APPENDIX 3D – GROUNDWATER MONITORING DATA

Summary of Groundwater Results 2017

Site	Water Level (mbgl)			pH			EC (uS/cm)		
	Min	Max	Ave	Min	Max	Max	Min	Max	Ave
GWa1	0.00	0.00	0.00	0.00	0.00	0.00	4.89	5.02	4.93
GWa2	2.58	3.70	3.33	6.50	6.60	6.53	1420.00	1690.00	1518.57
GWa3	4.10	4.51	4.31	7.20	7.30	7.22	1550.00	2000.00	1816.67
GWa4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GWa5	3.60	4.01	3.83	7.40	7.60	7.49	10400.00	15800.00	13296.36
GWa6	1.16	2.15	1.75	7.60	7.60	7.60	8210.00	13600.00	12101.67
GWa7	4.52	4.60	4.56	7.00	7.00	7.00	10400.00	10500.00	10450.00
GWa8	1.42	1.98	1.59	6.90	7.10	7.02	2330.00	2520.00	2430.00
GWa10	3.82	4.17	3.96	6.90	7.10	6.98	3320.00	3470.00	3399.17
GWa11	3.34	3.75	3.49	7.20	7.80	7.65	1450.00	1960.00	1707.50
GWa12	3.86	4.97	4.48	7.70	7.80	7.74	820.00	870.00	843.00
GWa14	4.97	31.45	18.21	0.00	0.00	0.00	0.00	0.00	0.00
GWa15	2.81	3.21	3.07	7.10	7.10	7.10	710.00	710.00	710.00
GWa16	3.47	3.52	3.50	7.30	7.40	7.35	18300.00	18500.00	18400.00
GWa22	-	-	-	-	-	-	-	-	-
GWa32	1.81	3.93	2.19	7.10	7.30	7.21	3480.00	4430.00	4062.50
GWa34	2.43	4.49	4.246818182	4.30	4.90	4.51	5190.00	6210.00	5843.333333
GWc1	9.51	10.20	9.77	7.00	7.30	7.15	2080.00	3540.00	2913.33
GWc2	12.85	14.43	13.80	7.00	7.20	7.11	1240.00	1300.00	1271.67
GWc3	9.27	11.46	10.21	6.80	6.90	6.81	3920.00	4410.00	4037.50
GWc4	14.55	14.85	14.69	6.60	6.70	6.65	2370.00	3110.00	2467.50
GWc5	5.71	6.33	6.00	6.50	6.70	6.61	5340.00	5620.00	5515.00
GWc10	1.84	3.93	2.44	6.50	7.00	6.79	3530.00	3710.00	3605.00
GWc11	14.19	14.59	14.37	6.50	6.60	6.55	3510.00	3710.00	3649.17
GWc12	30.04	34.60	32.61	7.10	7.50	7.28	1160.00	3580.00	1975.00
GWc14	26.33	31.45	29.27	7.30	7.40	7.34	1090.00	1120.00	1104.17
GWc15	2.81	3.21	3.07	7.10	7.10	7.10	710.00	710.00	710.00
GWc16	19.89	36.75	24.02	7.00	7.20	7.13	2150.00	2430.00	2325.83
GWc17	35.90	61.70	40.71	6.80	7.10	6.92	1620.00	1820.00	1705.00
GWc18	61.66	62.17	61.77	7.10	7.10	7.10	1620.00	2000.00	1882.00
GWc19	20.43	29.14	24.35	6.50	6.70	6.53	1250.00	1780.00	1375.45
GWc20	-	-	-	-	-	-	-	-	-
GWc22	-	-	-	-	-	-	-	-	-
GWc24	22.12	45.42	24.19	5.00	5.80	5.27	3570.00	3740.00	3640.00
GWc25	22.73	27.46	25.34	6.60	7.60	6.88	1500.00	1730.00	1567.50
GWc26	34.20	38.82	35.56	7.00	7.30	7.16	1220.00	1480.00	1339.17
GWc27	14.35	22.29	15.86	3.90	5.60	4.37	1750.00	1830.00	1795.00
GWc28	20.40	40.71	37.55	6.70	6.90	6.79	3230.00	3410.00	3338.33
GWc29	31.73	41.19	38.98	6.40	7.30	6.83	2190.00	2590.00	2420.00
GWc30	27.75	38.49	30.33	6.60	6.80	6.66	2440.00	2960.00	2596.67
GWc31	28.45	49.72	45.14	6.50	6.80	6.58	3430.00	4310.00	3588.18
GWc32	3.61	15.18	4.69	6.60	6.90	6.70	3440.00	3560.00	3495.83
GWc33	36.17	38.91	37.21	12.20	12.60	12.48	640.00	6950.00	6028.33
GWc34	4.39	20.60	18.16	7.00	7.30	7.11	4720.00	5040.00	4931.43
GWc35	40.41	41.87	40.99	6.90	7.20	7.05	600.00	664.00	639.83

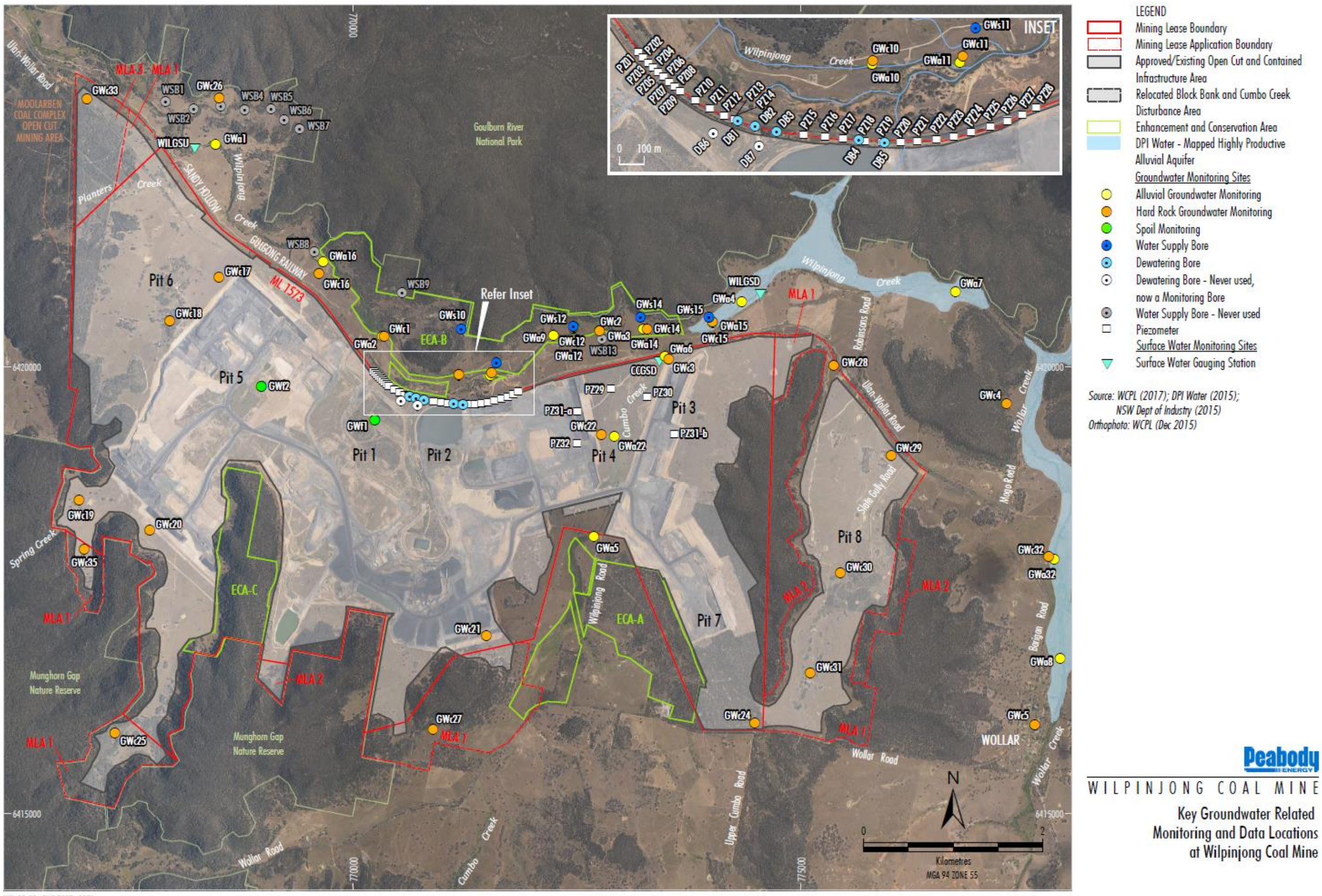
Summary of Groundwater Results 2016

Site	Water Level (mbgl)			pH			EC (uS/cm)		
	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave
GWa1	4.85	5.20	4.94	0.00	0.00	0.00	0.00	0.00	0.00
GWa2	1.37	4.27	3.09	6.60	7.00	6.76	1480.00	1910.00	1621.82
GWa3	3.62	5.12	4.22	7.00	7.40	7.17	500.00	2580.00	1281.43
GWa4	4.02	4.89	4.56	7.00	7.20	7.10	3040.00	3850.00	3546.67
GWa5	2.54	4.33	3.68	7.20	7.60	7.40	8920.00	14200.00	11310.91
GWa6	1.04	2.44	1.62	7.50	7.80	7.63	6640.00	13600.00	9832.00
GWa7	3.25	4.87	4.12	7.00	7.80	7.26	12.83	10800.00	5788.21
GWa8	1.10	2.28	1.59	6.80	7.20	7.03	2080.00	2520.00	2234.55
GWa10	3.03	3.99	3.62	6.80	7.30	6.98	2660.00	3590.00	3350.83
GWa11	3.16	3.62	3.40	7.40	7.70	7.53	1700.00	3070.00	2289.17
GWa12	3.28	5.54	3.93	7.60	7.70	7.63	890.00	1250.00	1030.00
GWa14	1.53	1.53	1.53	7.80	7.80	7.80	790.00	790.00	790.00
GWa15	2.48	3.73	3.41	7.20	7.60	7.38	290.00	2910.00	2354.00
GWa16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GWa22	3.87	3.92	3.90	6.90	7.10	7.00	5340.00	5470.00	5405.00
GWa32	1.56	2.85	2.11	7.00	7.30	7.16	3740.00	5550.00	4255.00
GWa34	2.80	4.71	4.2275	4.10	6.50	5.25	190.00	6640.00	4740
GWc1	8.62	9.61	9.19	6.90	7.20	7.05	2050.00	3370.00	2762.73
GWc2	12.23	14.62	13.83	7.00	7.20	7.06	1240.00	1290.00	1260.91
GWc3	8.93	14.23	10.77	6.70	7.00	6.82	3810.00	4250.00	4044.55
GWc4	14.26	14.57	14.45	6.70	7.00	6.82	1980.00	2470.00	2348.00
GWc5	5.91	6.56	6.18	6.40	6.80	6.58	5480.00	5700.00	5582.73
GWc10	1.40	2.37	1.97	6.50	7.30	6.94	3580.00	4020.00	3847.50
GWc11	13.34	14.32	13.79	6.20	6.50	6.34	3470.00	3710.00	3573.33
GWc12	26.52	32.29	29.51	6.90	7.30	7.11	1180.00	4130.00	1842.73
GWc14	22.97	30.37	27.10	7.20	7.30	7.25	1080.00	1170.00	1107.27
GWc15	19.37	25.55	22.56	6.50	6.70	6.55	3180.00	3370.00	3266.36

Summary of Groundwater Results 2014

Site	Water Level (mbgl)			pH			EC (uS/cm)		
	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave
GWa1	4.94	5.21	5.05	0.00	0.00	-	0.00	0.00	-
GWa2	3.78	4.20	4.01	6.70	6.90	6.81	1400.00	1510.00	1431.67
GWa3	4.88	5.45	5.22	6.90	7.20	7.03	2120.00	2640.00	2396.67
GWa4	3.80	13.67	5.08	6.50	7.20	6.92	2350.00	5260.00	4381.11
GWa5	3.24	4.19	3.67	7.00	7.50	7.23	9950.00	11070.00	10511.67
GWa6	2.47	2.79	2.72	7.50	7.60	7.55	8370.00	8830.00	8600.00
GWa7	4.66	5.21	4.95	7.00	7.30	7.05	12330.00	15270.00	13656.00
GWa8	1.42	2.25	1.72	6.80	7.10	6.95	2060.00	2290.00	2174.17
GWa10	3.43	4.18	3.87	6.80	7.00	6.90	3470.00	3840.00	3575.83
GWa11	3.16	4.07	3.57	7.40	7.70	7.53	2060.00	3920.00	2789.17
GWa12	5.04	5.85	5.62	0.00	0.00	-	0.00	0.00	0.00
GWa14	4.54	5.01	4.85	0.00	0.00	-	0.00	0.00	-
GWa15	3.54	3.69	3.62	7.20	7.40	7.30	2860.00	2960.00	2934.00
GWc1	9.62	10.12	9.85	6.90	7.10	7.03	2200.00	3320.00	2682.50
GWc2	12.47	14.51	13.61	7.00	7.30	7.13	1180.00	1300.00	1240.83
GWc3	9.88	10.73	10.27	6.70	6.80	6.74	4190.00	4630.00	4511.67
GWc4	13.23	14.09	13.83	6.40	6.70	6.56	2240.00	2480.00	2380.83
GWc5	5.81	6.47	6.08	6.40	6.70	6.56	5520.00	5770.00	5659.17
GWc10	2.66	5.04	3.98	6.90	7.50	7.22	3730.00	4020.00	3910.83
GWc11	13.49	14.80	14.20	6.10	6.40	6.23	3670.00	3820.00	3761.67
GWc12	24.28	32.33	27.79	7.10	7.60	7.24	1400.00	1700.00	1568.33
GWc14	19.64	29.58	24.56	7.20	7.40	7.26	1120.00	1170.00	1148.33
GWc15	15.32	23.11	19.53	6.50	6.70	6.55	3270.00	3370.00	3321.67

Groundwater Monitoring Locations



Complete Groundwater Results 2017

Sample Number	Sample Location	Sampling Date	Sampling Time	Aluminium mg/L	Arsenic mg/L	Barium mg/L	Bicarbonate Alkalinity as CaCO3 mg/L	Calcium mg/L	Carbonate Alkalinity as CaCO3 mg/L	Chloride mg/L	Copper mg/L	Depth to Standpipe m	Electrical Conductivity Field Reading) µS/cm	Electrical Conductivity - Client Supplied µS/cm	Electrical Conductivity @ 25°C µS/cm	Hydroxide Alkalinity as CaCO3 mg/L	Iron mg/L	Lead mg/L	Magnesium mg/L	Manganese mg/L	Nickel mg/L	No Sample	pH - Client Supplied pH Unit	pH - Field pH Unit
ME1700011001	GWA1	18-Jan-2017	1115										4.96											
ME1700011002	GWA2	18-Jan-2017	1139	1.36	0.003	0.095	93	32	<1	343	0.004	2.58		1530		<1		11.4	0.002	50	0.326	0.003		6.6
ME1700011003	GWA3	18-Jan-2017	1309	9.62	0.002	0.075	232	30	<1	280	0.014	4.1		1560		<1		8.35	0.008	40	0.23	0.019		7.2
ME1700011004	GWA4	18-Jan-2017	1218										4.09											
ME1700011005	GWA5	04-Jan-2017	1348	2.45	0.07	0.116	569	512	<1	1680	0.024	4.01		10500		<1		6.22	0.026	516	0.409	0.037		7.5
ME1700011006	GWA6	18-Jan-2017	1349	34.3	0.007	0.272	750	546	<1	2910	0.03	2.06		13600		<1		32.1	0.037	553	0.307	0.035		7.6
ME1700011007	GWA7	18-Jan-2017	1428	7.01	0.003	0.809	1080	492	<1	1550	0.014	4.6		10400		<1		15.7	0.019	461	3.29	0.044		7
ME1700011008	GWA8	23-Jan-2017	1338	0.66	<0.001	0.077	203	116	<1	341	0.006	1.8		2430		<1		1.15	0.002	118	16.1	0.011		7
ME1700011009	GWC1	18-Jan-2017	1151	0.04	<0.001	0.066	265	61	<1	420	0.003	9.69		2080		<1		0.55	<0.001	65	0.203	0.001		7
ME1700011010	GWC2	18-Jan-2017	1259	0.04	<0.001	0.413	541	62	<1	111	0.001	12.85		1240		<1		0.91	<0.001	34	0.064	0.001		7.1
ME1700011011	GWC3	18-Jan-2017	1336	2.23	0.024	0.066	586	135	<1	578	0.02	9.27		4080		<1		127	0.02	116	0.176	0.012		6.8
ME1700011012	GWC4	20-Jan-2017	1325	0.04	<0.001	0.075	638	165	<1	325	0.013	14.55		2400		<1		3.29	0.001	86	0.051	<0.001		6.6
ME1700011013	GWC5	23-Jan-2017	1359	0.02	<0.001	0.244	2380	299	<1	484	0.002	6.33		5570		<1		0.66	0.004	147	1.82	0.028		6.6
ME1700011014	GWA10	16-Jan-2017	1142	4.95	0.014	0.096	472	120	<1	655	0.035	3.85		3390		<1		11.1	0.006	117	2.32	0.019		6.9
ME1700011015	GWC10	16-Jan-2017	1204	0.07	<0.001	0.065	390	188	<1	275	0.081	2.37		3670		<1		2.68	<0.001	117	1.08	0.007		6.5
ME1700011016	GWA11	16-Jan-2017	1240	18.5	0.006	0.157	548	20	29	146	0.847	3.72		1950		<1		17.6	0.03	28	0.542	0.046		7.7
ME1700011017	GWC11	16-Jan-2017	1304	0.39	<0.001	0.14	346	116	<1	338	0.029	14.47		3600		<1		11.7	0.005	113	2.19	0.012		6.5
ME1700011018	GWA12	16-Jan-2017	1424	18.7	0.002	0.082	336	14	23	53	0.062	3.86		870		<1		7.34	0.008	12	0.143	0.033		7.8
ME1700011019	GWC12	16-Jan-2017	1450	0.24	<0.001	1	467	32	18	120	0.028	30.04		1240		<1		2.44	0.007	16	0.05	0.003		7.3
ME1700011020	GWA14	16-Jan-2017	1537										4.91											
ME1700011021	GWC14	16-Jan-2017	1527	0.15	<0.001	17.1	455	36	19	74	0.011	26.33		1090		<1		1.04	0.015	19	0.037	0.001		7.3
ME1700011022	GWA15	16-Jan-2017	1607	15.8	0.002	0.655	98	9	<1	123	0.452	2.81		710		<1		9.55	0.022	4	0.448	0.036		7.1
ME1700011023	GWC15	16-Jan-2017	1637	0.9	<0.001	0.654	966	75	<1	250	0.019	21.51		3300		<1		2.38	0.003	52	0.213	0.003		6.6
ME1700011024	GWC25	12-Jan-2017	1301	5.69	0.016	0.272	362	58	<1	252	0.026	22.73		1640		<1		14.4	0.089	82	2.98	0.137		6.7
ME1700011025	GWC19	12-Jan-2017	1050	0.08	0.002	0.208	238	64	<1	276	0.005	25.37		1350		<1		3.88	0.001	64	0.902	0.002		6.5
ME1700011026	GWC35	12-Jan-2017	1147	0.46	0.002	0.265	240	39	<1	40	0.058	40.41		620		<1		2.99	0.005	26	0.229	0.006		6.9
ME1700011027	GWC33	12-Jan-2017	1417	1.18	<0.001	0.469	<1	529	40	54	0.006	36.17		6390		1220		0.59	0.003	<1	0.031	0.003		12.2
ME1700011028	GWC26	20-Jan-2017	1043	0.06	<0.001	0.316	365	56	<1	162	0.007	34.62		1220		<1		2.8	<0.001	30	0.129	0.004		7.1
ME1700011029	GWC18	12-Jan-2017	1529	2.94	0.003	0.223	436	83	<1	169	0.017	62.17		1620		<1		11.4	0.02	55	0.309	0.042		7.1
ME1700011030	GWC17	25-Jan-2017	1218	1.6	0.004	0.221	291	107	<1	184	0.012	36.62		1790		<1		39.3	0.011	56	1.74	0.003		6.8
ME1700011031	GWC16	23-Jan-2017	1154	0.04	<0.001	0.157	573	80	<1	375	0.005	20.33		2390		<1		6.43	<0.001	44	0.04	<0.001		7.2
ME1700011032	GWC28	20-Jan-2017	1157	1.2	<0.001	4.66	869	140	<1	367	0.1	36.48		3250		<1		3.06	0.017	79	0.137	0.016		6.9
ME1700011033	GWC29	20-Jan-2017	1253	3.13	0.003	4.8	705	132	<1	302	0.112	37		2440		<1		8.1	0.043	101	0.368	0.019		7.3
ME1700011034	GWC30	23-Jan-2017	1300	0.05	<0.001	0.079	465	167	<1	413	0.047	27.83		2570		<1		7.44	<0.001	116	0.226	<0.001		6.6
ME1700011035	GWC31	04-Jan-2017	1201	0.06	0.004	0.044	375	209	<1	473	0.009	45.36		3480		<1		1.64	<0.001	153	0.561	0.038		6.5
ME1700011036	GWC24	04-Jan-2017	1301	0.9	0.002	0.056	<1	113	<1	483	0.985	22.71			3510	<1		64.6	0.011	188	7.52	0.319		
ME1700011037	GWC27	04-Jan-2017	1513	1.69	0.033	0.169	10	21	<1	346	0.016	14.35		1800		<1		66.2	0.014	40	2.85	0.05		5.5
ME1700011038	GWC32	20-Jan-2017	1356	0.04	<0.001	0.12	1300	145	<1	315	0.365	3.71		3440		<1		0.4	<0.001	109	0.064	0.003		6.7
ME1700011039	GWA32	20-Jan-2017	1421	0.02	<0.001	0.08	523	187	<1	814	0.01	2.3		4400		<1		0.07	<0.001	197	0.609	0.003		7.2
ME1700011040	GWA34	23-Jan-2017	1437	22.5	0.007	0.097	<1	455	<1	278	0.274	4.36		5190		<1		84.1	0.016	350	10.3	0.784		4.9
ME1700011041	GWC34	23-Jan-2017	1444	174	0.274	3.44	1980	99	<1	238	1.36	20.27		4950		<1		440	0.568	90	4.57	0.934		7.1
ME1700246001	GWA1	01-Feb-2017	1209										5.02											
ME1700246002	GWA2	02-Feb-2017	1213									2.78		1480										6.6
ME1700246003	GWA3	02-Feb-2017	1321									4.18		1550										7.2
ME1700246004	GWA4	02-Feb-2017	1246										4.11											

