement at the Moss residence is taken at the entrance gate to the property.

A total of three separate sets of measurements were made over the “circuit”. ACP activities were visible at monitoring locations 2, 3 and 5 and were audible at all locations at times throughout the monitoring period. The afternoon of February 28 was hot with a gusty wind and storms about. The wind was initially from the west north west early in the afternoon at between 4 and 6 m/s. The wind swung to the east south east in the evening. During the night time survey (commencing at 3 am the wind was light from the west south west (<1 m/s). No rain fell throughout the survey period. A temperature inversion of between +1° and +2° C/100m was active during the night time survey commencing at 3 am.

Meteorological data used in this report was supplied by the mine from their automatic weather station

Noise emission levels were measured with a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instrument was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator Prior to and at the completion of measurements. To avoid undue influence of noise from traffic on roads adjacent to some measurement locations, where practical this noise has been excluded from the measurements prior to further analysis.

Measured noise levels for each monitoring circuit are summarised in the following tables. The total measured Leq is shown in the tables. This was analysed with the Bruel & Kjaer "*Evaluator*" software to quantify the contributions of the various noise source(s) to the overall. The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal for mining operations at ACP is **38 dB(A) Leq (15 min)** for all operating times during the day and evening. Where mine noise from ACP exceeds the noise goal it is shown in bold. Exceedences of EPL and Development Consent noise criteria are shown in red.

Table 1
ACP Noise Monitoring Results – 28 February 2007 - Day

Location	Time	dB(A) Leq	Comments	WS and Direction	Inversion $^{o}C/100m$	ACOL Noise Sources
Richards	12.05 pm	38	Wind on microphone (38), ACP inaudible	6.2 WNW	< +3	
Stapleton	2.52 pm	47	Traffic on New England Highway (43), ACP (41), wind (40).	4.7 NNW	< +3	
Clark	12.25 pm	45	Road work on Glennies Creek Rd (44), wind (40), ACP audible not measurable	4.0 WNW	< +3	
Horadam	3.30 pm	47	Traffic on New England Highway (47), ACP inaudible	3.3 WNW	< +3	
Moss	3.12 pm	49	Traffic on New England Highway (49), ACP inaudible	2.9 WNW	< +3	

Table 2
ACP Noise Monitoring Results – 28 February 2007 - Evening

Location	Time	dB(A) Leq	Comments	WS and Direction	Inversion $^{o}C/100m$	ACOL Noise Sources
Richards	6.00 pm	51	Birds and insects (50), mines other than ACP (40), traffic on N.E. Highway (30)	4.3 ESE	< +3	
Stapleton	6.38 pm	59	Birds (59), traffic on N.E. Highway (42), wind (40), ACP inaudible	6.1 ESE	< +3	
Clark	6.22 pm	45	Birds and insects (41), traffic on N. E. Highway (40), wind (38), ACP inaudible	5.3 ESE	< +3	
Horadam	6. 57 pm	48	Traffic on N. E. Highway (47), wind (40), ACP inaudible	5.3 ESE	< +3	
Moss	7.21 pm	50	Traffic on N. E. Highway (50), wind (40), ACP inaudible	3.9 ESE	< +3	

Table 3
ACP Noise Monitoring Results – 1 March 2007

Location	Time	dB(A) Leq	Comments	WS and Direction	Inversion $^{o}C/100m$	ACOL Noise Sources
Richards	3.31 am	43	Mines other than ACP (43), insects (30), ACP inaudible	1.0 WSW	< +3	
Stapleton	3.58 am	40	Traffic on N.E. Highway (37), mines other than ACP (37) insects (29), ACP (<30)	0.6 WSW	< +3	
Clark	3.05 am	41	Insects (37), mines other than ACP (37) and (30), ACP barely audible	0.2 WSW	< +3	
Horadam	4.35 am	40	Mines other than ACP (39), insects (33), ACP inaudible	1.1 N	< +3	
Moss	4.55 am	55	Traffic on N.E. Highway (55), mines other than ACP (36)	1.6 N	< +3	

ACP environmental licence conditions indicate that compliance with noise emission criteria is not applicable under atmospheric conditions where winds speeds are higher than 3m/s and/or there is a temperature inversion of greater than +3° C/100m.

The results show that noise emissions from ACP were above the noise goals at one location throughout the survey period. On this occasion the noise was from mining activities in the vicinity of the Glennies Creek Road environmental bund including haul truck engine revs, dumping, reverse beepers etc. At this time the wind at the mine operated weather station was from the north north west at 4.7 m/s.

Data from those times where ACP operations were audible was analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from ACP must not exceed 46 dB(A) Lmax between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine.

During the nigh time measurement circuit ACP was only audible at the Stapleton and Clark residences. At the Clark residence the noise from ACP was barely audible. Occasional impact noises were evident but these were not measurable above the general mine hum and engine revs from other mines in the area. At the Stapleton residence the noise from ACP was audible as low hum from the direction of the CPP. Occasional engine whine from the FEL working at the CPP was also discernable. Impact noises from ACP (possibly related to the bucket on eth FEL) were measured to an Lmax of 45dB(A). This is below the sleep disturbance criterion for the mine.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please do not hesitate to contact the undersigned.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author: Review:

Ross Hardy

Neil Pennington

……………………………….. ………………………………..

Ross Hodge
Acoustical Consultant

Neil Pennington
Acoustical Consultant

1 May 2007

Ref: 05148/2210

Ashton Coal Operations Limited
P.O. Box 699
Singleton NSW 2330

RE: 2006/2007 QUARTER 3
APRIL 07 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Ashton Coal Project (ACP) between approximately 3.15 p.m. on Thursday 26th April and 7.00 a.m. on Friday 27th April 2007.

Noise measurements of fifteen minutes duration were taken in one third-octave bands at the following locations (as shown in Figure 1 Attached):

Location 1: Richards
Location 2: Scholz *
Location 3: Clark
Location 4: Horadam
Location 5: Moss **

*Note that to avoid disruptions to the community, the noise measurements at the Scholz residence were relocated along the street to a location in front of the Stapleton residence.

**The measurement at the Moss residence is taken at the entrance gate to the property.

A total of three separate sets of measurements were made over the "circuit". ACP activities were not visible at any of the monitoring locations. Noise from ACP was faintly audible on one occasion at location 1. The afternoon and evening of April 26 was warm with a wind from the east south east gusting to over 3m/s. During the night time survey (commencing at approximately 3 am the wind was light from the south south east (<2 m/s). No rain fell throughout the survey period.

Meteorological data used in this report was supplied by the mine from their automatic weather station

Data from the mine operated meteorological station showed no significant temperature inversion active during the night time survey commencing at 3 am.

Noise emission levels were measured with a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instrument was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator Prior to and at the completion of measurements. To avoid undue influence of noise from traffic on roads adjacent to some measurement locations, where practical this noise has been excluded from the measurements prior to further analysis.

Measured noise levels for each monitoring circuit are summarised in the following tables. The total measured Leq is shown in the tables. This was analysed with the Bruel & Kjaer "*Evaluator*" software to quantify the contributions of the various noise source(s) to the overall. The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal for mining operations at ACP is **38 dB(A) Leq (15 min)** for all operating times during the day and evening. The contribution of mine noise from ACP is shown in bold. Exceedences of EPL and Development Consent noise criteria are shown in red.