ME1700246005	GWA5	06-Feb-2017	1304									3.87		10400										7.5
ME1700246006	GWA6	02-Feb-2017	1349										2.17											
ME1700246007	GWA7	02-Feb-2017	1407										4.66											
ME1700246008	GWA8	06-Feb-2017	1301									1.98		2390										7.1
ME1700246009	GWC1	02-Feb-2017	1221									9.615		2150										7.1
ME1700246010	GWC2	02-Feb-2017	1313									13.095		1270										7
ME1700246011	GWC3	02-Feb-2017	1339									9.41		4190										6.8
ME1700246012	GWC4	02-Feb-2017	1430									14.58		2410										6.7
ME1700246013	GWC5	06-Feb-2017	1321									5.855		5620										6.6
ME1700246014	GWA10	03-Feb-2017	1033									3.95		3470										7
ME1700246015	GWC10	03-Feb-2017	1052									2.04		3710										6.5
ME1700246016	GWA11	03-Feb-2017	1121									3.68		1850										7.7
ME1700246017	GWC11	03-Feb-2017	1144									14.42		3660										6.5
ME1700246018	GWA12	03-Feb-2017	1209									4.02		870										7.7
ME1700246019	GWC12	03-Feb-2017	1234									31		1160										7.3
ME1700246020	GWA14	16-Feb-2017	1147										4.97											
ME1700246021	GWC14	16-Feb-2017	1208									28.85		1110										7.3
ME1700246022	GWA15	16-Feb-2017	1256										3.1											
ME1700246023	GWC15	16-Feb-2017	1307									23.64		3250										6.6
ME1700246024	GWC25	08-Feb-2017	1138									22.87		1550										6.6
ME1700246025	GWC19	08-Feb-2017	1257									23.26		1350										6.5
ME1700246026	GWC35	08-Feb-2017	1215									40.61		640										7
ME1700246027	GWC33	01-Feb-2017	1113									36.17		6470										12.4
ME1700246028	GWC26	01-Feb-2017	1155									34.62		1230										7.1
ME1700246029	GWC18	15-Feb-2017	1139									61.66		1930										7.1
ME1700246030	GWC17	15-Feb-2017	1219									36.66		1720										6.9
ME1700246031	GWC16	02-Feb-2017	1152									20.53		2270										7.1
ME1700246032	GWC28	16-Feb-2017	1401									37.37		3390										6.8
ME1700246033	GWC29	16-Feb-2017	1434									31.725		2480										7.1
ME1700246034	GWC30	17-Feb-2017	1132									28.205		2510										6.6
ME1700246035	GWC31	17-Feb-2017	1313									45.3		3450										6.6
ME1700246036	GWC24	06-Feb-2017	1420									22.255		3600										5.1
ME1700246037	GWC27	01-Feb-2017	1505									15.03		1770										4.5
ME1700246038	GWC32	17-Feb-2017	1220									3.84		3470										6.7
ME1700246039	GWA32	17-Feb-2017	1203									2.52		4400										7.2
ME1700246040	GWA34	08-Feb-2017	1426									4.43		5520										4.6
ME1700246041	GWC34	08-Feb-2017	1452									20.6		5040										7.3
ME1700396002	GWA2	01-Mar-2017	1140											1440										6.5
ME1700396003	GWA3	01-Mar-2017	1300											1880										7.2
ME1700396005	GWA5	10-Mar-2017	1459											10710										7.4
ME1700396009	GWC1	01-Mar-2017	1149											2140										7.2
ME1700396010	GWC2	01-Mar-2017	1252											1260										7
ME1700396011	GWC3	01-Mar-2017	1316											4140										6.8
ME1700396012	GWC4	01-Mar-2017	1424											2390										6.6
ME1700396013	GWC5	01-Mar-2017	1458											5520										6.6
ME1700396014	GWA10	03-Mar-2017	1034											3420										7
ME1700396015	GWC10	03-Mar-2017	1053											3630										6.5
ME1700396016	GWA11	03-Mar-2017	1124											1890										7.7
ME1700396017	GWC11	03-Mar-2017	1145											3630										6.5
ME1700396018	GWA12	03-Mar-2017	1217											840										7.8
ME1700396019	GWC12	03-Mar-2017	1229											1170										7.3
ME1700396021	GWC14	03-Mar-2017	1301											1120										7.4
ME1700396023	GWC15	03-Mar-2017	1346											3290										6.6
ME1700396024	GWC25	10-Mar-2017	1055											1580										6.8
ME1700396025	GWC19	10-Mar-2017	1123											1380										6.5

ME1700396026	GWC35	10-Mar-2017	1146											640										7.1
ME1700396027	GWC33	02-Mar-2017	1120											6260										12.5
ME1700396028	GWC26	02-Mar-2017	1159											1260										7
ME1700396029	GWC18	10-Mar-2017	1247											1910										7.1
ME1700396030	GWC17	10-Mar-2017	1315											1820										7.1
ME1700396031	GWC16	02-Mar-2017	1237											2290										7.1
ME1700396032	GWC28	07-Mar-2017	1124											3360										6.8
ME1700396033	GWC29	07-Mar-2017	1202											2570										6.9
ME1700396034	GWC30	07-Mar-2017	1232											2460										6.7
ME1700396035	GWC31	09-Mar-2017	1219											3440										6.5
ME1700396036	GWC24	09-Mar-2017	1305											3670										5
ME1700396037	GWC27	09-Mar-2017	1433											1830										4
ME1700396038	GWC32	07-Mar-2017	1332											3530										6.6
ME1700396039	GWA32	07-Mar-2017	1317											4350										7.2
ME1700396040	GWA34	07-Mar-2017	1406											5570										4.8
ME1700425001	GWA10	03-Mar-2017	1023									4.12												
ME1700425002	GWC10	03-Mar-2017	1044									2.2												
ME1700425003	GWA11	03-Mar-2017	1102									3.75												
ME1700425004	GWC11	03-Mar-2017	1134									14.46												
ME1700425005	GWA12	03-Mar-2017	1201									4.22												
ME1700425006	GWC12	03-Mar-2017	1204									33.04												
ME1700425007	GWC14	03-Mar-2017	1251									30.36												
ME1700425008	GWA15	03-Mar-2017	1321										3.16											
ME1700425009	GWC15	03-Mar-2017	1326									24.87												
ME1700425010	GWC25	10-Mar-2017	1047									23.63												
ME1700425011	GWC35	10-Mar-2017	1140									40.67												
ME1700425012	GWC33	02-Mar-2017	1104									36.26												
ME1700425013	GWC26	02-Mar-2017	1145									34.58												
ME1700425014	GWC17	10-Mar-2017	1308									61.7												
ME1700425015	GWC16	02-Mar-2017	1226									36.75												
ME1700425016	GWC28	07-Mar-2017	1114									20.4												
ME1700425017	GWC29	07-Mar-2017	1142									38.245												
ME1700425018	GWC30	07-Mar-2017	1218									38.49												
ME1700425019	GWC31	09-Mar-2017	1201									28.445												
ME1700425020	GWC24	10-Mar-2017	1417									45.42												
ME1700425021	GWC27	09-Mar-2017	1421									22.29												
ME1700425022	GWC32	07-Mar-2017	1325									15.18												
ME1700425023	GWA32	07-Mar-2017	1310									3.93												
ME1700425024	GWA34	07-Mar-2017	1353									2.425												
ME1700425025	GWC34	07-Mar-2017	1359									4.385												
ME1700425026	GWA1	01-Mar-2017	1114										4.96											
ME1700425027	GWA2	01-Mar-2017	1140									3.1												
ME1700425028	GWA3	01-Mar-2017	1300									4.3												
ME1700425029	GWA4	01-Mar-2017	1213										4.24											
ME1700425030	GWA5	10-Mar-2017	1459									3.88												
ME1700425031	GWA6	01-Mar-2017	1323										2.32											
ME1700425032	GWA7	01-Mar-2017	1339										4.705											
ME1700425033	GWA8	01-Mar-2017	1438																				No access	
ME1700425034	GWC1	01-Mar-2017	1149									9.64												
ME1700425035	GWC2	01-Mar-2017	1252									13.64												
ME1700425036	GWC3	01-Mar-2017	1316									9.85												
ME1700425037	GWC4	01-Mar-2017	1424									14.65												
ME1700425038	GWC5	01-Mar-2017	1458									5.71												
ME1700425039	GWA14	03-Mar-2017	1242										5.01											
ME1700425040	GWC18	10-Mar-2017	1247									61.7												

ME1700425041	GWC19	10-Mar-2017	1123									20.43												
ME1700501002	GWA2	04-Apr-2017	1122	2.39	0.023	0.094	62	30	<1	376	0.005			1420		<1		27	0.006	39	0.357	0.005		6.5
ME1700501003	GWA3	04-Apr-2017	1223	13.3	0.002	0.104	300	30	<1	370	0.023			1920		<1		11.5	0.013	35	0.323	0.028		7.2
ME1700501005	GWA5	05-Apr-2017	1439	3.47	0.031	0.614	453	614	<1	2390	0.011			12500		<1		5.75	0.008	646	0.222	0.029		7.4
ME1700501006	GWA6	04-Apr-2017	1317	2.68	0.003	0.12	461	292	<1	1520	0.008			8210		<1		2.66	0.003	310	0.148	0.006		7.6
ME1700501007	GWA7	04-Apr-2017	1344	1.62	0.002	0.152	1120	459	<1	2210	0.005			10500		<1		11.4	0.008	532	4.92	0.034		7
ME1700501008	GWA8	04-Apr-2017	1441	0.16	<0.001	0.077	195	120	<1	395	0.004			2360		<1		0.36	<0.001	110	16.5	0.009		7
ME1700501009	GWC1	04-Apr-2017	1133	0.05	<0.001	0.113	274	64	<1	480	0.002			2140		<1		0.54	<0.001	59	0.187	<0.001		7.3
ME1700501010	GWC2	04-Apr-2017	1217	0.06	<0.001	0.443	526	70	<1	116	<0.001			1260		<1		1.1	<0.001	29	0.056	<0.001		7.1
ME1700501011	GWC3	04-Apr-2017	1257	1.85	0.029	0.099	578	127	<1	672	0.018			4070		<1		256	0.017	113	0.189	0.01		6.8
ME1700501012	GWC4	04-Apr-2017	1412	0.05	<0.001	0.104	657	177	<1	360	<0.001			2390		<1		3.86	<0.001	79	0.05	<0.001		6.6
ME1700501013	GWC5	04-Apr-2017	1456	0.03	<0.001	0.229	2390	285	<1	555	0.003			5500		<1		0.64	0.003	148	1.67	0.029		6.6
ME1700501014	GWA10	12-Apr-2017	1104	2.21	0.008	0.069	505	122	<1	714	0.012			3460		<1		6.32	0.045	122	1.73	0.01		7
ME1700501015	GWC10	12-Apr-2017	1119	0.02	<0.001	0.056	381	178	<1	290	0.019			3620		<1		0.6	<0.001	125	0.912	0.007		6.8
ME1700501016	GWA11	12-Apr-2017	1138	1.72	<0.001	0.046	666	20	<1	128	0.031			1900		<1		1.71	0.002	26	0.431	0.005		7.6
ME1700501017	GWC11	12-Apr-2017	1202	0.2	<0.001	0.043	344	118	<1	364	0.046			3650		<1		11.2	0.001	133	2	0.011		6.5
ME1700501018	GWA12	12-Apr-2017	1234	43.4	0.003	0.229	332	14	<1	59	0.136			820		<1		18.5	0.022	11	0.624	0.08		7.8
ME1700501019	GWC12	12-Apr-2017	1303	0.56	<0.001	0.48	970	35	<1	165	0.035			2540		<1		2.3	0.006	16	0.069	0.005		7.3
ME1700501021	GWC14	12-Apr-2017	1351	0.06	<0.001	5.7	474	36	<1	100	0.007			1120		<1		0.58	0.008	18	0.027	<0.001		7.4
ME1700501023	GWC15	12-Apr-2017	1429	0.04	<0.001	0.115	1000	71	<1	265	0.003			3230		<1		1.04	<0.001	48	0.089	<0.001		6.7
ME1700501024	GWC25	06-Apr-2017	1006	0.76	0.004	0.155	383	26	<1	261	0.019			1540		<1		2.8	0.015	68	2.05	0.104		6.9
ME1700501025	GWC19	06-Apr-2017	1120	0.21	0.003	0.362	243	59	<1	273	0.006			1390		<1		6.11	0.003	59	0.41	0.002		6.5
ME1700501026	GWC35	06-Apr-2017	1058	0.09	<0.001	0.234	241	35	<1	42	0.118			620		<1		0.55	<0.001	24	0.118	0.005		7
ME1700501027	GWC33	11-Apr-2017	1105	0.99	0.001	0.398	<1	519	37	82	0.002			640		1330		0.17	<0.001	<1	0.005	0.002		12.6
ME1700501028	GWC26	11-Apr-2017	1147	0.02	<0.001	0.184	396	57	<1	153	0.004			1260		<1		1.61	<0.001	28	0.082	0.003		7.1
ME1700501029	GWC18	06-Apr-2017	1228	0.14	0.002	0.068	494	98	<1	180	0.001			2000		<1		5.42	0.002	60	0.412	0.042		7.1
ME1700501030	GWC17	06-Apr-2017	1309	0.95	0.001	0.238	503	76	<1	222	0.006			1770		<1		11	0.005	44	0.104	0.003		7
ME1700501031	GWC16	11-Apr-2017	1238	0.02	<0.001	0.118	575	85	<1	396	0.003			2380		<1		2.3	<0.001	41	0.03	<0.001		7.2
ME1700501032	GWC28	11-Apr-2017	1341	0.12	<0.001	0.232	805	141	<1	465	0.049			3230		<1		1.64	0.002	78	0.053	0.027		6.8
ME1700501033	GWC29	11-Apr-2017	1427	0.64	<0.001	0.903	721	120	<1	285	0.034			2450		<1		3.21	0.008	93	0.102	0.005		6.4
ME1700501034	GWC30	11-Apr-2017	1457	0.14	<0.001	0.227	463	164	<1	406	0.03			2440		<1		6.72	0.001	117	0.23	<0.001		6.6
ME1700501035	GWC31	05-Apr-2017	1331	<0.01	0.003	0.033	374	214	<1	478	0.002			3460		<1		1.57	<0.001	133	0.641	0.037		6.5
ME1700501036	GWC24	05-Apr-2017	1358	0.38	<0.001	0.058	<1	105	<1	516	0.115			3570		<1		66.1	0.005	168	7.8	0.286		5.2
ME1700501037	GWC27	06-Apr-2017	1429	0.6	0.005	0.073	<1	31	<1	354	0.016			1800		<1		4.09	0.006	34	3.52	0.054		4.2
ME1700501038	GWC32	05-Apr-2017	1140	0.01	<0.001	0.076	1400	135	<1	310	0.032			3450		<1		2.51	<0.001	109	0.08	<0.001		6.6
ME1700501039	GWA32	05-Apr-2017	1111	<0.01	<0.001	0.065	537	174	<1	786	0.012			4430		<1		0.05	<0.001	211	0.294	0.003		7.2
ME1700501040	GWA34	05-Apr-2017	1206	15.7	0.003	0.049	<1	488	<1	298	0.098			5650		<1		94.3	0.005	413	11.7	0.862		4.5
ME1700619001	GWA1	04-Apr-2017	1055										4.96											
ME1700619002	GWA2	04-Apr-2017	1122									3.3												
ME1700619003	GWA3	04-Apr-2017	1223									4.37												
ME1700619004	GWA4	04-Apr-2017	1157										4.635											
ME1700619005	GWA5	05-Apr-2017	1439									3.595												
ME1700619006	GWA6	04-Apr-2017	1317									1.16												
ME1700619007	GWA7	04-Apr-2017	1344									4.52												
ME1700619008	GWA8	04-Apr-2017	1441									1.47												
ME1700619009	GWC1	04-Apr-2017	1133									9.51												
ME1700619010	GWC2	04-Apr-2017	1217									13.595												
ME1700619011	GWC3	04-Apr-2017	1257									9.915												
ME1700619012	GWC4	04-Apr-2017	1412									14.645												
ME1700619013	GWC5	04-Apr-2017	1456									5.76												
ME1700619014	GWA10	12-Apr-2017	1057									3.875												
ME1700619015	GWC10	12-Apr-2017	1113									2.005												
ME1700619016	GWA11	12-Apr-2017	1128									3.44												
ME1700619017	GWC11	12-Apr-2017	1154									14.19												
ME1700619018	GWA12	12-Apr-2017	1218									4.395												

ME1700619019	GWC12	12-Apr-2017	1225									31.01												
ME1700619020	GWA14	12-Apr-2017	1325										4.97											
ME1700619021	GWC14	12-Apr-2017	1341									27.12												
ME1700619022	GWA15	12-Apr-2017	1405										3.17											
ME1700619023	GWC15	12-Apr-2017	1412									22.53												
ME1700619024	GWC25	06-May-2017	957									24.06												
ME1700619025	GWC19	06-Apr-2017	1120									23.55												
ME1700619026	GWC35	06-May-2017	1047									40.76												
ME1700619027	GWC33	11-Apr-2017	1054									36.41												
ME1700619028	GWC26	11-Apr-2017	1130									34.195												
ME1700619029	GWC18	06-Apr-2017	1228									61.67												
ME1700619030	GWC17	06-May-2017	1254									35.9												
ME1700619031	GWC16	11-Apr-2017	1229									19.89												
ME1700619032	GWC28	11-Apr-2017	1320									38.275												
ME1700619033	GWC29	11-Apr-2017	1401									38.91												
ME1700619034	GWC30	11-Apr-2017	1444									27.745												
ME1700619035	GWC31	05-Apr-2017	1319									45.48												
ME1700619036	GWC24	05-Apr-2017	1407									22.225												
ME1700619037	GWC27	06-Apr-2017	1415									15.275												
ME1700619038	GWC32	05-Apr-2017	1130									3.705												
ME1700619039	GWA32	05-Apr-2017	1123									1.9												
ME1700619040	GWA34	05-Apr-2017	1210									4.34												
ME1700619041	GWC34	05-Apr-2017	1214										20.565											
ME1700747001	GWA1	02-May-2017	1220																					
ME1700747002	GWA2	03-May-2017	1102											1480										6.5
ME1700747003	GWA3	03-May-2017	1203											1990										7.2
ME1700747004	GWA4	03-May-2017	1132																					
ME1700747005	GWA5	04-May-2017	1354											11750										7.4
ME1700747006	GWA6	03-May-2017	1245											10900										7.6
ME1700747007	GWA7	03-May-2017	1310																					
ME1700747008	GWA8	03-May-2017	1403											2470										7.1
ME1700747009	GWC1	03-May-2017	1111											2360										7.2
ME1700747010	GWC2	03-May-2017	1153											1280										7.2
ME1700747011	GWC3	03-May-2017	1227											4410										6.8
ME1700747012	GWC4	03-May-2017	1347											2440										6.7
ME1700747013	GWC5	03-May-2017	1421											5560										6.7
ME1700747014	GWA10	08-May-2017	1149											3410										6.9
ME1700747015	GWC10	08-May-2017	1207											3590										6.9
ME1700747016	GWA11	08-May-2017	1225											1960										7.6
ME1700747017	GWC11	08-May-	1247											3650										6.5

		2017																						
ME1700747018	GWA12	08-May-2017	1323											820										7.7
ME1700747019	GWC12	08-May-2017	1334											3520										7.2
ME1700747020	GWA14	11-May-2017	1359																					
ME1700747021	GWC14	11-May-2017	1423											1100										7.3
ME1700747022	GWA15	11-May-2017	1442																					
ME1700747023	GWC15	11-May-2017	1510											3200										6.6
ME1700747024	GWC25	11-May-2017	1108											1540										6.7
ME1700747025	GWC19	25-May-2017	1431											1280										6.5
ME1700747026	GWC35	25-May-2017	1412											640										7
ME1700747027	GWC33	02-May-2017	1134											6470										12.5
ME1700747028	GWC26	02-May-2017	1210											1260										7
ME1700747029	GWC18	11-May-2017	1211											1950										7.1
ME1700747030	GWC17	11-May-2017	1302											1660										6.8
ME1700747031	GWC16	02-May-2017	1250											2430										7
ME1700747032	GWC28	02-May-2017	1326											3410										6.7
ME1700747033	GWC29	02-May-2017	1357											2510										6.8
ME1700747034	GWC30	02-May-2017	1428											2530										6.6
ME1700747035	GWC31	04-May-2017	1224											3480										6.6
ME1700747036	GWC24	04-May-2017	1326											3620										5.3
ME1700747037	GWC27	04-May-2017	1438											1820										4.2
ME1700747038	GWC32	02-May-2017	1457											3560										6.6
ME1700747039	GWA32	02-May-2017	1520											4360										7.1
ME1700747040	GWA34	04-May-2017	1129											5990										4.7
ME1700747041	GWC34	04-May-2017	1146																					
ME1700750001	GWA1	02-May-2017	1220										4.91											
ME1700750002	GWA2	03-May-2017	1102									3.38												
ME1700750003	GWA3	03-May-2017	1203									4.41												
ME1700750004	GWA4	03-May-2017	1132										4.73											
ME1700750005	GWA5	04-May-2017	1354									3.955												
ME1700750006	GWA6	03-May-2017	1245									1.79												

ME1700750007	GWA7	03-May-2017	1310										4.66											
ME1700750008	GWA8	03-May-2017	1403									1.515												
ME1700750009	GWC1	03-May-2017	1111									9.535												
ME1700750010	GWC2	03-May-2017	1153									13.375												
ME1700750011	GWC3	03-May-2017	1227									10.105												
ME1700750012	GWC4	03-May-2017	1347									14.675												
ME1700750013	GWC5	03-May-2017	1421									5.795												
ME1700750014	GWA10	08-May-2017	1136									3.95												
ME1700750015	GWC10	08-May-2017	1157									1.84												
ME1700750016	GWA11	08-May-2017	1217									3.47												
ME1700750017	GWC11	08-May-2017	1236									14.31												
ME1700750018	GWA12	08-May-2017	1305									4.52												
ME1700750019	GWC12	08-May-2017	1311									30.45												
ME1700750020	GWA14	11-May-2017	1359										4.97											
ME1700750021	GWC14	11-May-2017	1412									26.69												
ME1700750022	GWA15	11-May-2017	1438										3.185											
ME1700750023	GWC15	11-May-2017	1448									22.11												
ME1700750024	GWC25	11-May-2017	1100									25.24												
ME1700750025	GWC19	25-May-2017	1431									23.88												
ME1700750026	GWC35	25-May-2017	1352									40.89												
ME1700750027	GWC33	02-May-2017	1120									36.58												
ME1700750028	GWC26	02-May-2017	1159									34.21												
ME1700750029	GWC18	11-May-2017	1211									61.665												
ME1700750030	GWC17	11-May-2017	1250									36.41												
ME1700750031	GWC16	02-May-2017	1240									20.3												
ME1700750032	GWC28	02-May-2017	1315									37.83												
ME1700750033	GWC29	02-May-2017	1344									38.55												
ME1700750034	GWC30	02-May-2017	1416									27.9												
ME1700750035	GWC31	04-May-2017	1212									45.52												
ME1700750036	GWC24	04-May-2017	1305									22.265												
ME1700750037	GWC27	04-May-2017	1428									15.34												

ME1700750038	GWC32	02-May-2017	1449									3.69												
ME1700750039	GWA32	02-May-2017	1508									1.92												
ME1700750040	GWA34	04-May-2017	1135									4.445												
ME1700750041	GWC34	04-May-2017	1140										20.53											
ME1700912002	GWA2	01-Jun-2017	1145											1590										6.5
ME1700912003	GWA3	01-Jun-2017	1317											2000										7.3
ME1700912005	GWA5	16-Jun-2017	1154											13500										7.4
ME1700912006	GWA6	01-Jun-2017	1359											13100										7.6
ME1700912008	GWA8	14-Jun-2017	1235											2480										6.9
ME1700912009	GWC1	01-Jun-2017	1159											3110										7.2
ME1700912010	GWC2	01-Jun-2017	1300											1260										7.1
ME1700912011	GWC3	01-Jun-2017	1344											3940										6.8
ME1700912012	GWC4	01-Jun-2017	1457											3110										6.7
ME1700912013	GWC5	14-Jun-2017	1304											5530										6.5
ME1700912014	GWA10	09-Jun-2017	1022											3440										6.9
ME1700912015	GWC10	09-Jun-2017	1042											3610										7
ME1700912016	GWA11	09-Jun-2017	1120											1520										7.7
ME1700912017	GWC11	09-Jun-2017	1139											3710										6.5
ME1700912018	GWA12	09-Jun-2017	1201											840										7.7
ME1700912019	GWC12	09-Jun-2017	1222											1160										7.2
ME1700912021	GWC14	09-Jun-2017	1252											1110										7.3
ME1700912023	GWC15	09-Jun-2017	1333											3280										6.6
ME1700912024	GWC25	05-Jun-2017	1238											1550										6.8
ME1700912025	GWC19	05-Jun-2017	1125											1300										6.6
ME1700912026	GWC35	05-Jun-2017	1205											639										7.1
ME1700912027	GWC33	08-Jun-2017	1038											6560										12.5
ME1700912028	GWC26	08-Jun-2017	1113											1260										7.1
ME1700912030	GWC17	05-Jun-2017	1430											1660										6.8
ME1700912031	GWC16	08-Jun-2017	1148											2370										7.1
ME1700912032	GWC28	08-Jun-2017	1228											3330										6.8
ME1700912033	GWC29	08-Jun-2017	1306											2590										6.8
ME1700912034	GWC30	08-Jun-2017	1336											2500										6.6
ME1700912035	GWC31	16-Jun-2017	1311											3430										6.5
ME1700912036	GWC24	16-Jun-2017	1235											3640										5.4
ME1700912037	GWC27	16-Jun-2017	1112											1800										4
ME1700912038	GWC32	08-Jun-2017	1418											3540										6.6
ME1700912039	GWA32	08-Jun-2017	1441											4150										7.2
ME1700912040	GWA34	14-Jun-2017	1332											5920										4.5
ME1700912041	GWC34	14-Jun-2017	1353											4890										7
ME1700913001	GWA1	01-Jun-2017	1113										4.89											
ME1700913003	GWA3	01-Jun-2017	1317									4.505												
ME1700913004	GWA4	01-Jun-2017	1227										4.655											
ME1700913005	GWA5	16-Jun-2017	1146									3.86												
ME1700913006	GWA6	01-Jun-2017	1359									1.31												
ME1700913007	GWA7	01-Jun-2017	1422										4.675											
ME1700913008	GWA8	14-Jun-2017	1229									1.51												
ME1700913009	GWC1	01-Jun-2017	1159									9.78												
ME1700913002	GWA2	01-Jun-2017	1145									3.435												
ME1700913010	GWC2	01-Jun-2017	1300									13.65												
ME1700913011	GWC3	01-Jun-2017	1344									10.005												
ME1700913012	GWC4	01-Jun-2017	1457									14.695												
ME1700913013	GWC5	14-Jun-2017	1256									5.93												

ME1700913014	GWA10	09-Jun-2017	1013									3.91												
ME1700913015	GWC10	09-Jun-2017	1032									2.23												
ME1700913016	GWA11	09-Jun-2017	1050									3.41												
ME1700913017	GWC11	09-Jun-2017	1128									14.29												
ME1700913018	GWA12	09-Jun-2017	1150									4.69												
ME1700913019	GWC12	09-Jun-2017	1209									32.89												
ME1700913020	GWA14	09-Jun-2017	1233										5.02											
ME1700913021	GWC14	09-Jun-2017	1240									29.56												
ME1700913023	GWC15	09-Jun-2017	1321									24.49												
ME1700913024	GWC25	05-Jun-2017	1229									25.43												
ME1700913025	GWC19	05-Jun-2017	1115									23.97												
ME1700913026	GWC35	05-Jun-2017	1152									40.865												
ME1700913027	GWC33	08-Jun-2017	1022									36.87												
ME1700913028	GWC26	08-Jun-2017	1059									34.33												
ME1700913029	GWC18	05-Jun-2017	1356																					
ME1700913030	GWC17	05-Jun-2017	1418									36.345												
ME1700913031	GWC16	08-Jun-2017	1137									20.3												
ME1700913032	GWC28	08-Jun-2017	1212									38.41												
ME1700913033	GWC29	08-Jun-2017	1243									38.84												
ME1700913034	GWC30	08-Jun-2017	1324									28.77												
ME1700913035	GWC31	16-Jun-2017	1254									45.58												
ME1700913036	GWC24	16-Jun-2017	1223									22.29												
ME1700913037	GWC27	16-Jun-2017	1058									15.39												
ME1700913038	GWC32	08-Jun-2017	1408									3.66												
ME1700913039	GWA32	08-Jun-2017	1428									1.87												
ME1700913040	GWA34	14-Jun-2017	1322									4.48												
ME1700913041	GWC34	14-Jun-2017	1341									20.46												
ME1700913022	GWA15	09-Jun-2017	1309										3.25											
ME1700927001	GWA1	03-Jul-2017	1104																					
ME1700927002	GWA2	03-Jul-2017	1134	12	0.024	0.116	63	38	<1	404	0.008			1690		<1	1.53	33.4	0.009	53	0.357	0.013		6.5
ME1700927003	GWA3	03-Jul-2017	1240																					
ME1700927004	GWA4	03-Jul-2017	1210																					
ME1700927005	GWA5	07-Jul-2017	1414	3.88	0.036	0.622	465	676	<1	3360	0.008			14900		<1	8.78	6.44	0.011	862	0.201	0.028		7.5
ME1700927006	GWA6	03-Jul-2017	1318	8.34	0.004	0.074	629	475	<1	2750	0.021			13500		<1	1.95	6.34	0.031	704	0.238	0.012		7.6
ME1700927007	GWA7	03-Jul-2017	1345																					
ME1700927008	GWA8	03-Jul-2017	1438	0.22	<0.001	0.056	208	143	<1	381	0.003			2510		<1	4.12	1.79	<0.001	131	15.4	0.01		7
ME1700927009	GWC1	03-Jul-2017	1143	0.08	<0.001	0.108	532	156	<1	541	0.004			3470		<1	4.35	0.67	<0.001	106	1.47	0.006		7.2
ME1700927010	GWC2	03-Jul-2017	1231	0.1	<0.001	0.37	481	75	<1	112	0.002			1280		<1	4.12	1.05	<0.001	32	0.062	0.002		7.1
ME1700927011	GWC3	03-Jul-2017	1307	6.55	0.097	0.211	522	137	<1	569	0.029			3980		<1	6.18	445	0.018	124	0.238	0.024		6.8
ME1700927012	GWC4	03-Jul-2017	1417	0.27	<0.001	0.129	600	173	<1	327	0.004			2430		<1	0.97	3.82	0.004	84	0.067	0.003		6.7
ME1700927013	GWC5	07-Jul-2017	1338	0.05	<0.001	0.222	2230		<1	543	0.002			5550		<1		1.68	0.003		1.63	0.031		6.6
ME1700927014	GWA10	25-Jul-2017	1227	0.39	0.016	0.05	476	122	<1	609	0.017			3380		<1	1.84	8.45	0.002	121	2.15	0.008		7
ME1700927015	GWC10	25-Jul-2017	1244	0.03	<0.001	0.049	360	181	<1	255	0.027			3550		<1	2.98	1.1	<0.001	125	0.167	0.003		7
ME1700927016	GWA11	25-Jul-2017	1302	3.65	<0.001	0.046	476	24	<1	102	0.175			1580		<1	7.29	3.7	0.004	24	0.343	0.008		7.7
ME1700927017	GWC11	25-Jul-2017	1325	0.17	<0.001	0.041	346	136	<1	323	0.011			3640		<1	0.83	8.22	0.001	145	1.8	0.01		6.6
ME1700927018	GWA12	31-Jul-2017	1059																					
ME1700927019	GWC12	31-Jul-2017	1132	1.57	<0.001	2.39	563	38	<1	118	0.015			1520		<1	2.24	2.38	0.005	20	0.092	0.006		7.4
ME1700927020	GWA14	31-Jul-2017	1146																					
ME1700927021	GWC14	31-Jul-2017	1206	0.16	<0.001	15.3	452	38	<1	62	0.01			1100		<1	2.86	1.02	0.024	20	0.033	<0.001		7.3
ME1700927022	GWA15	31-Jul-2017	1228																					
ME1700927023	GWC15	31-Jul-2017	1248	0.55	<0.001	2.94	984	30	<1	263	0.052			3220		<1	42.1	4.61	0.006	21	0.098	0.001		6.6
ME1700927024	GWC25	19-Jul-2017	1236	0.14	0.001	0.071	355	21	<1	252	0.038			1540		<1	2.54	0.54	0.006	63	0.137	0.069		6.6
ME1700927025	GWC19	19-Jul-2017	1105	0.04	<0.001	0.229	204	53	<1	240	0.002			1250		<1	3.15	1.68	0.001	48	0.151	0.001		6.5
ME1700927026	GWC35	19-Jul-2017	1157	0.04	<0.001	0.273	237	37	<1	46	0.105			650		<1	2.36	0.46	0.001	22	0.11	0.008		7.1
ME1700927027	GWC33	13-Jul-2017	1053	0.94	<0.001	0.368	<1	507	51	83	0.003			6660		1250	0.98	0.36	0.001	<1	0.019	0.002		12.6