Table 1
ACP Noise Monitoring Results – 26 April 2007 - Day

Location	Time	dB(A) Leq	Comments	WS and Direction	Inversion ^oC/ 100m	Ashton Coal Noise Sources
Richards	3.40 pm	45	Wind on mic. (45), birds (30), ACP dozer faintly audible	3.3 ESE	< +3	Dozer
Stapleton	4.40 pm	45	Traffic on New England Highway (44), wind (40), ACP inaudible	4.7 ESE	< +3	
Clark	4.05 pm	41	Traffic on New England Highway (40), wind (40), wind (32), ACP inaudible	3.7 ESE	< +3	
Horadam	5.02 pm	47	Traffic on New England Highway (47), ACP inaudible		< +3	
Moss	3.15 pm	55	Traffic on New England Highway (55), ACP inaudible	4.1 ESE	< +3	

Table 2
ACP Noise Monitoring Results – 26 April 2007 – Evening

Location	Time	dB(A) Leq	Comments	WS and Direction	Inversion ^oC/ 100m	Ashton Coal Noise Sources
Richards	7.40 pm	44	Mines other than ACP (42), train (40), ACP inaudible	2.2 ESE	< +3	
Stapleton	8.45 pm	42	Traffic on N.E. Highway (42), wind (30), ACP inaudible	1.4 ESE	3.1	
Clark	8.03 pm	37	Mines other than ACP (31), traffic (31), train (30), insects (25) ACP inaudible	1.9 ESE	< +3	
Horadam	7.17 pm	42	Traffic (42), occ. impacts from other mines (30), ACP inaudible	2.1 ESE	< +3	
Moss	7.00 pm	52	Traffic (52), other mines (30), ACP	2.9 ESE	< +3	

			inaudible			

Table 3
ACP Noise Monitoring Results – 27 April 2007 – Night

Location	Time	dB(A) Leq	Comments	WS and Direction	Inversion ^{o}C/ 100m	Ashton Coal Noise Sources
Richards	4.10 am	38	Other mines (38), insects (26), ACP inaudible	1.4 SSE	< +3	
Stapleton	3.07 am	40	Traffic (40), other mines (30), ACP inaudible	1.6 SSE	< +3	
Clark	2.50 am	34	Other mines (31), traffic (31), ACP inaudible	1.2 SSE	< +3	
Horadam	3.45 am	47	Traffic (47), dog (35), ACP inaudible	1.5 SSE	< +3	
Moss	3.25 am	45	Traffic (44), other mines (37), ACP inaudible	1.7 SSE	< +3	

The results show that, under the atmospheric and operating conditions at the time, noise emissions from ACP did not exceed the noise goals at any monitoring locations throughout the survey period. Throughout the period the wind was blowing generally from the receivers to the mine and would be considered noise reducing conditions.

Data from those times where ACP operations were audible was analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from ACP must not exceed 46 dB(A) Lmax between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine.

During the nigh time measurement circuit ACP was not audible at any residences.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please do not hesitate to contact the undersigned.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author: Review:

……………………………….. ………………………………..

Ross Hodge
Acoustical Consultant

Neil Pennington
Acoustical Consultant

10 September 2007

Ref: 05148/2339

Ashton Coal Operations Limited
P.O. Box 699
Singleton NSW 2330

RE: 2006-07 QUARTER 4
AUGUST 2007 NOISE MONITORING RESULTS

This letter report presents the results of noise compliance monitoring conducted for the Ashton Coal Project (ACP) between approximately 3.30 p.m. and 11.40 p.m. on Friday 31st August 2007.

Noise measurements of fifteen minutes duration were taken in one third-octave bands at the following locations (as shown in Figure 1 Attached):

Location 1:	Richards
Location 2:	Scholz *
Location 3:	Clark
Location 4:	Horadam
Location 5:	Moss **

*Note that to avoid disruptions to the community, the noise measurements at the Scholz residence were relocated along the street to a location in front of the Stapleton residence.

**The measurement at the Moss residence is taken at the entrance gate to the property.

A total of three separate sets of measurements were made over the "circuit". ACP activities were not visible from any of the monitoring locations. During the day time survey strong winds from the west north west dominated all noise measurements. The wind dropped during the evening and noise from ACP was audible throughout the entire evening survey period. .

Meteorological data used in this report was supplied by the mine from their automatic weather station

Noise emission levels were measured with a Brüel & Kjær Type 2260 Precision Sound Analyser. This instrument has Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters". Calibration of the instrument was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator Prior to and at the completion of measurements. To avoid undue influence of noise from traffic on roads adjacent to some measurement locations, where practical this noise has been excluded from the measurements prior to further analysis.

Measured noise levels for each monitoring circuit are summarised in the following tables. The total measured Leq is shown in the tables. This was analysed with the Bruel & Kjaer "*Evaluator*" software to quantify the contributions of the various noise source(s) to the overall. The noise sources are listed in the comments column with the contribution of each shown in brackets. The noise goal for mining operations at ACP is **38 dB(A) Leq (15 min)** for all operating times during the day and evening. The contribution of mine noise from ACP is shown in bold. Exceedences of EPL and Development Consent noise criteria are shown in red.

Table 1
ACP Noise Monitoring Results – 31 August 2007 – Day

Location	Time	dB(A) Leq	Comments	WS and Direction	Inversion °C/ 100m	ACP Noise Sources
Richards	3.30 pm	43	Wind on mic (43), **ACP audible not measurable**	8.6 WNW	< +3	Mine hum
Stapleton	4.12 pm	>45	Wind on mic (>45), **ACP audible not measurable**	8.7 WNW	< +3	Mine hum
Clark	3.55 pm	>45	Wind on mic (>45), **ACP audible not measurable**	9.3 WNW	< +3	Mine hum
Horadam	4.30 pm	>45	Wind on mic (>45), **ACP inaudible**	7.6 WNW	< +3	n/a
Moss	4.47 pm	>45	Wind on mic (>45), **ACP inaudible**	6.9 WNW	< +3	n/a

Table 2
ACP Noise Monitoring Results – 31 August 2007 – Evening

Location	Time	dB(A) Leq	Comments	WS and Direction	Inversion °C/ 100m	Ashton Coal Noise Sources
Richards	7.20 pm	42	ACP (40), train (38)	5.5 WNW	< +3	Dozer, haul trucks, mine hum
Stapleton	8.01 pm	49	ACP (49)	2.2 NNW	< +3	Dozer, haul trucks, mine hum, reverse alarms, impacts
Clark	7.44 pm	49	ACP (49)	4.2 NNW	< +3	Dozer, haul trucks, mine hum, reverse alarms, impacts
Horadam	8.20 pm	54	Traffic (53), ACP (48)	2.3 NNW	< +3	Haul trucks, mine hum
Moss	8.38 pm	54	Traffic (53), ACP (45), insects (43)	2.2 NNW	2.86	Haul trucks, mine hum

Table 3
ACP Noise Monitoring Results – 31 August 2007 – Night

Location	Time	dB(A) Leq	Comments	WS and Direction	Inversion °C/ 100m	Ashton Coal Noise Sources
Richards	10.03 pm	38	Other mines (36), farm animals (35), **ACP inaudible**	1.6 WSW	6.08	
Stapleton	10.47 pm	47	Traffic (47), other mines (35), ACP (<30)	3.9 WSW	4.65	Mine hum
Clark	10.30 pm	41	Traffic (40), other mines (35), ACP (<30)	3.5 WSW	7.16	Mine hum
Horadam	11.05 pm	45	Traffic (45), **ACP inaudible**	3.1 WSW	4.65	
Moss	11.22 pm	48	Traffic (48), **ACP inaudible**	3.1 WNW	1.25	

ACP environmental licence conditions indicate that compliance with noise emission criteria is not applicable under atmospheric conditions where winds speeds are higher than 3m/s and/or there is a temperature inversion of greater than +3° C/100m.

During the day time monitoring period the high wind speeds meant that valid noise measurements were not possible. During the evening and night time monitoring periods weather station reported that wind speeds dropped significantly. During these periods the weather conditions were noise enhancing at all monitoring locations in terms of noise emissions from ACP.

The results in Table 2 show that, under the atmospheric and operating conditions at the time, noise emissions from ACP exceeded the noise goals at all monitoring locations during the evening time period. An analysis of the wind data showed that during t he surveys at Richards and Clark the wind speed was greater than 3m/s.

Data from those times where ACP operations were audible was analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions in the NSW Industrial Noise Policy.

In addition to the operational noise, the noise from ACP must not exceed 48 dB(A) Lmax between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine.

During the night time measurement circuit Lmax noise from ACP did not exceed the 48 dB(A) Lmax criterion.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please do not hesitate to contact the undersigned.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Ross Hodge
Acoustical Consultant

Review:

Neil Pennington
Acoustical Consultant

APPENDIX 5

Noise Zone Review

3 July 2007

Ref: 06277/2216

Lisa Richards
Ashton Coal Operations Limited
P.O. Box 699
Singleton NSW 2330

RE: NOISE MODELLING RESULTS

This letter report presents the results of noise modelling conducted for the Ashton Coal Project (ACP) to determine the location of the 43 dB(A),$L_{eq(15\ minute)}$ noise contour for existing and future mining scenarios. Based on a noise emission criterion of 38 dB(A),$L_{eq(15\ minute)}$, the 43 dB(A) contour represents the level at which the acquisition process contained in ACP's consent could be triggered.

Modelled Scenarios

A pit map showing plant locations, haul routes and dump locations at the end of March 2007 was supplied by ACP as a basis for modelling the existing mining configuration. Noise models also included the CPP and front end loader. Sound power levels for open cut mining equipment were obtained by ERM in 2005 and reported in a document titled "Ashton Coal – Equipment Sound Power Level Determination" (21 November 2005). Sound power levels of the CPP and associated equipment have previously been measured by Spectrum Acoustics.

Overburden is currently being placed north of Glennies Creek Road and the intention is to extend the southern face of the eastern emplacement further to the west to provide an acoustic shield for ongoing mining in the Barrett Pit.

Figures 1 and 2 show the modelled 'existing' and 'future' (3rd quarter 2008) scenarios and source locations for the open-cut mining equipment.

Two separate scenarios were constructed for the 2008 mining scenario:

1) A dumping scenario indicated by ***northern and central haul routes*** in Figure 2, and
2) a dumping scenario indicated by the ***southern haul route*** in Figure 2 where dumping is at RL 95 and RL 135, extending the eastern emplacement to the west.

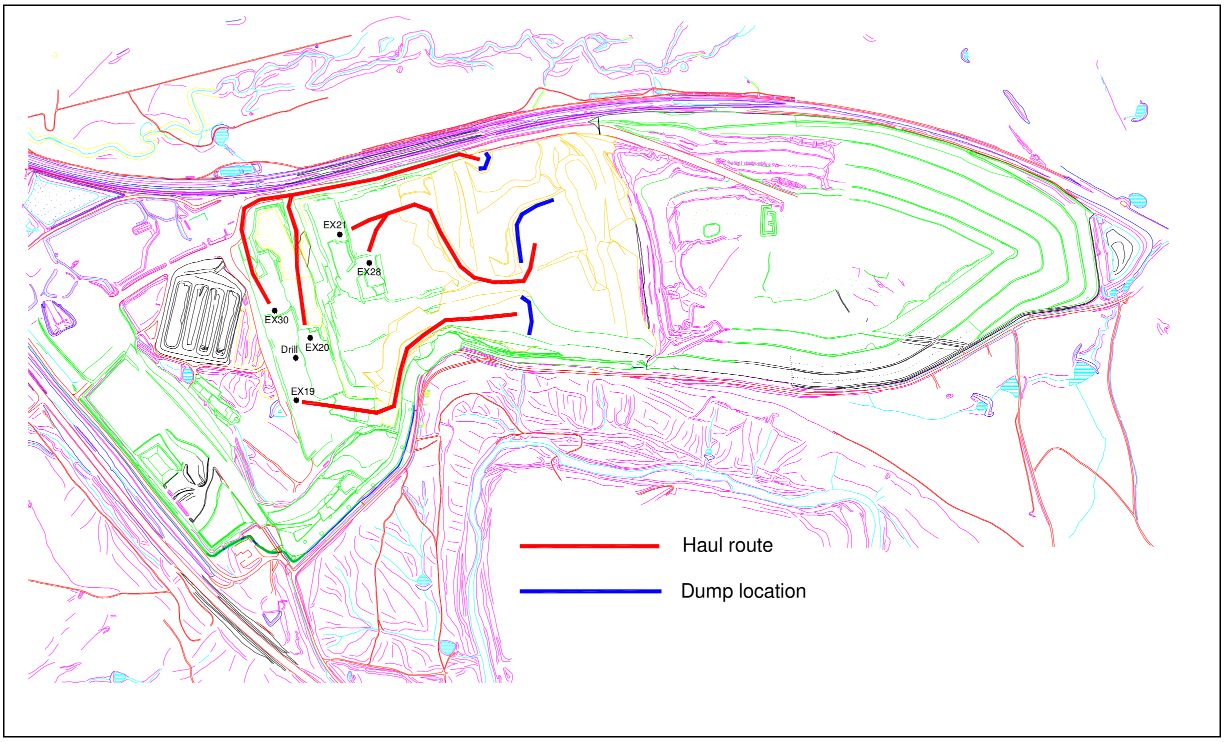


FIGURE 1. Mining source locations for ‘existing’ scenario.

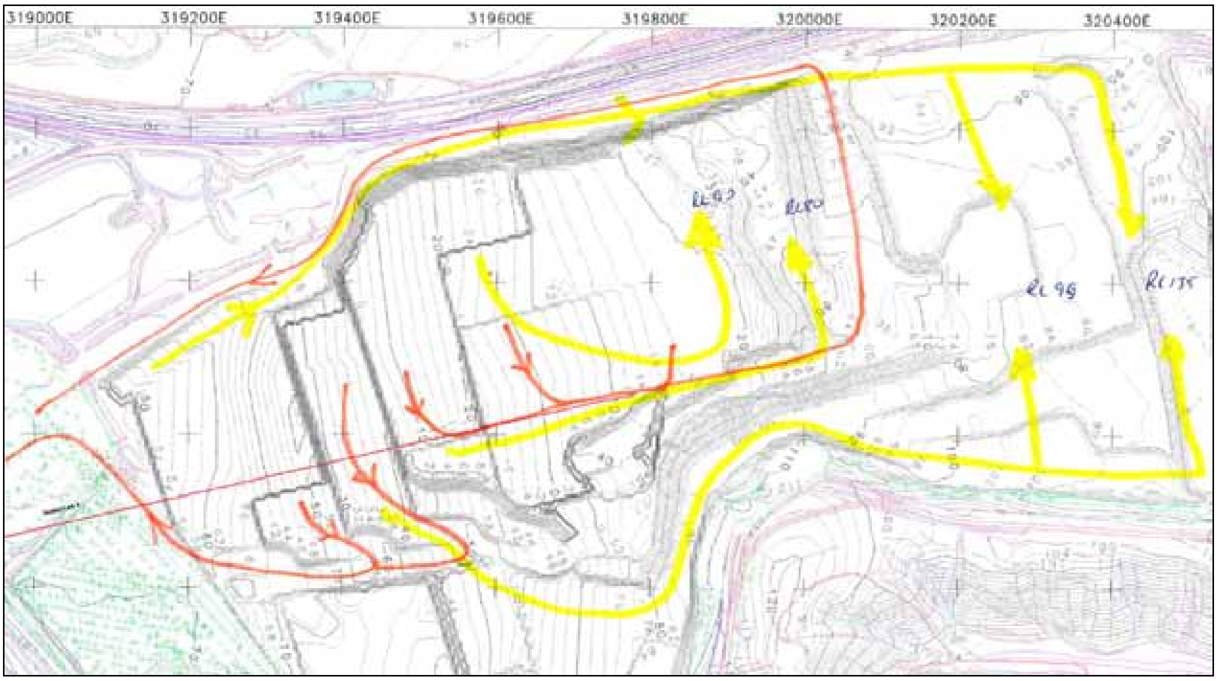


FIGURE 2. Haul routes and dump locations for 3rd quarter 2008 scenario.