ME1700927028	GWC26	13-Jul-2017	1137	0.33	<0.001	0.261	442	49	<1	151	0.011			1380		<1	1.68	1.51	0.004	22	0.07	0.003		7.2
ME1700927030	GWC17	19-Jul-2017	1350	0.06	<0.001	0.067	374	80	<1	234	0.001			1620		<1	2.72	3.63	0.001	40	0.449	<0.001		6.8
ME1700927031	GWC16	13-Jul-2017	1211	0.04	<0.001	0.12	532	83	<1	390	0.007			2410		<1	1.49	2.46	0.001	42	0.03	<0.001		7.2
ME1700927032	GWC28	13-Jul-2017	1248	0.12	<0.001	0.17	749	151	<1	490	0.052			3390		<1	2.44	1.69	0.002	89	0.051	0.005		6.8
ME1700927033	GWC29	13-Jul-2017	1319	0.21	<0.001	0.239	623	104	<1	286	0.05			2400		<1	6.66	1.81	0.003	77	0.036	0.003		6.8
ME1700927034	GWC30	13-Jul-2017	1351	0.05	<0.001	0.071	423	161	<1	421	0.052			2530		<1	0.98	6.61	<0.001	115	0.191	<0.001		6.6
ME1700927035	GWC31	13-Jul-2017	1429	0.08	0.002	0.036	328	206	<1	475	0.043			3510		<1	4.65	0.61	<0.001	128	0.439	0.034		6.6
ME1700927036	GWC24	14-Jul-2017	1331	0.2	<0.001	0.05	22	107	<1	544	0.006			3640		<1	7.22	79.5	0.002	169	6.9	0.228		5.6
ME1700927037	GWC27	14-Jul-2017	1413	1	0.009	0.088	<1	30	<1	361	0.026			1810		<1	1.68	5.66	0.011	36	3.37	0.052		3.9
ME1700927038	GWC32	07-Jul-2017	1316	0.03	<0.001	0.06	1290		<1	339	0.045			3510		<1		1.52	0.001		0.069	0.001		6.7
ME1700927039	GWA32	07-Jul-2017	1228	<0.01	<0.001	0.06	496	161	<1	772	0.008			4400		<1	0.27	<0.05	<0.001	200	0.271	0.004		7.2
ME1700927040	GWA34	07-Aug-2017	1333	18	0.002	0.031	<1	481	<1	318	0.162			5940		<1	2.57	102	0.003	471	11.1	0.909		4.3
ME1700927041	GWC34	07-Aug-2017	1355	4.09	0.008	0.143	1710	101	<1	231	0.521			4960		<1	4.7	11.9	0.027	91	0.256	0.355		7.1
ME1701078001	GWA1	03-Jul-2017	1104										4.89											
ME1701078002	GWA2	03-Jul-2017	1134									3.455												
ME1701078003	GWA3	03-Jul-2017	1240										4.91											
ME1701078004	GWA4	03-Jul-2017	1210										4.62											
ME1701078005	GWA5	07-Jul-2017	1408									3.685												
ME1701078006	GWA6	03-Jul-2017	1318									2.01												
ME1701078007	GWA7	03-Jul-2017	1345										4.73											
ME1701078008	GWA8	03-Jul-2017	1438									1.42												
ME1701078009	GWC1	03-Jul-2017	1143									9.74												
ME1701078010	GWC2	03-Jul-2017	1231									13.8												
ME1701078011	GWC3	03-Jul-2017	1307									10.385												
ME1701078012	GWC4	03-Jul-2017	1417									14.665												
ME1701078013	GWC5	07-Jul-2017	1334									6.155												
ME1701078014	GWA10	25-Jul-2017	1218									3.89												
ME1701078015	GWC10	25-Jul-2017	1237									2.04												
ME1701078016	GWA11	25-Jul-2017	1253									3.39												
ME1701078017	GWC11	25-Jul-2017	1312									14.245												
ME1701078018	GWA12	31-Jul-2017	1054									4.82												
ME1701078019	GWC12	31-Jul-2017	1123									34.49												
ME1701078020	GWA14	31-Jul-2017	1146									4.97												
ME1701078021	GWC14	31-Jul-2017	1150									31.3												
ME1701078022	GWA15	31-Jul-2017	1220									3.21												
ME1701078023	GWC15	31-Jul-2017	1233									26.12												
ME1701078024	GWC25	19-Jul-2017	1223									25.86												
ME1701078025	GWC19	19-Jul-2017	1054									24.16												
ME1701078026	GWC35	19-Jul-2017	1143									40.9												
ME1701078027	GWC33	13-Jul-2017	1038									37.18												
ME1701078028	GWC26	13-Jul-2017	1116									34.72												
ME1701078029	GWC18	03-Jul-2017	909																					
ME1701078030	GWC17	19-Jul-2017	1335									37.57												
ME1701078031	GWC16	13-Jul-2017	1201									21.25												
ME1701078032	GWC28	13-Jul-2017	1235									39.6												
ME1701078033	GWC29	13-Jul-2017	1306									39.88												
ME1701078034	GWC30	13-Jul-2017	1339									29.54												
ME1701078035	GWC31	13-Jul-2017	1413									46.49												
ME1701078036	GWC24	14-Jul-2017	1319									22.15												
ME1701078037	GWC27	14-Jul-2017	1358									15.315												
ME1701078038	GWC32	07-Jul-2017	1303									3.61												
ME1701078039	GWA32	07-Jul-2017	1255									1.81												
ME1701078040	GWA34	31-Jul-2017	1515																					
ME1701078041	GWC34	31-Jul-2017	1515																					
ME1701169001	GWA1	03-Aug-2017	1028																					

ME1701169002	GWA2	03-Aug-2017	1051											1720										6.5
ME1701169003	GWA3	03-Aug-2017	1211																					
ME1701169004	GWA4	03-Aug-2017	1127																					
ME1701169005	GWA5	02-Aug-2017	1413											15800										7.5
ME1701169006	GWA6	03-Aug-2017	1244											13300										7.6
ME1701169007	GWA7	03-Aug-2017	1308																					
ME1701169008	GWA8	03-Aug-2017	1416											2520										7
ME1701169009	GWC1	03-Aug-2017	1100											3520										7.2
ME1701169010	GWC2	03-Aug-2017	1206											1290										7.1
ME1701169011	GWC3	03-Aug-2017	1230											3920										6.8
ME1701169012	GWC4	03-Aug-2017	1354											2420										6.7
ME1701169013	GWC5	03-Aug-2017	1436											5530										6.7
ME1701169014	GWA10	10-Aug-2017	1210											3380										7.1
ME1701169015	GWC10	10-Aug-2017	1222											3570										7
ME1701169016	GWA11	10-Aug-2017	1241											1540										7.8
ME1701169017	GWC11	10-Aug-2017	1256											3700										6.6
ME1701169018	GWA12	10-Aug-2017	1325																					
ME1701169019	GWC12	10-Aug-2017	1347											1550										7.5
ME1701169020	GWA14	10-Aug-2017	1400																					
ME1701169021	GWC14	10-Aug-2017	1416											1100										7.4
ME1701169022	GWA15	10-Aug-2017	1431																					
ME1701169023	GWC15	10-Aug-2017	1451											3250										6.7
ME1701169024	GWC25	09-Aug-2017	1257											1540										6.6
ME1701169025	GWC19	09-Aug-2017	1137											1320										6.7
ME1701169026	GWC35	09-Aug-2017	1209											658										7.1
ME1701169027	GWC33	10-Aug-2017	1106											6580										12.6
ME1701169028	GWC26	10-Aug-2017	1240											1420										7.2
ME1701169029	GWC18	02-Aug-2017	1224																					
ME1701169030	GWC17	09-Aug-2017	1410											1630										7
ME1701169031	GWC16	09-Aug-2017	1438											2360										7.2
ME1701169032	GWC28	11-Aug-2017	1126											3340										6.8
ME1701169033	GWC29	11-Aug-2017	1217											2370										6.8
ME1701169034	GWC30	11-Aug-2017	1244											2510										6.7
ME1701169035	GWC31	02-Aug-2017	1241											3590										6.6
ME1701169036	GWC24	02-Aug-2017	1322											3620										5.5
ME1701169037	GWC27	02-Aug-2017	1452											1820										5.6
ME1701169038	GWC32	07-Aug-2017	1240											3500										6.8
ME1701169039	GWA32	07-Aug-2017	1224											3970										7.3
ME1701169040	GWA34	07-Aug-2017	1333											5940										4.3
ME1701169041	GWC34	07-Aug-2017	1355											4960										7.1
ME1701233001	GWA1	03-Aug-2017	1028										4.89											
ME1701233002	GWA2	03-Aug-2017	1044									3.49												
ME1701233003	GWA3	03-Aug-2017	1200										5.155											
ME1701233004	GWA4	03-Aug-2017	1123										4.565											
ME1701233005	GWA5	02-Aug-2017	1408									3.79												
ME1701233006	GWA6	03-Aug-2017	1236									2.15												
ME1701233007	GWA7	03-Aug-2017	1305										4.78											
ME1701233008	GWA8	03-Aug-2017	1412									1.465												
ME1701233009	GWC1	03-Aug-2017	1045									9.77												
ME1701233010	GWC2	03-Aug-2017	1158									14.11												
ME1701233011	GWC3	03-Aug-2017	1223									10.385												
ME1701233012	GWC4	03-Aug-2017	1348									14.695												
ME1701233013	GWC5	03-Aug-2017	1427									6.17												
ME1701233014	GWA10	15-Aug-2017	1521									3.82												
ME1701233015	GWC10	15-Aug-2017	1530									2.135												

ME1701233016	GWA11	15-Aug-2017	1540									3.34												
ME1701233017	GWC11	15-Aug-2017	1550									14.225												
ME1701233018	GWA12	15-Aug-2017	1602									4.825												
ME1701233019	GWC12	15-Aug-2017	1614									34.6												
ME1701233020	GWA14	15-Aug-2017	1630									31.45												
ME1701233021	GWC14	15-Aug-2017	1631									31.45												
ME1701233022	GWA15	15-Aug-2017	1641									3.18												
ME1701233023	GWC15	15-Aug-2017	1649									26.31												
ME1701233024	GWC25	16-Aug-2017	1053									26.06												
ME1701233025	GWC19	09-Aug-2017	1125									24.41												
ME1701233026	GWC35	16-Aug-2017	1032									40.95												
ME1701233027	GWC33	15-Aug-2017	1350									37.41												
ME1701233028	GWC26	15-Aug-2017	1419									35.28												
ME1701233029	GWC18	02-Aug-2017	1058																					
ME1701233030	GWC17	15-Aug-2017	1443									38.59												
ME1701233031	GWC16	15-Aug-2017	1502									22.575												
ME1701233032	GWC28	16-Aug-2017	1219									40.1												
ME1701233033	GWC29	16-Aug-2017	1246									40.335												
ME1701233034	GWC30	16-Aug-2017	1301									30.165												
ME1701233035	GWC31	16-Aug-2017	1421									48.47												
ME1701233036	GWC24	16-Aug-2017	1435									22.12												
ME1701233037	GWC27	16-Aug-2017	1455									15.27												
ME1701233038	GWC32	16-Aug-2017	1326									3.625												
ME1701233039	GWA32	16-Aug-2017	1319									1.82												
ME1701233040	GWA34	16-Aug-2017	1350									4.405												
ME1701233041	GWC34	16-Aug-2017	1356									20.59												
ME1701340001	GWA1	01-Sep-2017	1013																					
ME1701340002	GWA2	01-Sep-2017	1035											1760										6.5
ME1701340003	GWA3	01-Sep-2017	1142																					
ME1701340004	GWA4	01-Sep-2017	1110																					
ME1701340005	GWA5	01-Sep-2017	1449											15700										7.6
ME1701340006	GWA6	01-Sep-2017	1208																					
ME1701340007	GWA7	01-Sep-2017	1228																					
ME1701340008	GWA8	01-Sep-2017	1345											2470										7
ME1701340009	GWC1	01-Sep-2017	1045											3530										7.1
ME1701340010	GWC2	01-Sep-2017	1129											1280										7.1
ME1701340011	GWC3	01-Sep-2017	1200											3930										6.8
ME1701340012	GWC4	01-Sep-2017	1310											2410										6.6
ME1701340013	GWC5	01-Sep-2017	1402											5520										6.6
ME1701340014	GWA10	20-Sep-2017	1043											3360										7
ME1701340015	GWC10	20-Sep-2017	1104											3550										7
ME1701340016	GWA11	20-Sep-2017	1126											1690										7.7
ME1701340017	GWC11	20-Sep-2017	1149											3690										6.6
ME1701340018	GWA12	20-Sep-2017	1224											841										7.7
ME1701340019	GWC12	20-Sep-2017	1304											3080										7.1
ME1701340020	GWA14	20-Sep-2017	1324																					
ME1701340021	GWC14	20-Sep-2017	1353											1100										7.4
ME1701340022	GWA15	20-Sep-2017	1417																					
ME1701340023	GWC15	20-Sep-2017	1441											3240										6.6
ME1701340024	GWC25	14-Sep-2017	1250											1500										6.8
ME1701340025	GWC19	14-Sep-2017	1101											1380										6.5
ME1701340026	GWC35	14-Sep-2017	1132											662										7.2
ME1701340027	GWC33	11-Sep-2017	1222											6440										12.5
ME1701340028	GWC26	11-Sep-2017	1313											1430										7.3
ME1701340029	GWC18	01-Sep-2017	1335																					

ME1701340030	GWC17	14-Sep-2017	1351											1680										7
ME1701340031	GWC16	11-Sep-2017	1352											2310										7.1
ME1701340032	GWC28	15-Sep-2017	1126											3310										6.8
ME1701340033	GWC29	15-Sep-2017	1229											2290										6.8
ME1701340034	GWC30	15-Sep-2017	1307											2520										6.6
ME1701340035	GWC31	04-Sep-2017	1456											3510										6.5
ME1701340036	GWC24	04-Sep-2017	1418											3660										5.7
ME1701340037	GWC27	15-Sep-2017	1446											1770										4.1
ME1701340038	GWC32	15-Sep-2017	1356											3440										6.9
ME1701340039	GWA32	15-Sep-2017	1341											3500										7.3
ME1701340040	GWA34	04-Sep-2017	1249											6120										4.3
ME1701340041	GWC34	04-Sep-2017	1312											5000										7
ME1701358001	GWA1	01-Sep-2017	1013										4.89											
ME1701358002	GWA2	01-Sep-2017	1027									3.53												
ME1701358003	GWA3	01-Sep-2017	1133										5.335											
ME1701358004	GWA4	01-Sep-2017	1107										4.61											
ME1701358005	GWA5	01-Sep-2017	1444									3.825												
ME1701358006	GWA6	01-Sep-2017	1206										2.17											
ME1701358007	GWA7	01-Sep-2017	1227										4.735											
ME1701358008	GWA8	01-Sep-2017	1338									1.495												
ME1701358009	GWC1	01-Sep-2017	1039									9.765												
ME1701358010	GWC2	01-Sep-2017	1123									14.3												
ME1701358011	GWC3	01-Sep-2017	1153									10.365												
ME1701358012	GWC4	01-Sep-2017	1300									14.74												
ME1701358013	GWC5	01-Sep-2017	1358									6.26												
ME1701358014	GWA10	20-Sep-2017	1030									3.915												
ME1701358015	GWC10	20-Sep-2017	1054									2.665												
ME1701358016	GWA11	20-Sep-2017	1117									3.41												
ME1701358017	GWC11	20-Sep-2017	1136									14.37												
ME1701358018	GWA12	20-Sep-2017	1209									4.965												
ME1701358019	GWC12	20-Sep-2017	1238									33.19												
ME1701358020	GWA14	20-Sep-2017	1324										4.97											
ME1701358021	GWC14	20-Sep-2017	1341									30.87												
ME1701358022	GWA15	20-Sep-2017	1407										3.23											
ME1701358023	GWC15	20-Sep-2017	1428									26.33												
ME1701358024	GWC25	14-Sep-2017	1238									26.415												
ME1701358025	GWC19	14-Sep-2017	1048									24.83												
ME1701358026	GWC35	14-Sep-2017	1115									41.11												
ME1701358027	GWC33	11-Sep-2017	1203									37.76												
ME1701358028	GWC26	11-Sep-2017	1300									36.05												
ME1701358029	GWC18	01-Sep-2017	1055																					
ME1701358030	GWC17	14-Sep-2017	1338									40.13												
ME1701358031	GWC16	11-Sep-2017	1340									24.15												
ME1701358032	GWC28	15-Sep-2017	1103									40.71												
ME1701358033	GWC29	15-Sep-2017	1145									41.015												
ME1701358034	GWC30	15-Sep-2017	1256									30.88												
ME1701358035	GWC31	04-Sep-2017	1440									47.9												
ME1701358036	GWC24	04-Sep-2017	205									22.15												
ME1701358037	GWC27	15-Sep-2017	1432									15.4												
ME1701358038	GWC32	15-Sep-2017	1347									3.715												
ME1701358039	GWA32	15-Sep-2017	1330									1.885												
ME1701358040	GWA34	04-Sep-2017	1236									4.43												
ME1701358041	GWC34	04-Sep-2017	1258									20.435												
ME1701361001	GWA1	03-Oct-2017	1124																					
ME1701361002	GWA2	03-Oct-2017	1202	0.38	0.01	0.112	84	35	<1	401	0.004			1780		<1	1.15	11	0.003	50	0.193	0.004		6.5