RESULTS

Noise contours for each of the three modelled scenarios (existing, 2008 (central/northern haul routes) and 2008 (southern haul route)) under four meteorological conditions (neutral, 4.7^{0}C/100m inversion[1], 3 m/s SE wind and 3 m/s NW wind) are shown in as **Figures 3-14** in Appendix A.

Worst case predicted noise levels in Camberwell village are summarised in **Table 1**.

Table 1. Worst case predicted noise levels in Camberwell village.

	Meteorological Condition			
Scenario	**Neutral**	**Inversion**	**SE wind**	**NW wind**
Existing (March 2007)	30	35	25	43
2008 (central/northern haul routes)	27	33	22	36
2008 (southern haul route)	38	43	35	45

Predicted noise levels for the March 2007 scenario are under the 38 dB(A) noise criterion for all scenarios except the NW wind, where levels equal to the 43 dB(A) acquisition criterion were predicted. No exceedances of the site noise criterion are predicted for the 2008 scenario, when overburden is hauled via the northern and central haul routes.

Using the southern haul routed under inversion and NW wind conditions is predicted to produce noise levels equal to or greater than the acquisition criterion at some locations in Camberwell village. The main source of noise comes from the extreme eastern and of the haul route and the dumping location at RL 135. Compliant noise levels (approximately equal to the (central/northern haul route scenario) were predicted via supplementary modelling when the southern haul route is used to access dump sites at RL 110 or lower, under adverse conditions.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please do not hesitate to contact the undersigned.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:

Neil Pennington
Acoustical Consultant

Review:

Ross Hodge
Acoustical Consultant

1 This is the ACP applicable inversion strength determined by Spectrum Acoustics in 2006.

Appendix A

Predicted Noise Level Contours dB(A),$L_{eq(15\ minute)}$

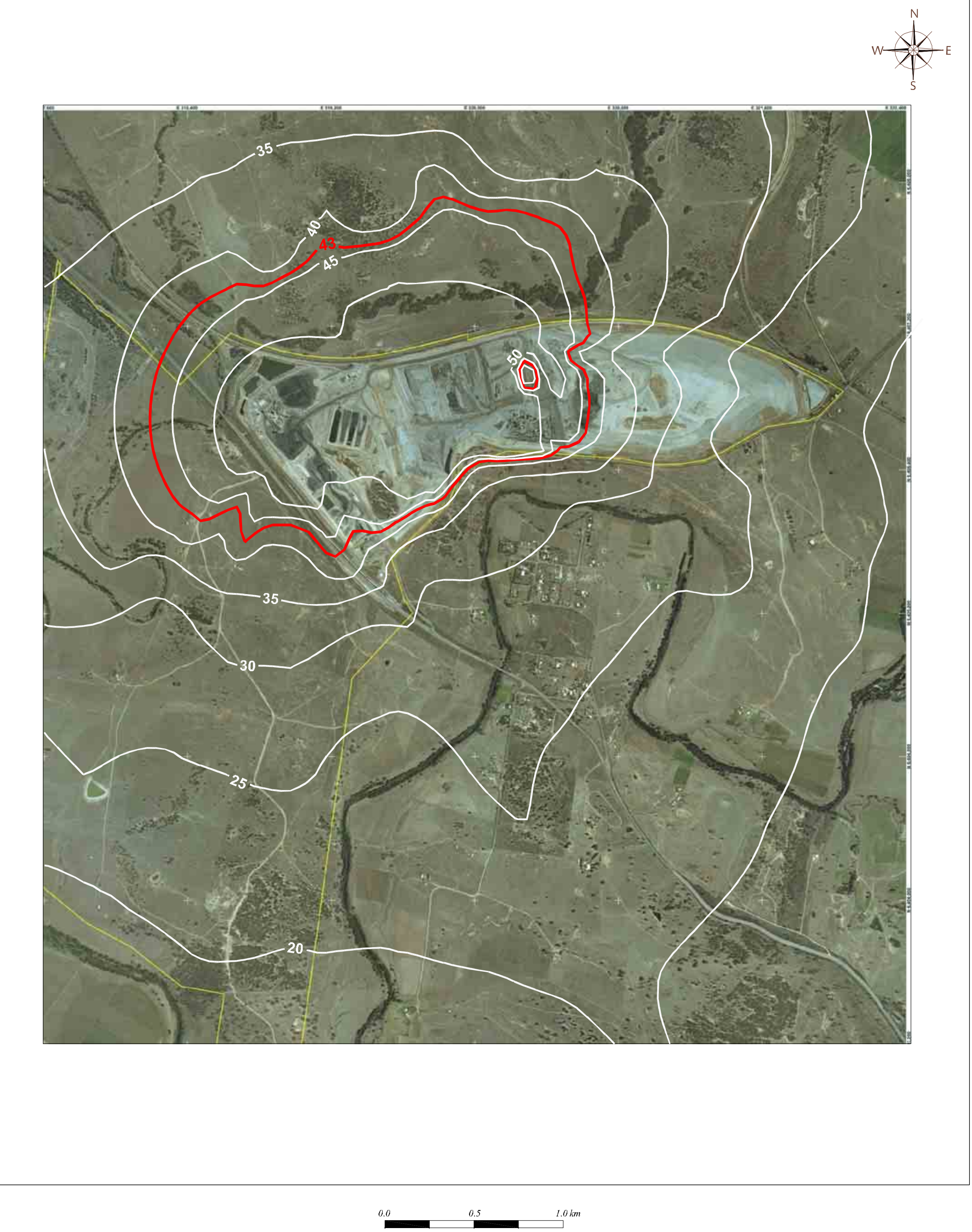