ME1701361003	GWA3	03-Oct-2017	1309																					
ME1701361004	GWA4	03-Oct-2017	1235																					
ME1701361005	GWA5	03-Oct-2017	1541	0.58	0.029	0.049	660	616	<1	3040	0.007			15500		<1	0.95	1.97	0.007	932	0.145	0.018		7.6
ME1701361006	GWA6	03-Oct-2017	1331																					
ME1701361007	GWA7	03-Oct-2017	1354																					
ME1701361008	GWA8	03-Oct-2017	1451	0.07	<0.001	0.061	271	103	<1	346	0.003			2400		<1	3.17	0.44	<0.001	103	17.4	0.01		7.1
ME1701361009	GWC1	03-Oct-2017	1215	0.03	<0.001	0.093	597	117	<1	540	0.003			3540		<1	5.04	1.26	<0.001	90	0.777	0.004		7.2
ME1701361010	GWC2	03-Oct-2017	1303	0.07	<0.001	0.396	544	66	<1	106	0.003			1300		<1	4.61	0.82	<0.001	32	0.056	0.001		7.2
ME1701361011	GWC3	03-Oct-2017	1325	0.33	0.005	0.048	615	98	<1	554	0.006			3940		<1	3.41	52.6	0.004	99	0.126	0.002		6.9
ME1701361012	GWC4	03-Oct-2017	1426	0.06	<0.001	0.094	674	165	<1	306	0.003			2430		<1	4.55	3.91	0.001	75	0.055	0.002		6.6
ME1701361013	GWC5	03-Oct-2017	1513	0.03	<0.001	0.213	2500	260	<1	483	0.004			5550		<1	6.87	0.69	0.004	136	1.63	0.03		6.6
ME1701361014	GWA10	18-Oct-2017	1122	0.99	0.019	0.056	537	123	<1	597	0.103			3320		<1	5.25	10.3	0.002	136	1.75	0.008		7.1
ME1701361015	GWC10	18-Oct-2017	1132	0.04	<0.001	0.047	386	155	<1	260	0.129			3530		<1	0.56	0.45	<0.001	122	0.121	0.005		6.8
ME1701361016	GWA11	18-Oct-2017	1159	4.97	<0.001	0.046	591	12	<1	100	0.07			1590		<1	9.95	4.51	0.003	15	0.298	0.01		7.7
ME1701361017	GWC11	18-Oct-2017	1231	0.22	<0.001	0.055	400	112	<1	339	0.006			3700		<1	1.1	10.5	<0.001	124	1.8	0.009		6.6
ME1701361018	GWA12	18-Oct-2017	1304																					
ME1701361019	GWC12	18-Oct-2017	1335	1.63	<0.001	1.51	754	14	<1	127	0.006			1860		<1	7.97	2.34	0.002	6	0.092	0.005		7.3
ME1701361020	GWA14	18-Oct-2017	1355																					
ME1701361021	GWC14	18-Oct-2017	1422	0.11	<0.001	6.5	518	23	<1	79	0.009			1100		<1	14	0.87	0.006	12	0.03	<0.001		7.4
ME1701361022	GWA15	18-Oct-2017	1447																					
ME1701361023	GWC15	18-Oct-2017	1507	0.13	<0.001	0.696	1080	51	<1	268	0.021			3230		<1	9.97	2.14	0.002	37	0.09	<0.001		6.6
ME1701361024	GWC25	19-Oct-2017	1210	0.12	0.002	0.074	414	20	<1	264	0.045			1540		<1	7.74	1.08	0.008	64	0.177	0.071		7.5
ME1701361025	GWC19	19-Oct-2017	1131	0.06	0.003	0.311	269	47	<1	272	0.004			1360		<1	12	4.4	0.001	47	0.382	0.002		6.5
ME1701361026	GWC35	19-Oct-2017	1108	0.15	<0.001	0.302	264	40	<1	48	0.102			664		<1	6.24	0.78	0.002	23	0.088	0.008		7.1
ME1701361027	GWC33	17-Oct-2017	1212	1.22	<0.001	0.622	<1	420	65	116	0.007			6410		1450	16.9	0.78	0.003	<1	0.035	0.004		12.4
ME1701361028	GWC26	17-Oct-2017	1300	0.07	<0.001	0.271	584	17	<1	155	0.008			1440		<1	12.1	0.58	<0.001	10	0.033	<0.001		7.3
ME1701361029	GWC18	18-Oct-2017	1306																					
ME1701361030	GWC17	19-Oct-2017	1320	0.34	<0.001	0.082	502	61	<1	259	0.003			1720		<1	13.5	7.48	0.002	35	0.118	0.004		6.9
ME1701361031	GWC16	17-Oct-2017	1342	0.05	<0.001	0.128	586	64	<1	442	0.006			2360		<1	12.1	1.03	<0.001	34	0.03	<0.001		7.1
ME1701361032	GWC28	23-Oct-2017	1227	0.09	<0.001	0.137	894	130	<1	514	0.017			3370		<1	8.09	1.89	0.002	80	0.057	<0.001		6.8
ME1701361033	GWC29	23-Oct-2017	1307	0.14	<0.001	0.157	646	88	<1	298	0.034			2190		<1	11.7	2.68	0.001	68	0.028	0.005		6.8
ME1701361034	GWC30	23-Oct-2017	1348	0.21	<0.001	0.179	582	170	<1	520	0.106			2800		<1	9.5	5.45	0.002	123	0.17	0.001		6.7
ME1701361035	GWC31	23-Oct-2017	1547	0.27	0.013	0.123	440	221	<1	548	0.151			3810		<1	1.57	11.4	0.002	144	0.553	0.031		6.7
ME1701361036	GWC24	23-Oct-2017	1622	0.13	0.002	0.038	5	105	<1	564	0.026			3630		<1	0.05	88.1	0.002	161	8.09	0.243		5.6
ME1701361037	GWC27	23-Oct-2017	1657	0.58	0.002	0.068	<1	32	<1	365	0.034			1800		<1	4	1.49	0.007	35	3.99	0.052		3.9
ME1701361038	GWC32	19-Oct-2017	1512	0.02	<0.001	0.05	1480	109	<1	317	0.982			3480		<1	12.4	0.31	<0.001	91	0.059	0.003		6.8
ME1701361039	GWA32	19-Oct-2017	1452	<0.01	<0.001	0.057	451	118	<1	562	0.007			3480		<1	3.78	0.06	<0.001	147	0.134	0.002		7.2
ME1701361040	GWA34	23-Oct-2017	1429	20.1	0.004	0.026	<1	492	<1	337	0.261			6020		<1	3.64	111	0.003	517	12.8	0.944		4.4
ME1701361041	GWC34	23-Oct-2017	1453	5.5	0.007	0.167	1840	63	<1	247	0.347			4720		<1	5.86	11.4	0.023	68	0.221	0.29		7.2
ME1701476001	GWA1	03-Oct-2017	1124										4.89											
ME1701476002	GWA2	03-Oct-2017	1157									3.565												
ME1701476003	GWA3	03-Oct-2017	1307										5.375											
ME1701476004	GWA4	03-Oct-2017	1235										4.705											
ME1701476005	GWA5	03-Oct-2017	1534									3.89												
ME1701476006	GWA6	03-Oct-2017	1331										2.31											
ME1701476007	GWA7	03-Oct-2017	1353										4.77											
ME1701476008	GWA8	03-Oct-2017	1445									1.56												
ME1701476009	GWC1	03-Oct-2017	1208									9.93												
ME1701476010	GWC2	03-Oct-2017	1255									14.385												
ME1701476011	GWC3	03-Oct-2017	1319									10.63												
ME1701476012	GWC4	03-Oct-2017	1420									14.785												
ME1701476013	GWC5	03-Oct-2017	1506									5.935												
ME1701476014	GWA10	18-Oct-2017	1100									3.99												
ME1701476015	GWC10	18-Oct-2017	1107									2.72												
ME1701476016	GWA11	18-Oct-2017	1142									3.435												

ME1701476017	GWC11	18-Oct-2017	1212									14.41												
ME1701476018	GWA12	18-Oct-2017	1253										5.035											
ME1701476019	GWC12	18-Oct-2017	1313									34.42												
ME1701476020	GWA14	18-Oct-2017	1355										4.97											
ME1701476021	GWC14	18-Oct-2017	1406									30.85												
ME1701476022	GWA15	18-Oct-2017	1441										5.28											
ME1701476023	GWC15	18-Oct-2017	1453									25.93												
ME1701476024	GWC25	19-Oct-2017	1214									27.02												
ME1701476025	GWC19	19-Oct-2017	1122									25.16												
ME1701476026	GWC35	19-Oct-2017	1056									41.32												
ME1701476027	GWC33	17-Oct-2017	1143									38.22												
ME1701476028	GWC26	17-Oct-2017	1244									37.195												
ME1701476029	GWC18	03-Oct-2017	959																					
ME1701476030	GWC17	19-Oct-2017	1304									42.035												
ME1701476031	GWC16	17-Oct-2017	1328									26.71												
ME1701476032	GWC28	23-Oct-2017	1201									40.7												
ME1701476033	GWC29	23-Oct-2017	1250									41.18												
ME1701476034	GWC30	23-Oct-2017	1323									31.44												
ME1701476035	GWC31	23-Oct-2017	1520									48.22												
ME1701476036	GWC24	23-Oct-2017	1610									22.245												
ME1701476037	GWC27	23-Oct-2017	1645									15.45												
ME1701476038	GWC32	19-Oct-2017	1503									3.775												
ME1701476039	GWA32	19-Oct-2017	1441									2.05												
ME1701476040	GWA34	23-Oct-2017	1419									4.45												
ME1701476041	GWC34	23-Oct-2017	1439									20.36												
ME1701644001	GWA1	01-Nov-2017	1055																					
ME1701644002	GWA2	01-Nov-2017	1122											1770										6.5
ME1701644003	GWA3	01-Nov-2017	1215																					
ME1701644004	GWA4	01-Nov-2017	1153																					
ME1701644005	GWA5	01-Nov-2017	1447											15000										7.6
ME1701644006	GWA6	01-Nov-2017	1253																					
ME1701644007	GWA7	01-Nov-2017	1308																					
ME1701644008	GWA8	01-Nov-2017	1401											2370										7
ME1701644009	GWC1	01-Nov-2017	1132											3520										7.1
ME1701644010	GWC2	01-Nov-2017	1211											1280										7.2
ME1701644011	GWC3	01-Nov-2017	1246											3930										6.8
ME1701644012	GWC4	01-Nov-2017	1337											2410										6.7
ME1701644013	GWC5	01-Nov-2017	1416											5390										6.6
ME1701644014	GWA10	02-Nov-2017	1124											3340										7
ME1701644015	GWC10	02-Nov-2017	1141											3530										6.8
ME1701644016	GWA11	02-Nov-2017	1204											1570										7.2
ME1701644017	GWC11	02-Nov-2017	1231											3650										6.6
ME1701644018	GWA12	02-Nov-2017	1247																					
ME1701644019	GWC12	02-Nov-2017	1332											3580										7.1
ME1701644020	GWA14	02-Nov-2017	1344																					
ME1701644021	GWC14	02-Nov-2017	1406											1090										7.3
ME1701644022	GWA15	02-Nov-2017	1423																					
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ME1701644024	GWC25	13-Nov-2017	1231											1560										7.6
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ME1701644036	GWC24	17-Nov-2017	1342											3650										5.7
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ME1701644040	GWA34	29-Nov-2017	1149											6050										4.4
ME1701644041	GWC34	17-Nov-2017	1205																					
ME1701644042	GWA36	28-Nov-2017	1234										5.82											
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ME1701644044	GWA16	28-Nov-2017	1157											18500										7.4
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ME1800011031	GWC16	08-Dec-2017	1319											2190										7.1
ME1800011032	GWC28	08-Dec-2017	1458											3340										6.8
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ME1800011036	GWC24	19-Dec-2017	1542											3740										5.8
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ME1800034006	GWA6	01-Dec-2017	1318										2.62											

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ME1800034040	GWA34	19-Dec-2017	1410									4.46												
ME1800034041	GWC34	19-Dec-2017	1417										20.435											
ME1800034042	GWA36	08-Dec-2017	1424										5.77											
ME1800034043	GWC36	08-Dec-2017	1414									14.95												
ME1800034044	GWA16	08-Dec-2017	1336									3.47												

Groundwater Review & Water Licence Review

APPENDIX A

Wilpinjong Coal Mine - Groundwater Level Hydrographs

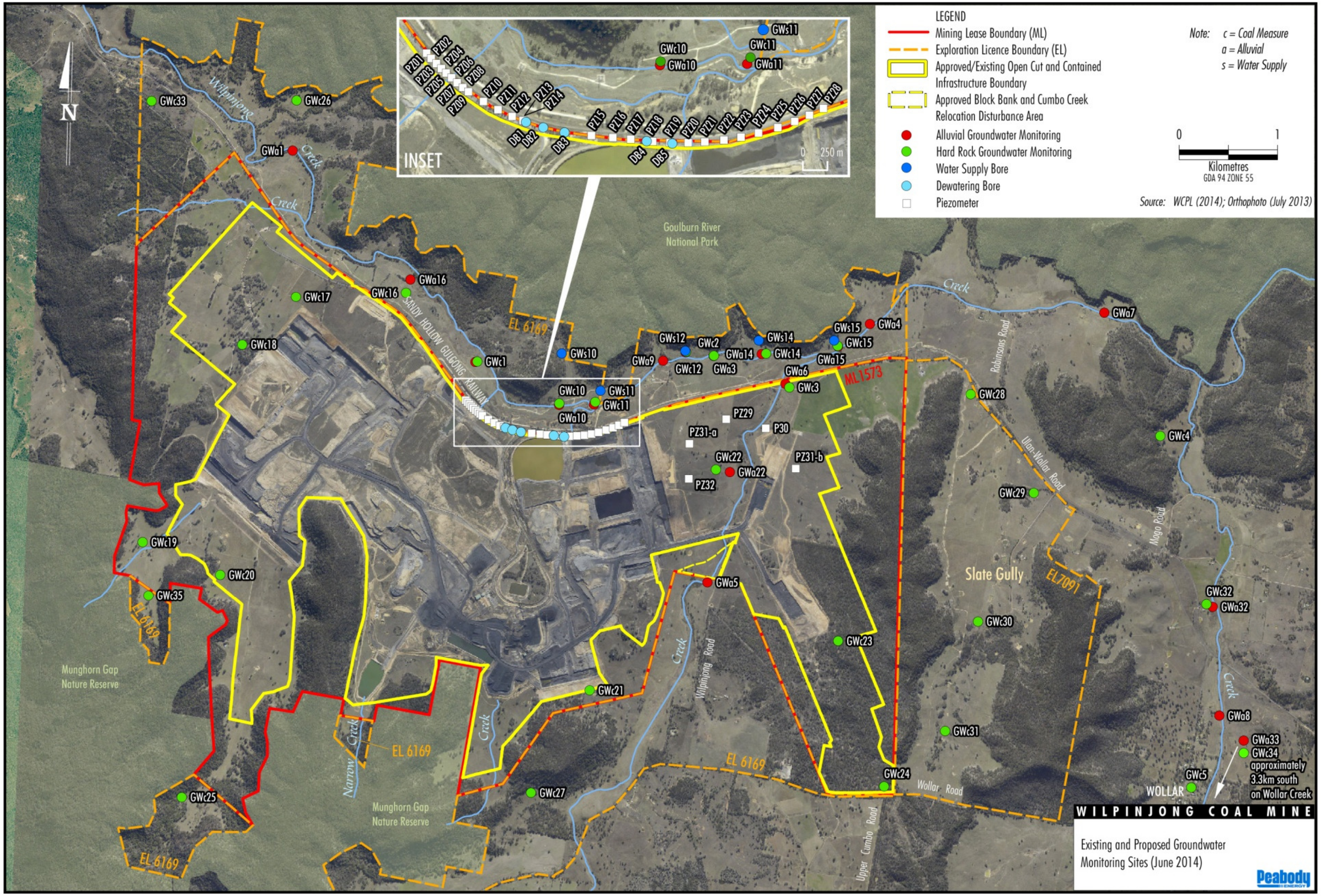


Figure A- 1 Existing and Proposed Groundwater Monitoring Sites (June 2014)

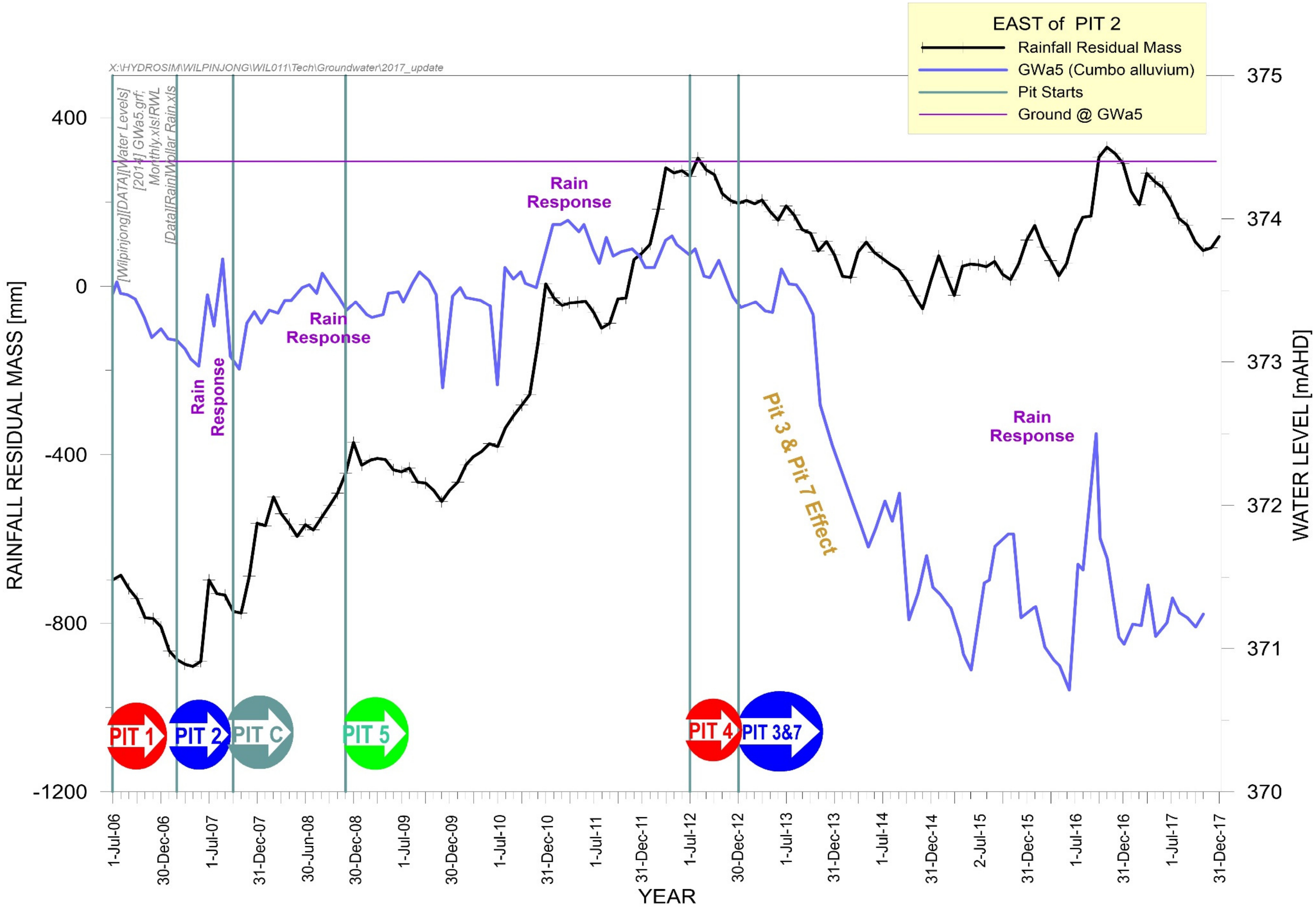


Figure A- 2 Alluvial Groundwater Hydrograph at GWa5 between Pit 2 and Pit 3, adjacent to Cumbo Creek