FIGURE 3

Existing Operations (March 07) Neutral Atmosphere

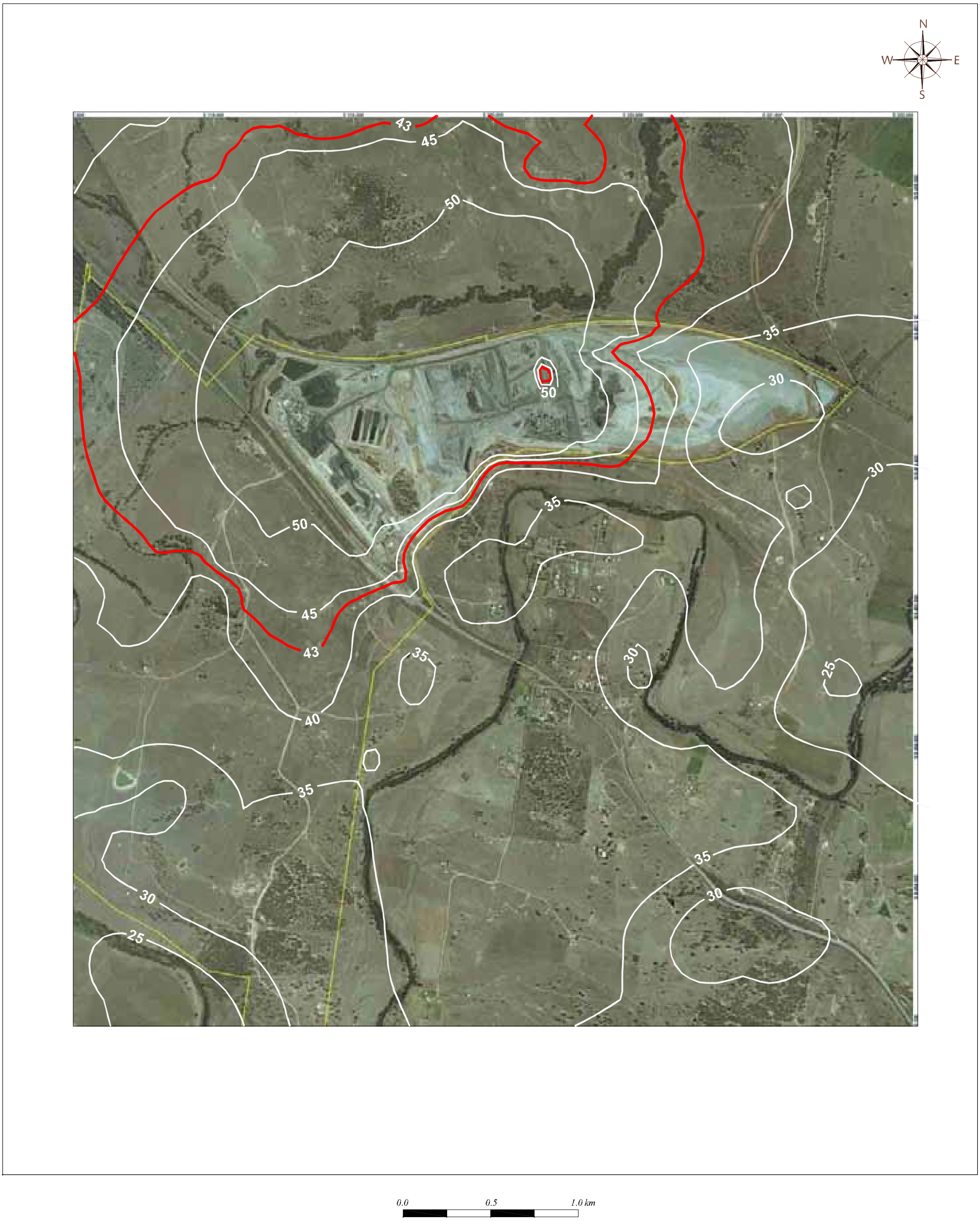


FIGURE 4

Existing Operations (March 07) 4.7° C/100m Inversion

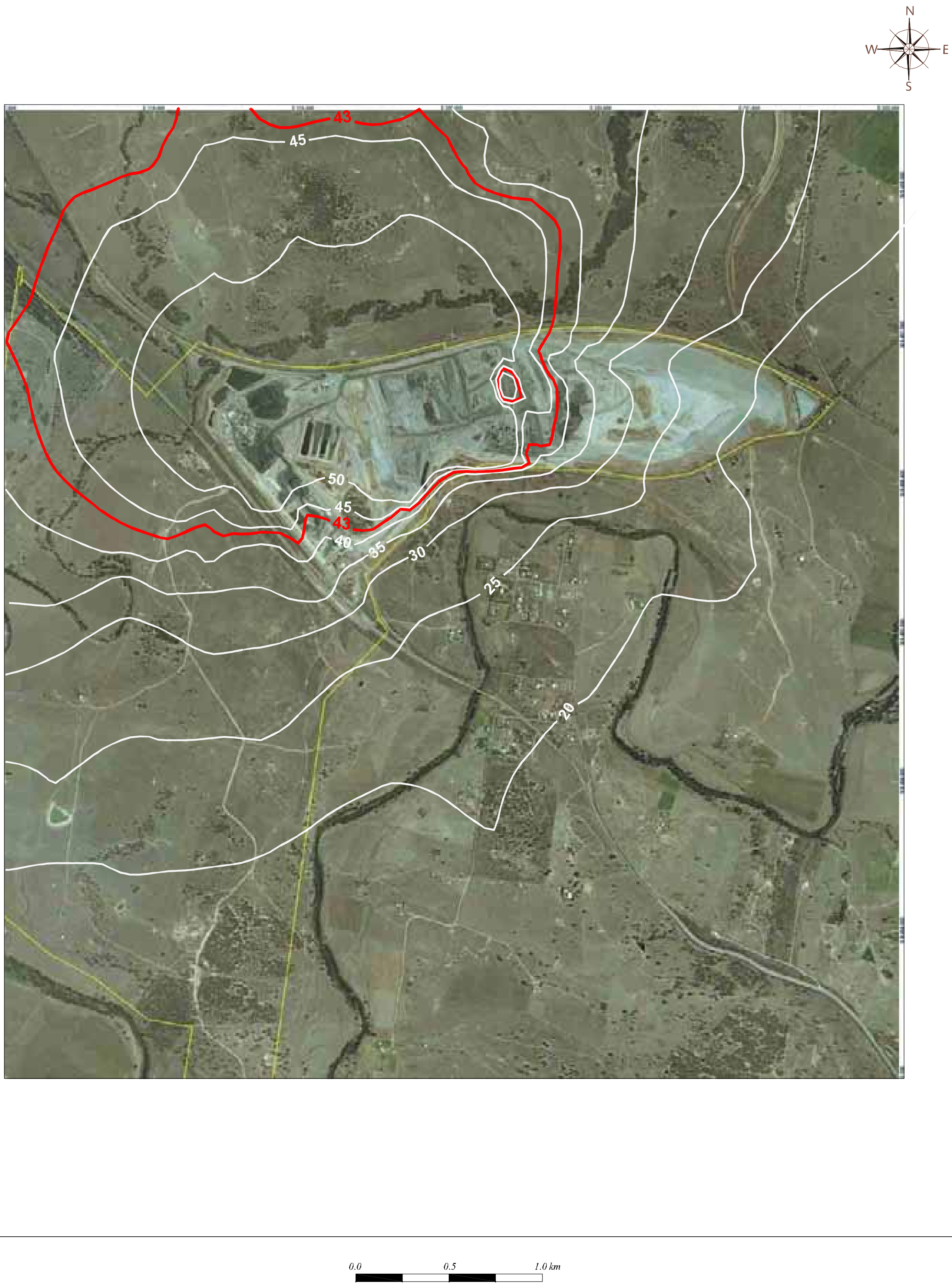


FIGURE 5

Existing Operations (March 07) 3 m/s SE Wind

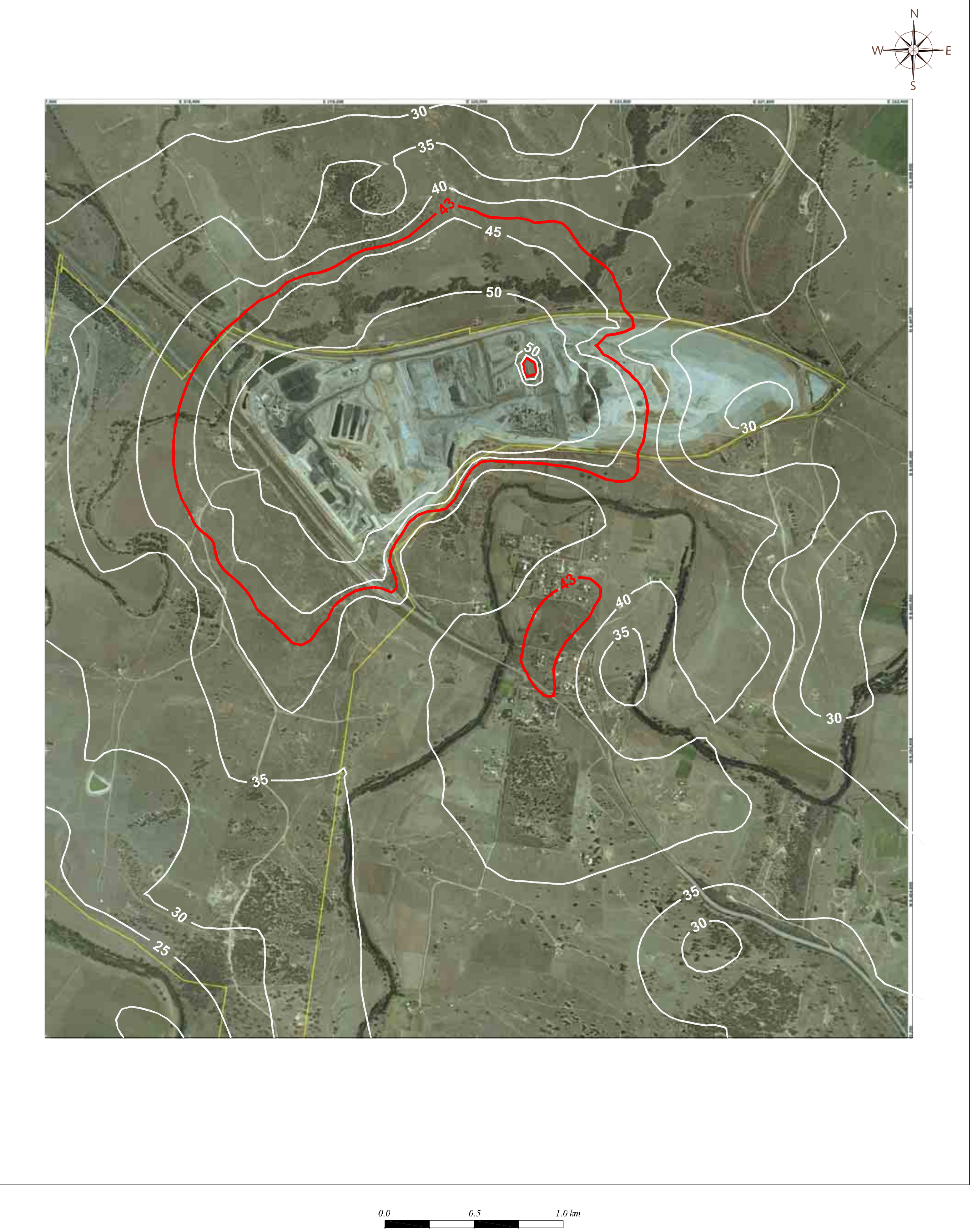


FIGURE 6

Existing Operations (March 07) 3 m/s NW Wind

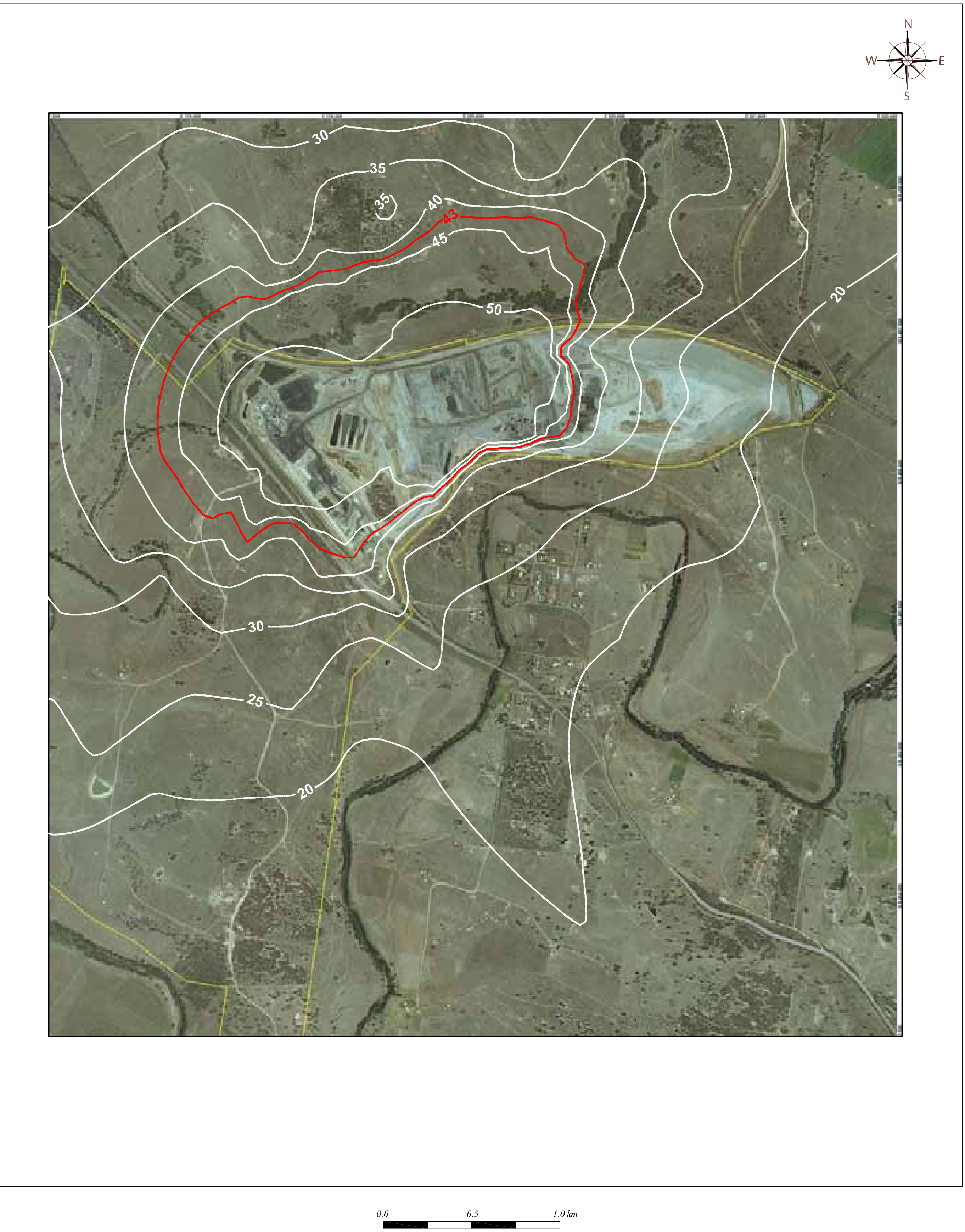
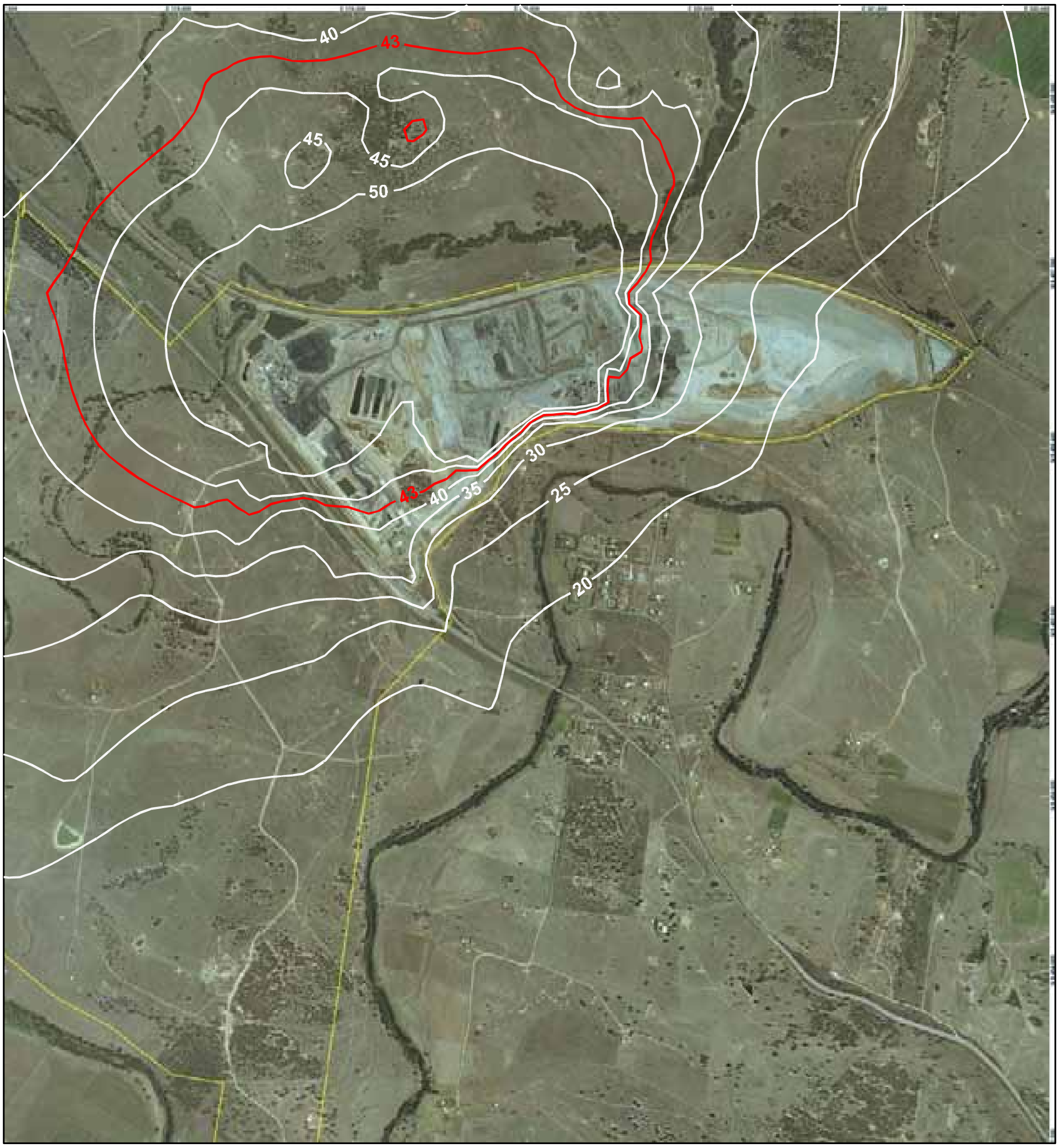