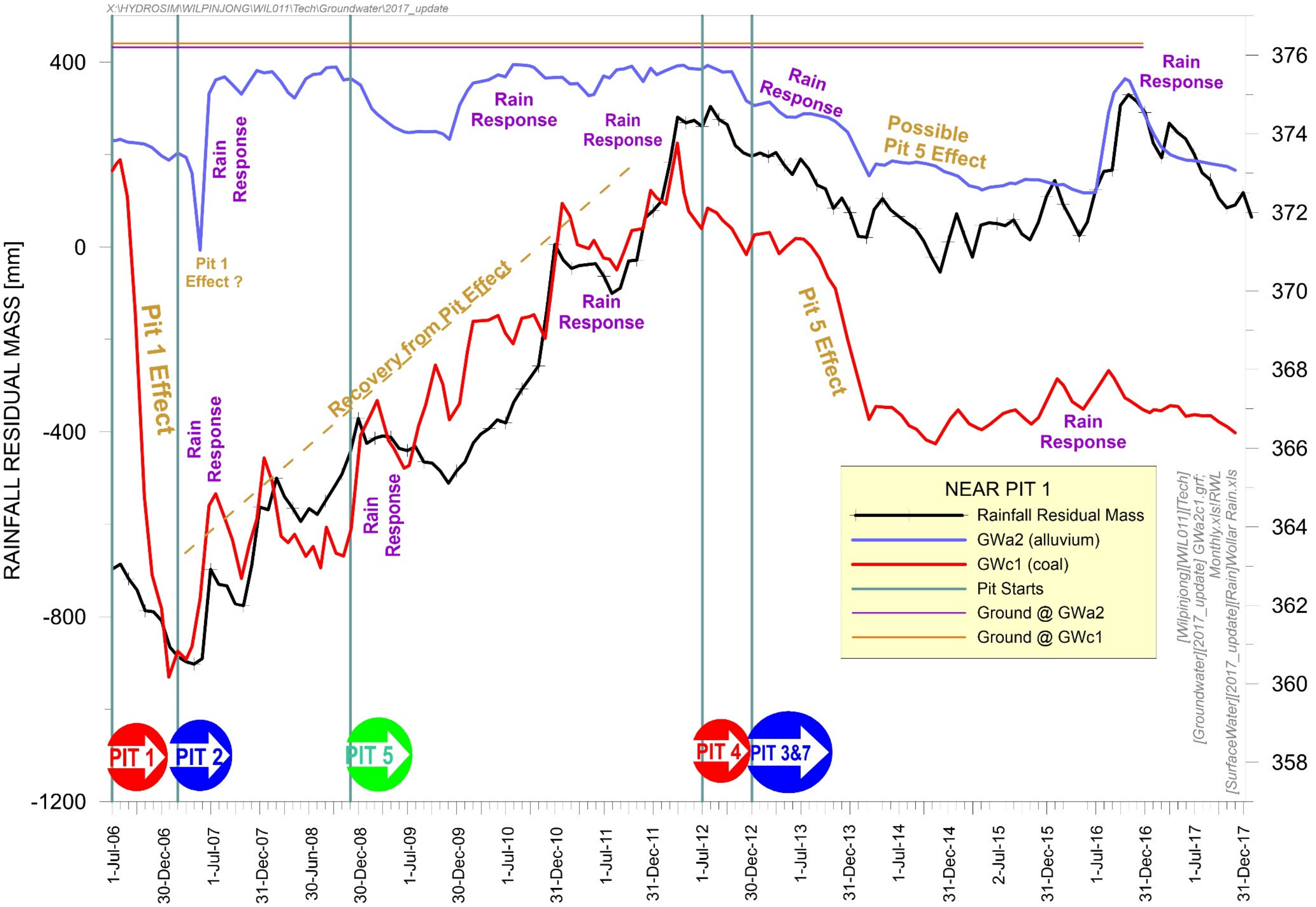


Figure A- 3 Groundwater Hydrographs at GWa2 and GWc1 at 0.3 km North-West of Pit 1

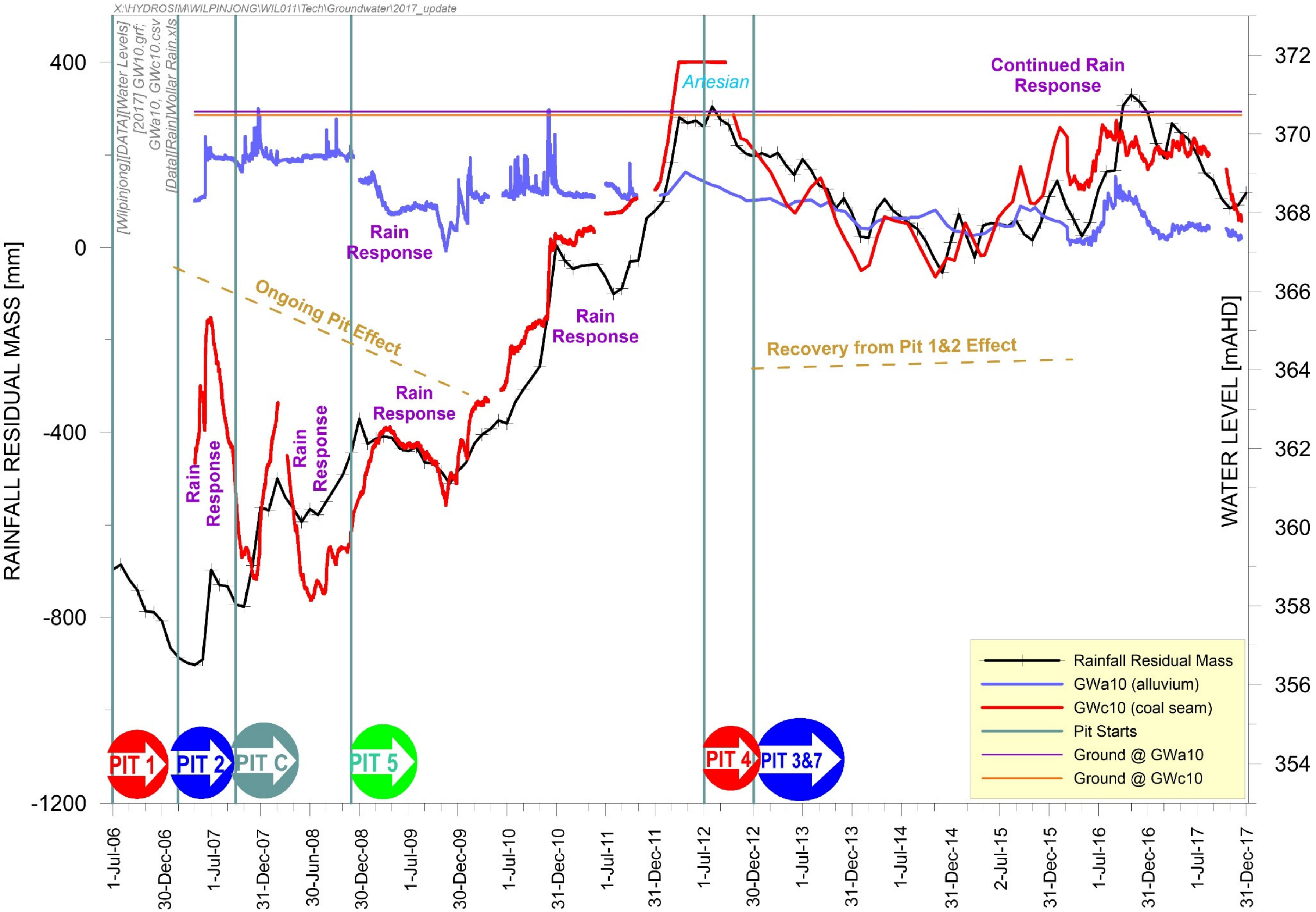


Figure A- 4 C-6. Groundwater Hydrographs at GWa10 and GWc10 at 0.3 km North-East of Pit 1