FIGURE 7

2008 Operations (Central & Northern Haul Roads)
Neutral Atmosphere

FIGURE 8

2008 Operations (Central & Northern Haul Roads)
4.7° C/100m Inversion



0.0 0.5 1.0 km

FIGURE 9

2008 Operations (Central & Northern Haul Roads)
3 m/s SE Wind

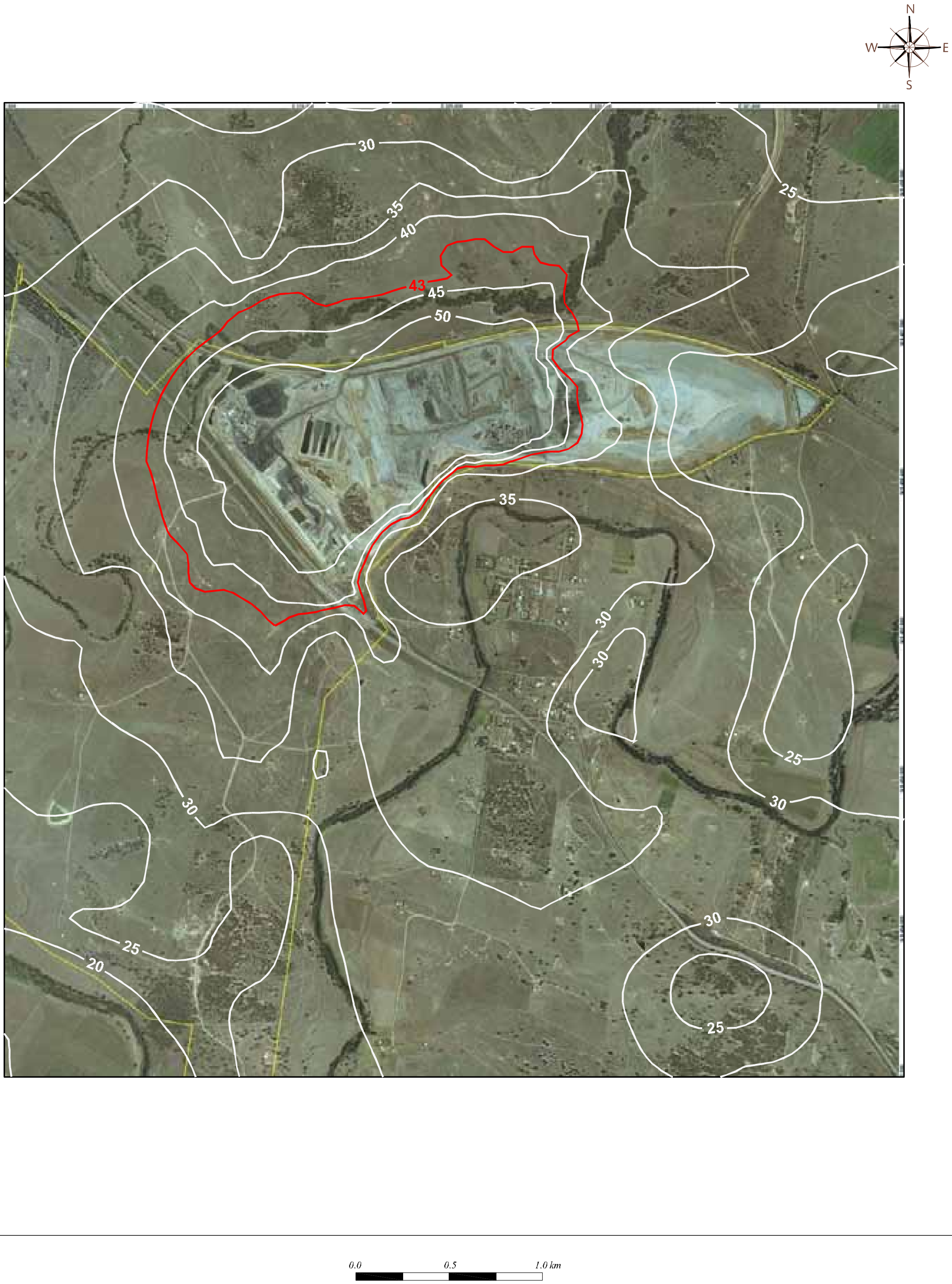


FIGURE 10

2008 Operations (Central & Northern Haul Roads)
3 m/s NW Wind

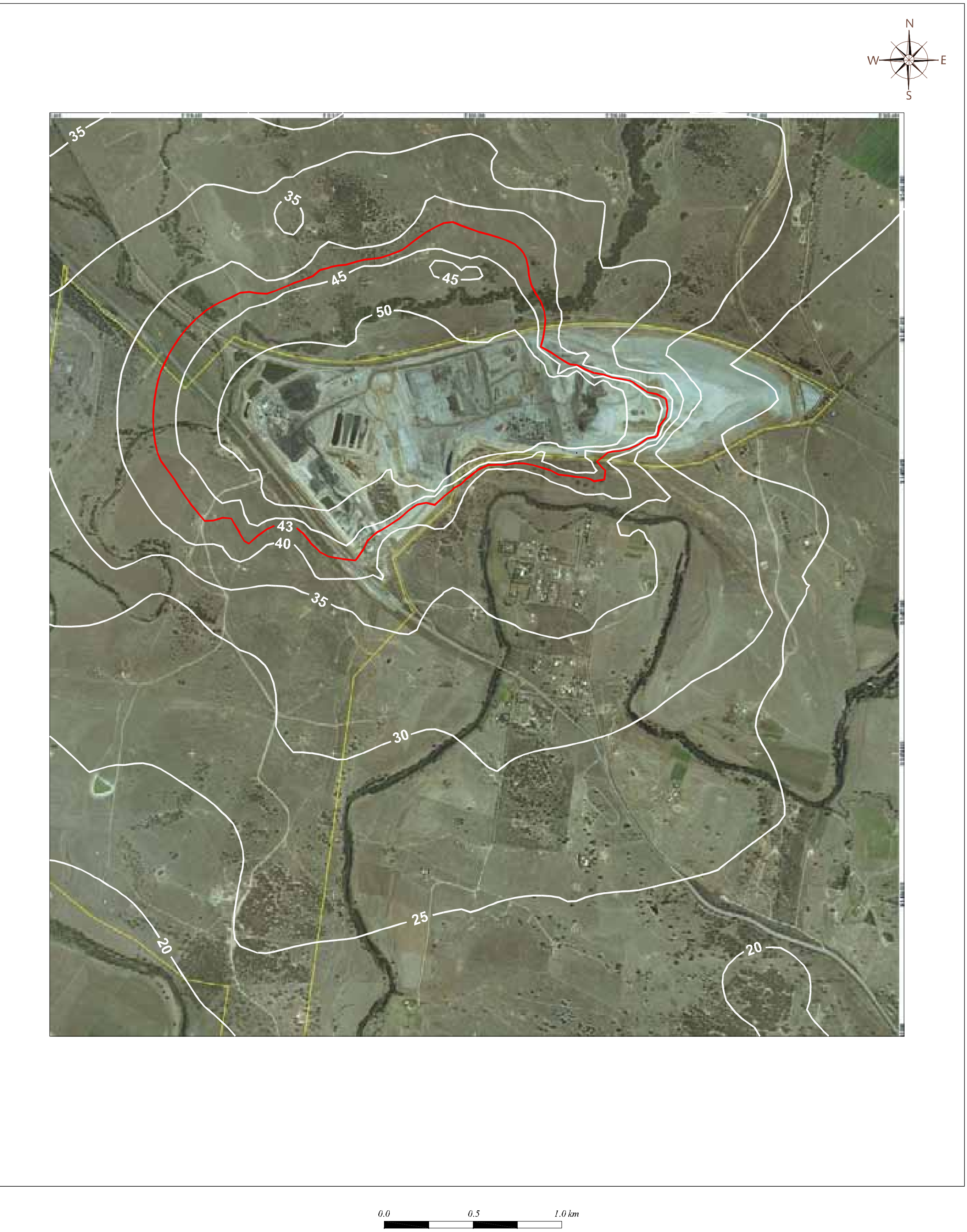


FIGURE 11

2008 Operations (Southern Haul Road)
Neutral Atmosphere

FIGURE 12

2008 Operations (Southern Haul Road)
4.7° C/100m Inversion

FIGURE 13

2008 Operations (Southern Haul Road)
3 m/s SE Wind

SPECTRUM ACOUSTICS

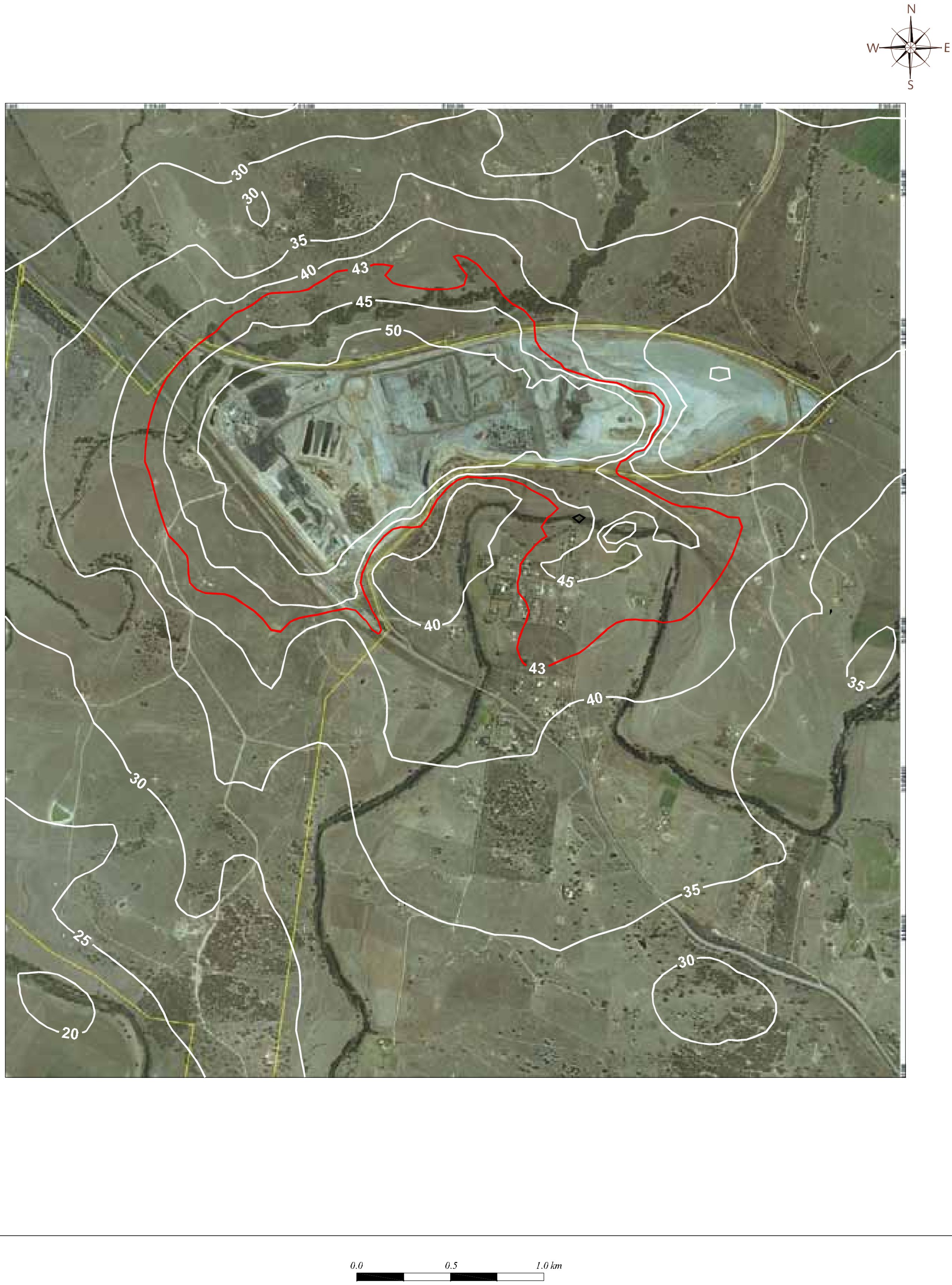


FIGURE 14

2008 Operations (Southern Haul Road)
3 m/s NW Wind

APPENDIX 6

AEMR Plans