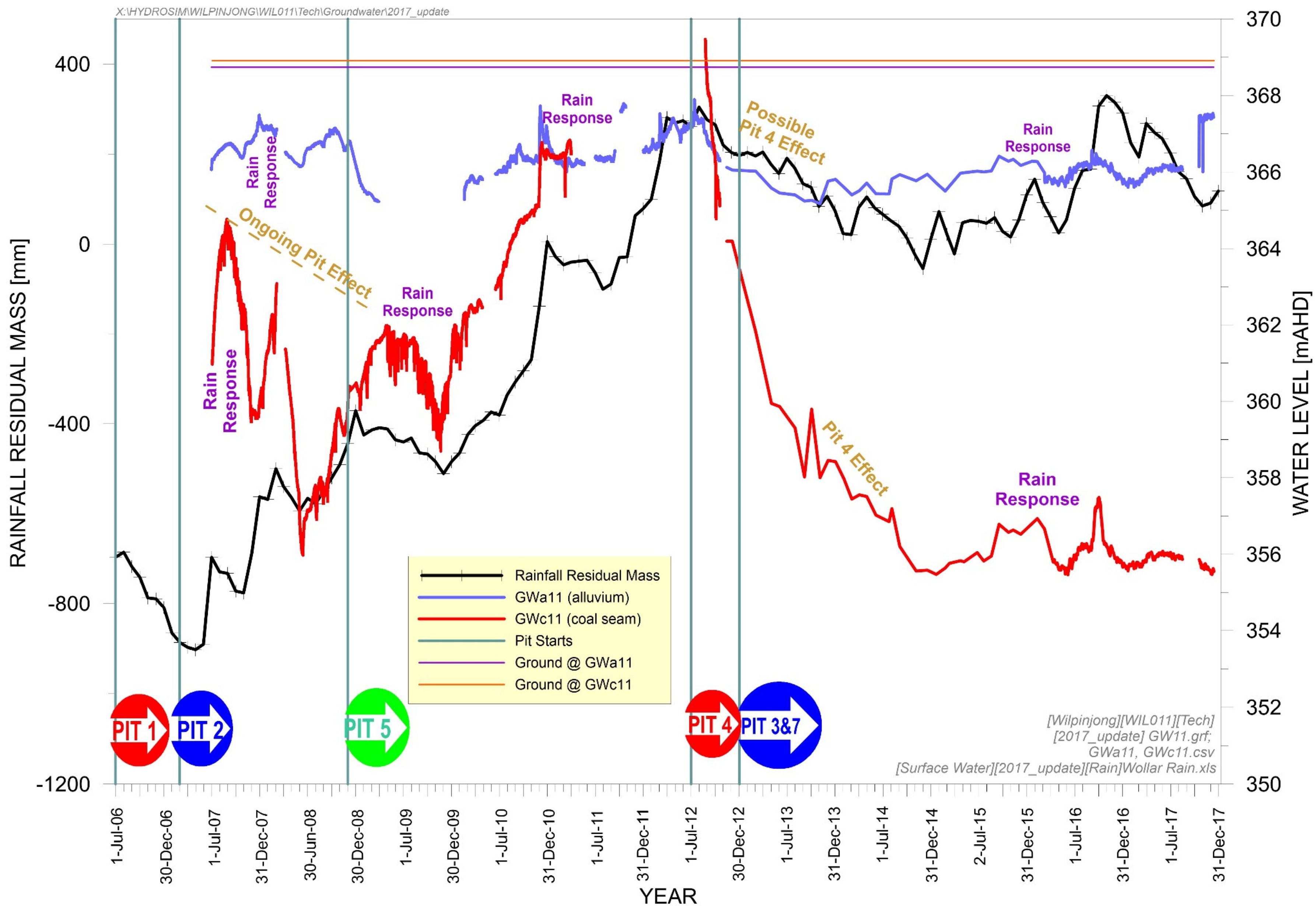


Figure A- 5 Groundwater Hydrographs at GWa11 and GWc11 at 0.3 km North of Pit 2

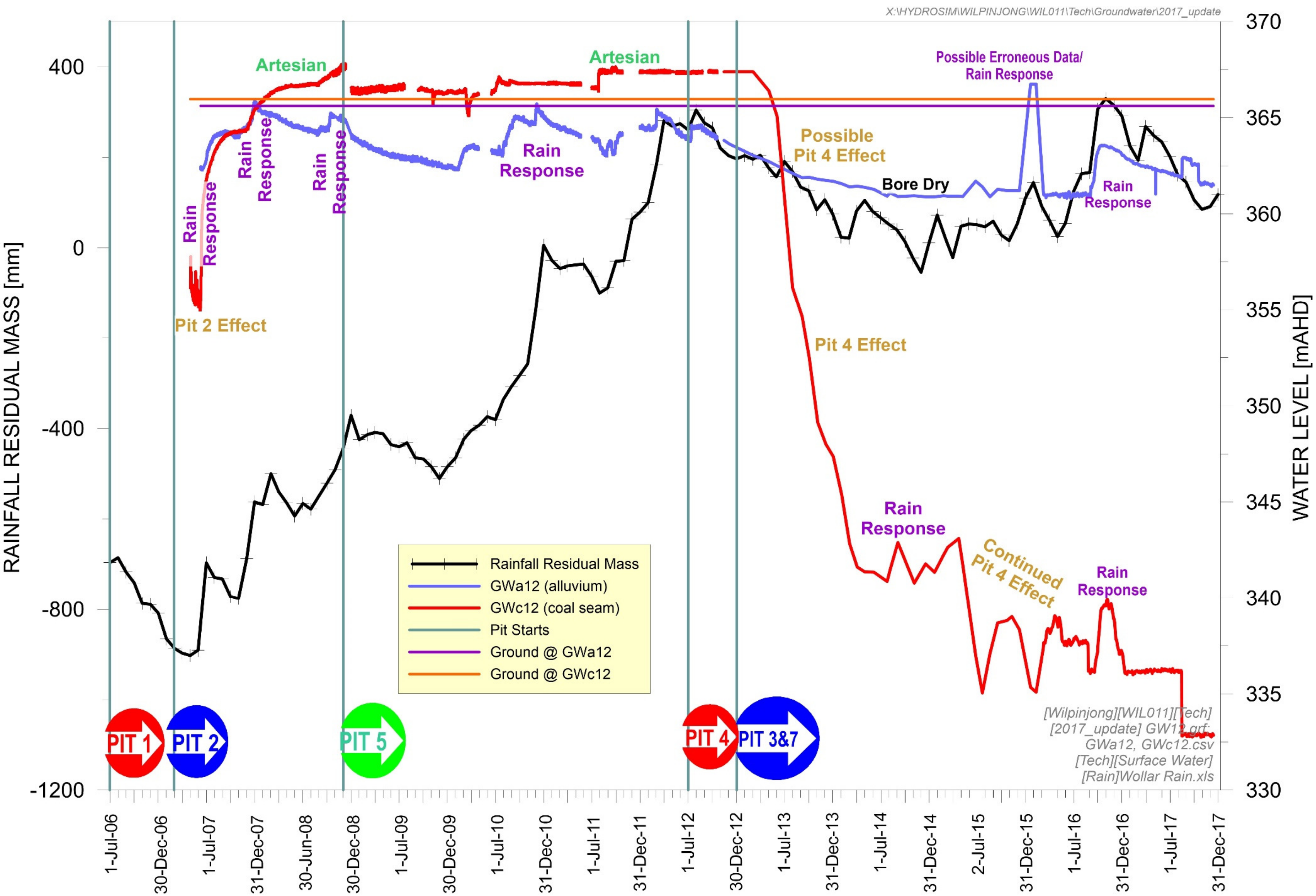


Figure A- 6 Groundwater Hydrographs at GWa12 and GWc12 at 0.5 km North of Pit 4

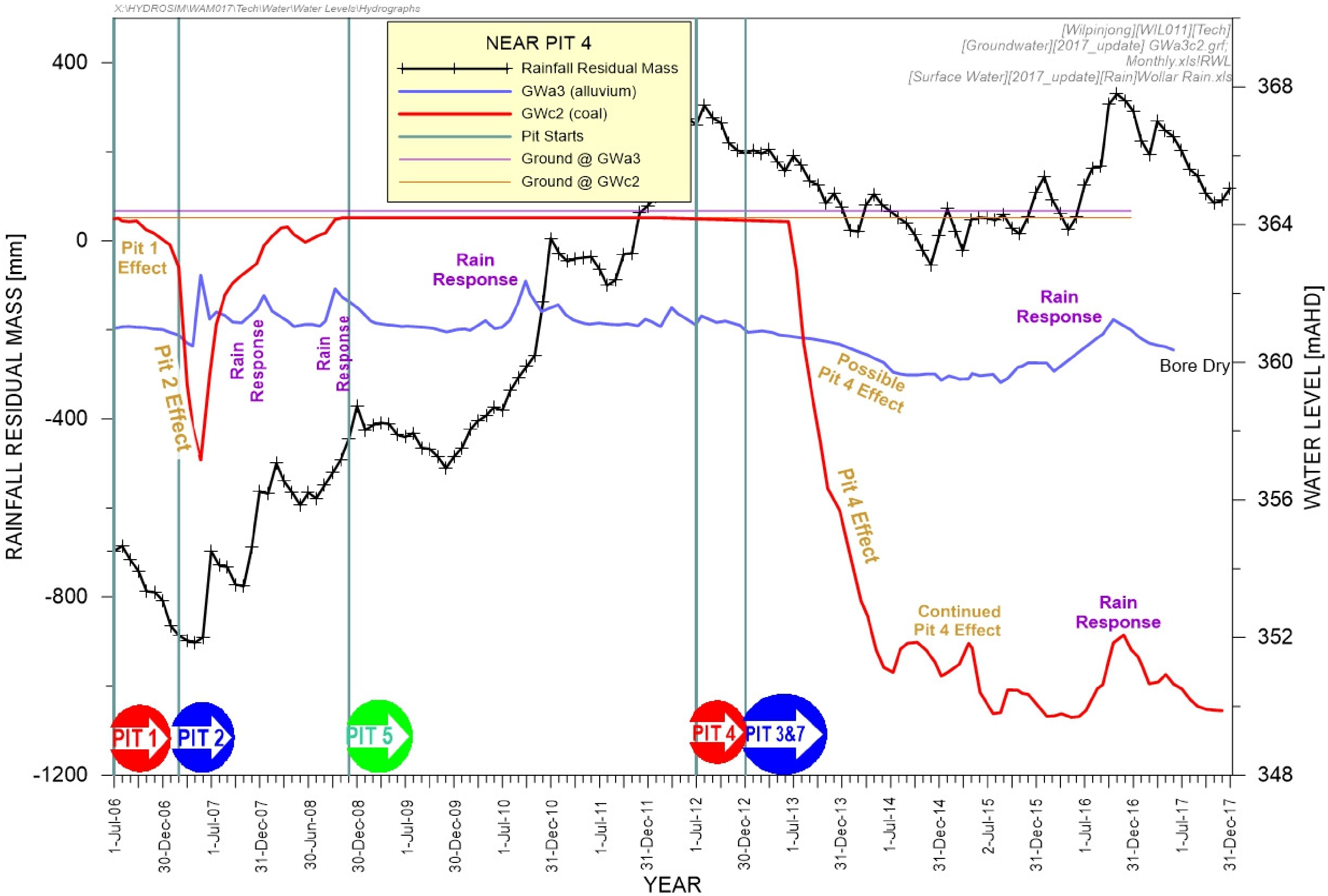


Figure A- 7 Groundwater Hydrographs at GWa3 and GWc2 at 0.45 km North of Pit 4

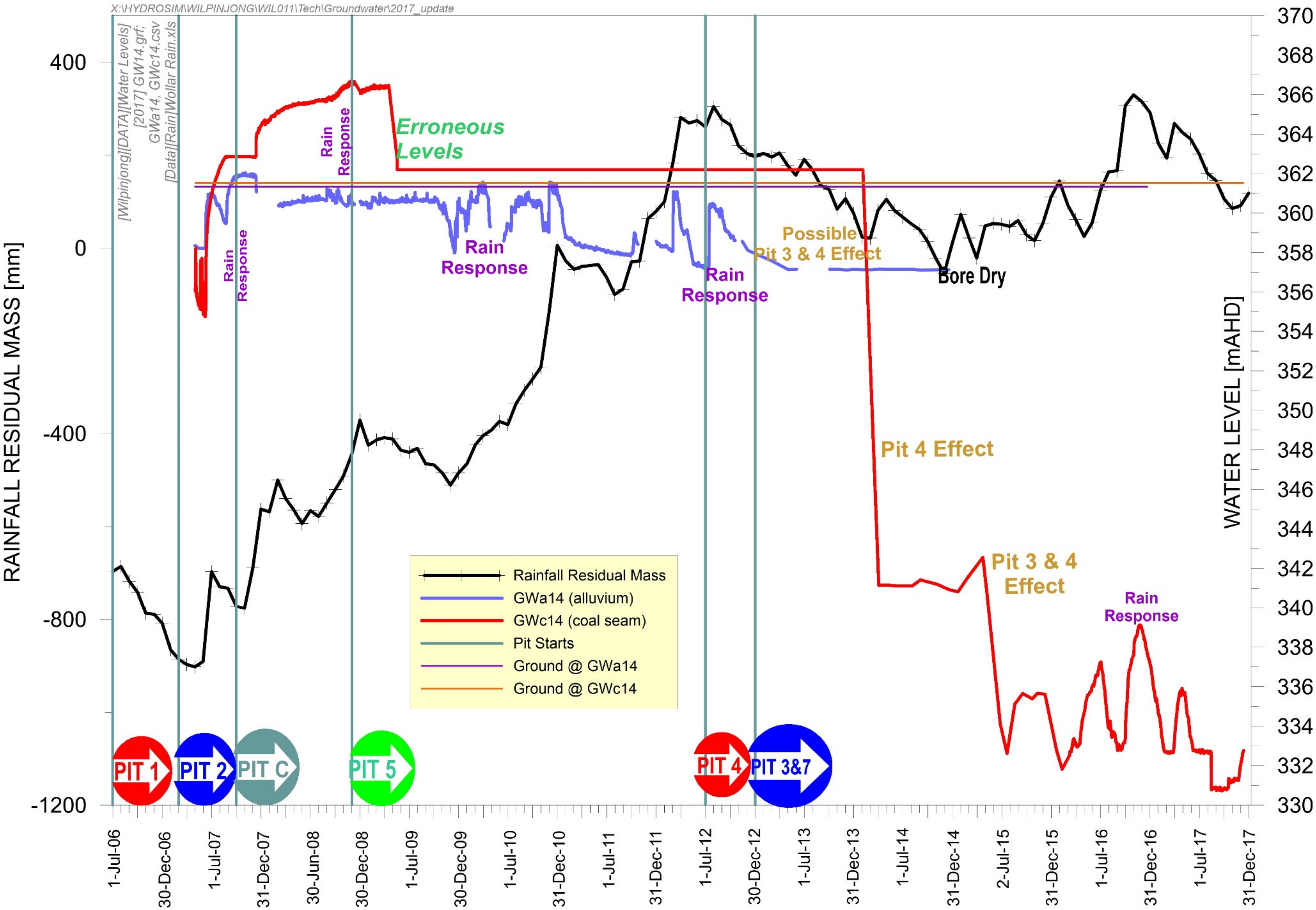


Figure A- 8 Groundwater Hydrographs at GWa14 and GWc14 at 0.3 km North of Pit 4

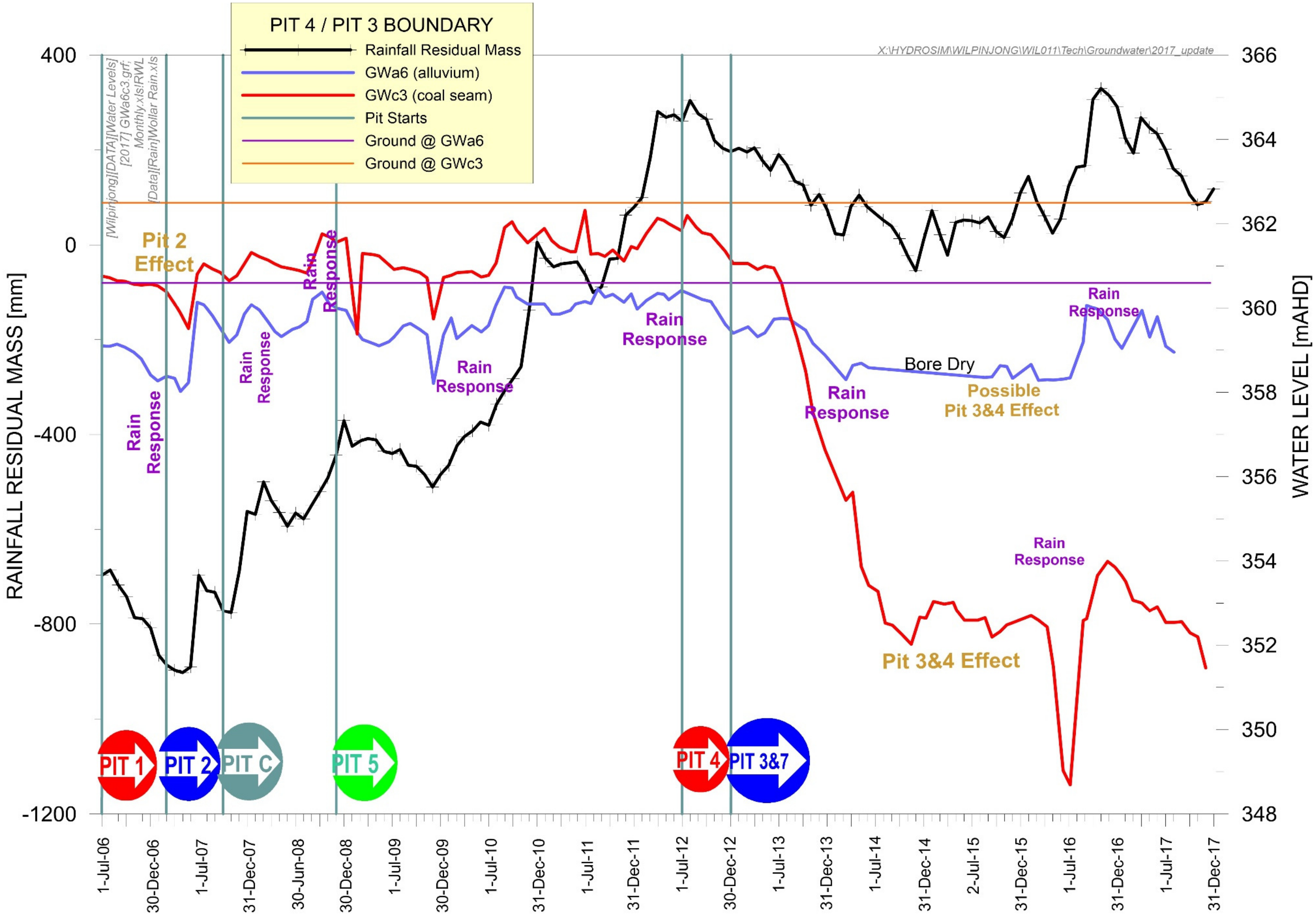


Figure A- 9 Groundwater Hydrographs at GWa6 and GWc3 at Northern Junction of Pits 3 and 4, adjacent to Cumbo Creek

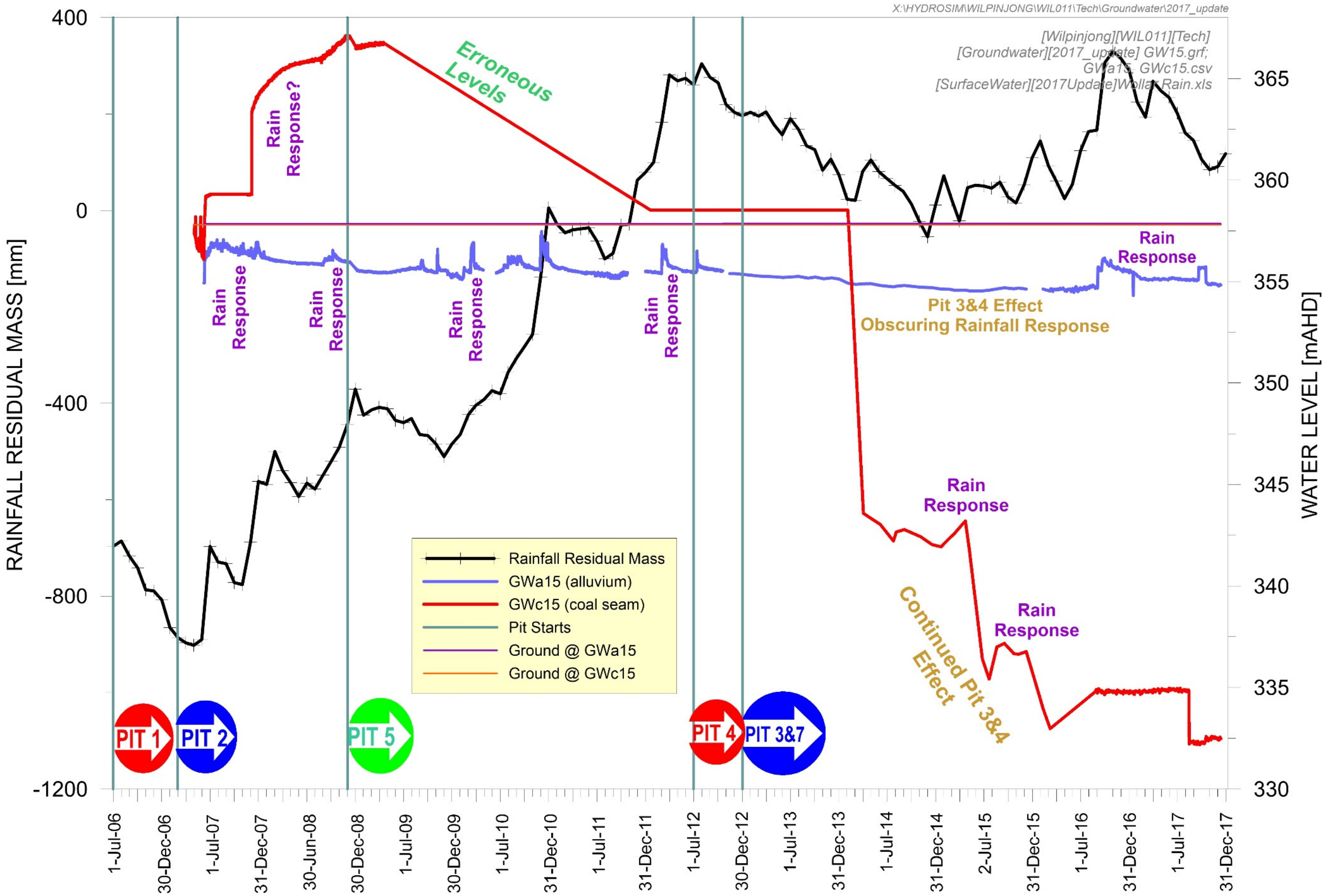


Figure A- 10 Groundwater Hydrographs at GWa15 and GWc15 at 0.2 km North of Pit 3

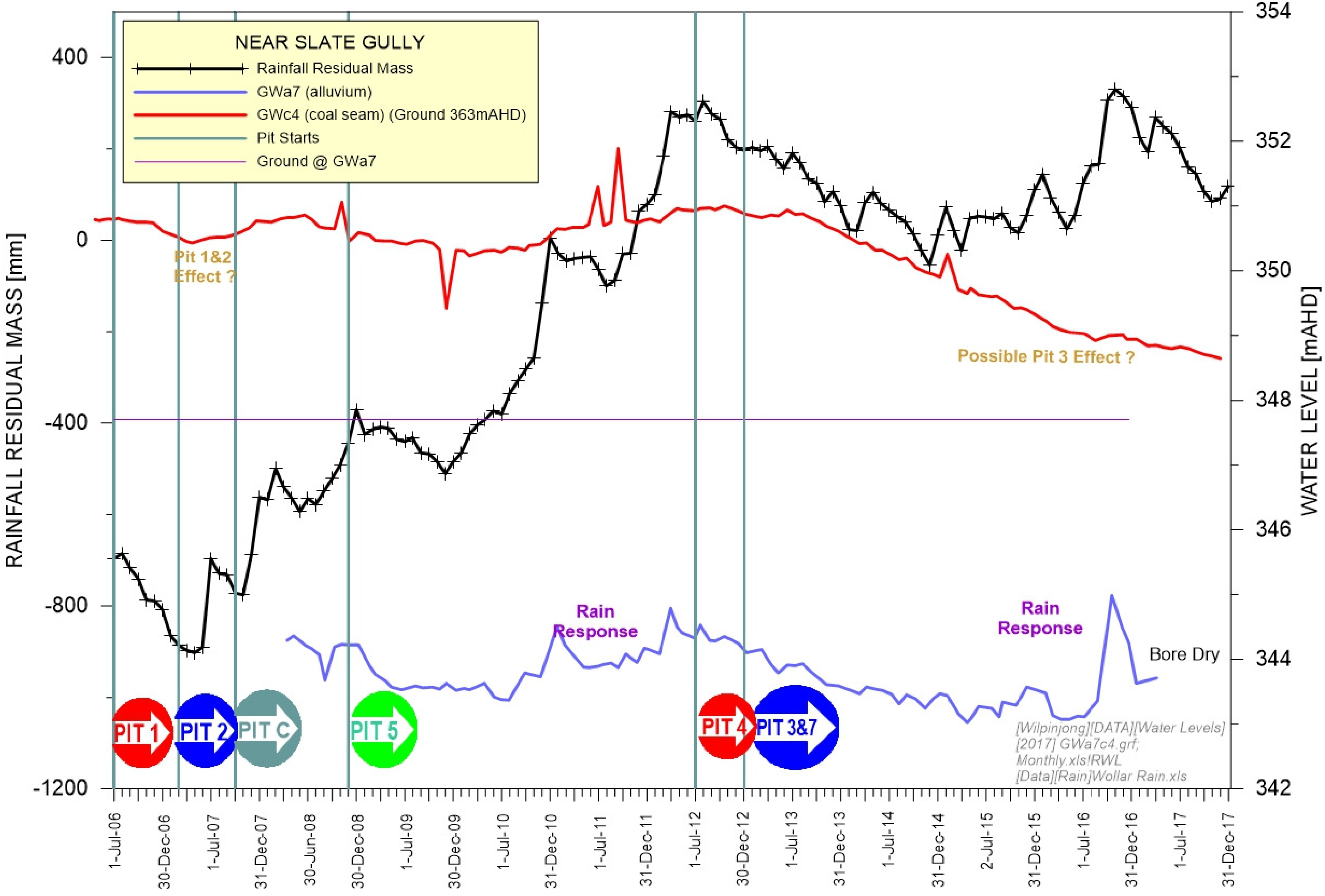


Figure A- 11 Groundwater Hydrographs at GWa7 and GWc4 near the Confluence of Wilpinjong Creek and Wollar Creek

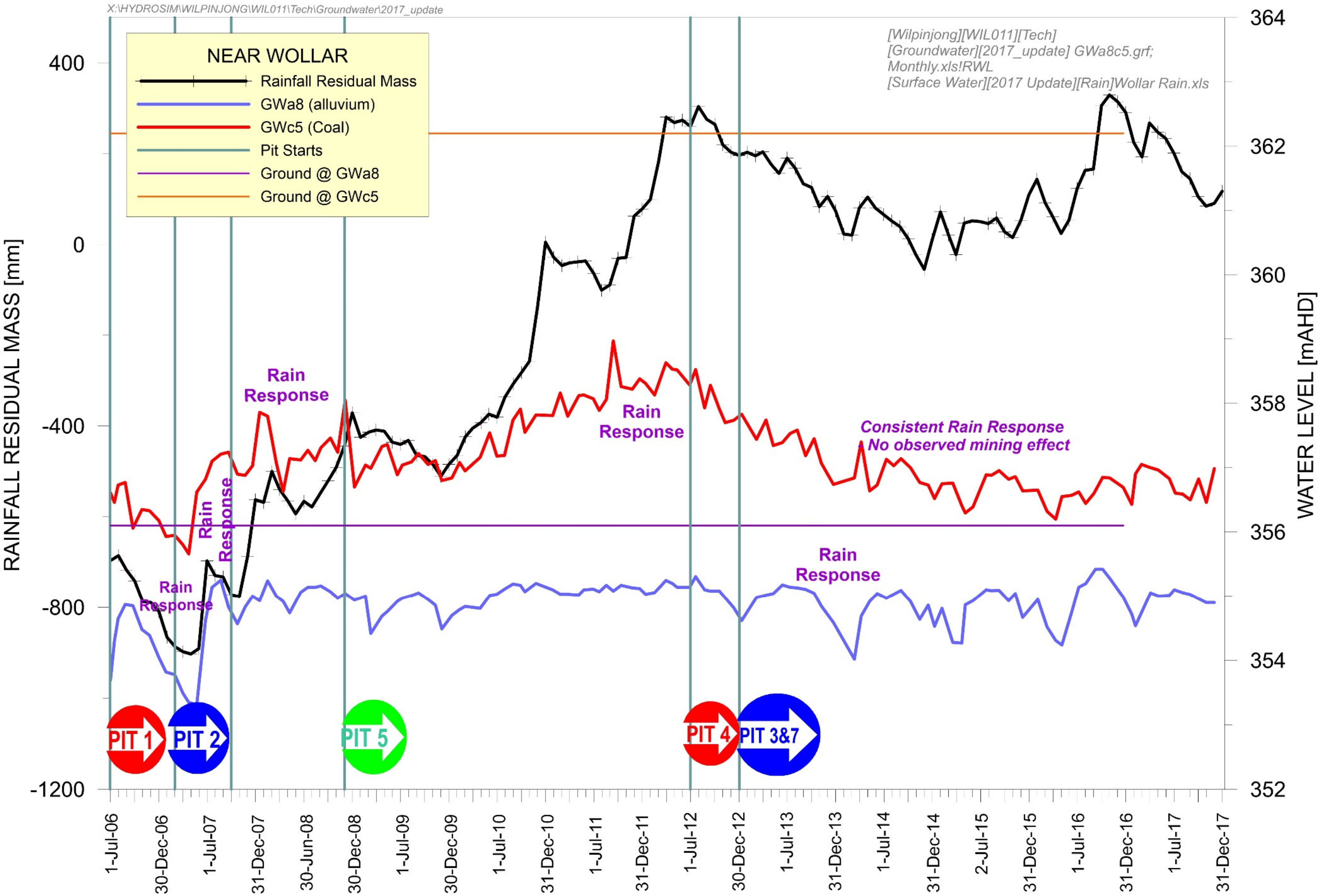


Figure A- 12 Groundwater Hydrographs at GWa8 and GWc5 near Wollar

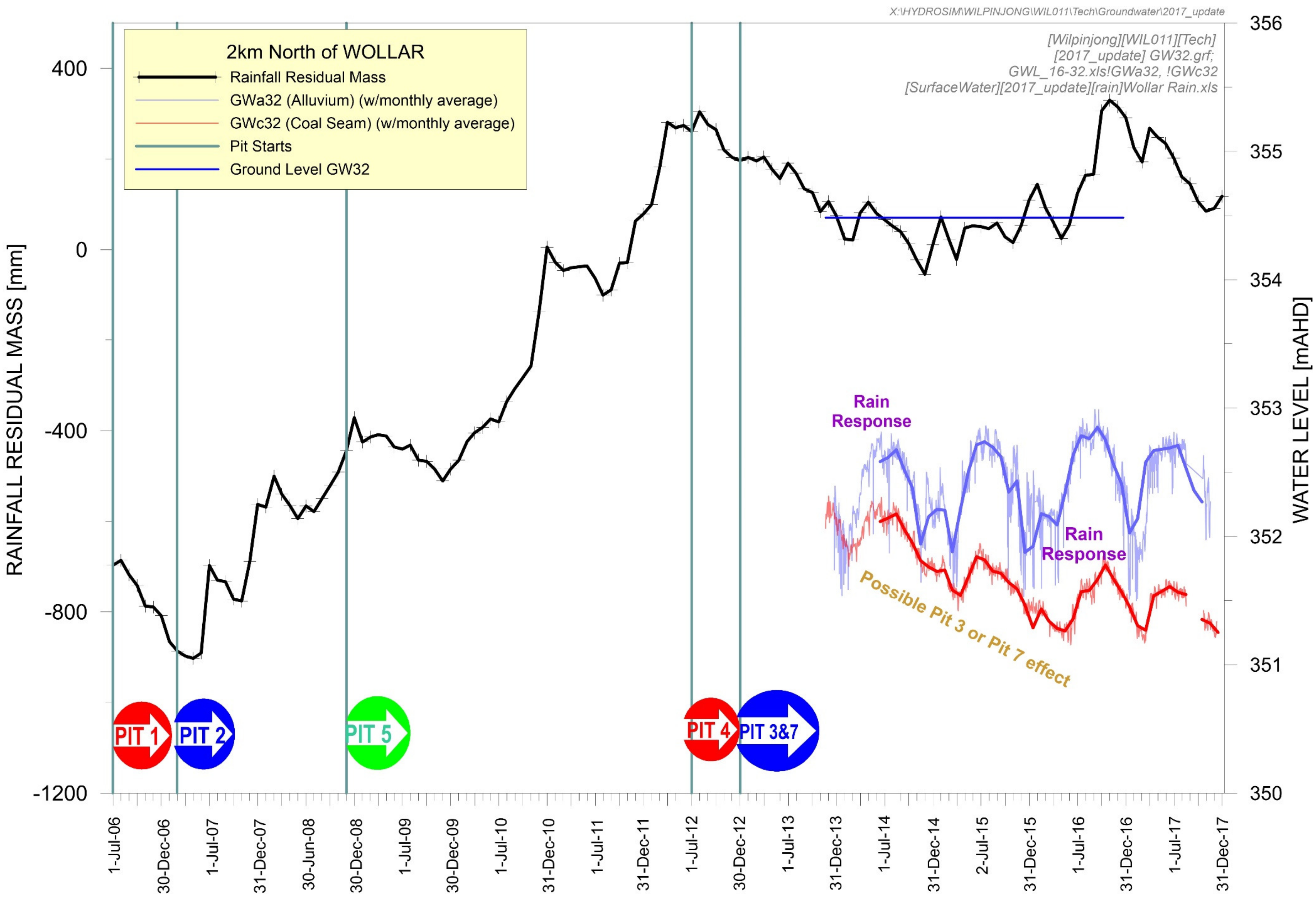


Figure A- 13 Groundwater Hydrographs at GWa32 and GWc32 adjacent to Wollar Creek

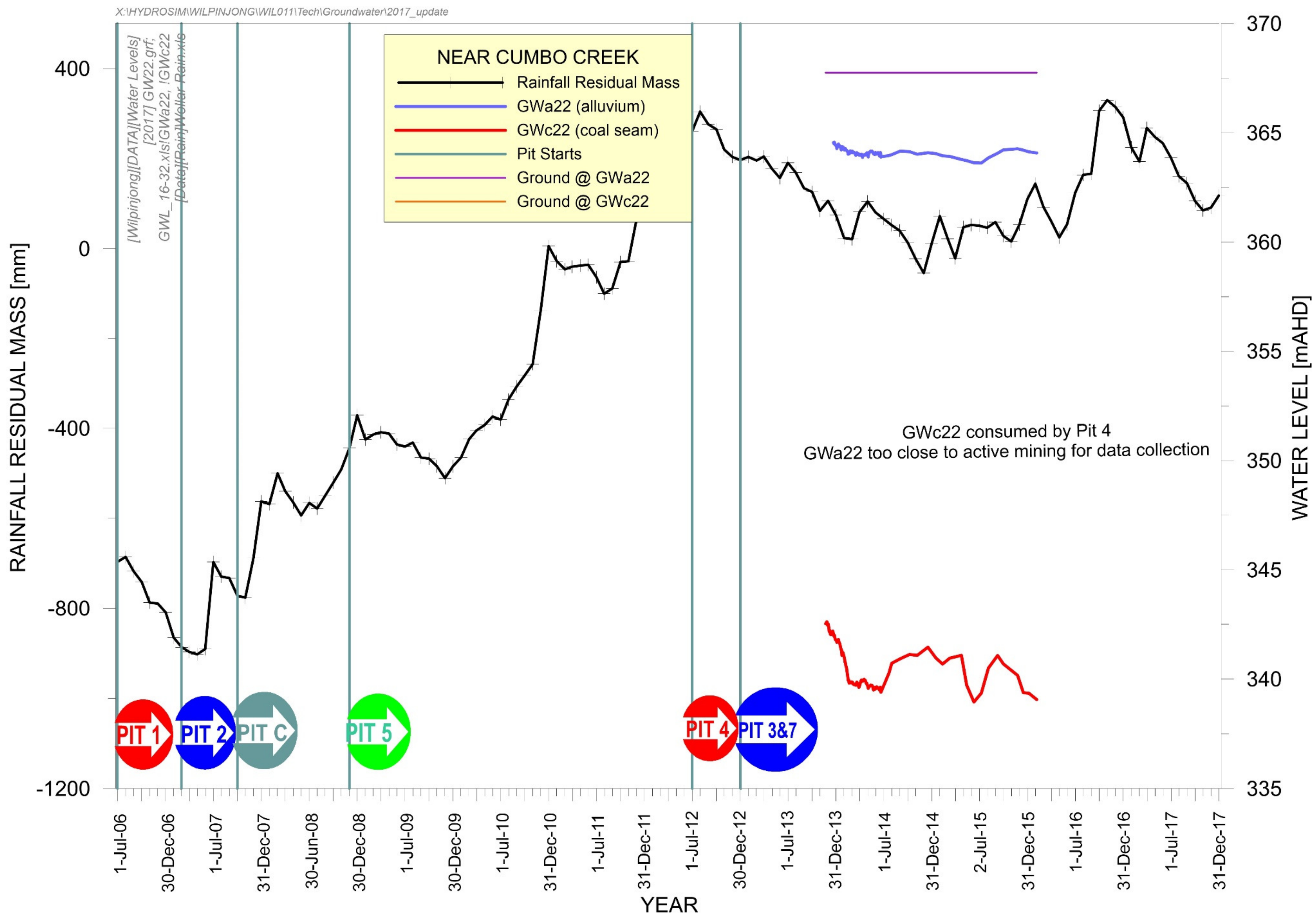


Figure A- 14 Groundwater Hydrographs at GWa22 and GWc22 adjacent to Cumbo Creek

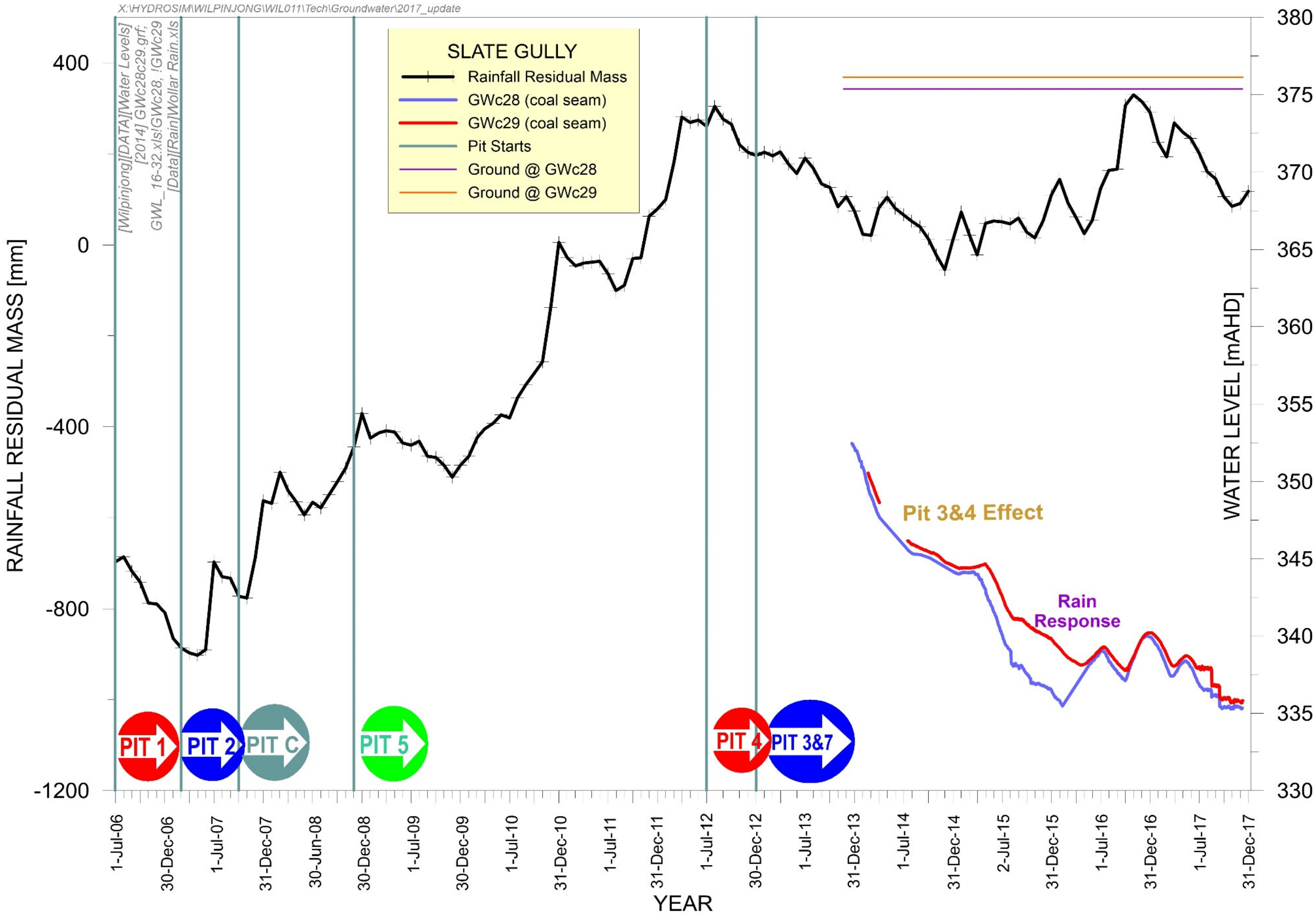


Figure A- 15 Groundwater Hydrographs at GWc28 and GWc29 in Slate Gully

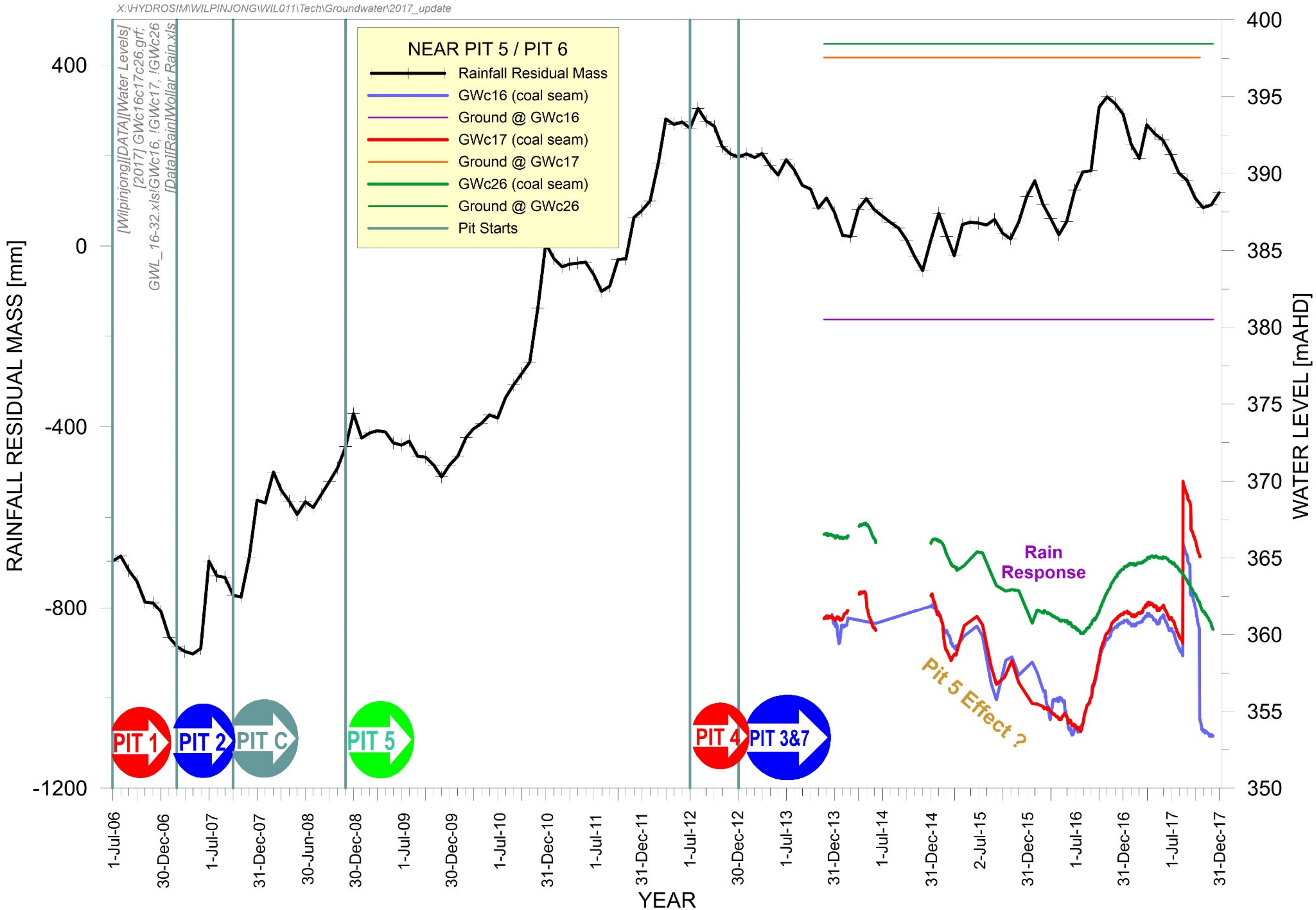


Figure A- 16 Groundwater Hydrographs at GWc16, GWc17 and GWc26 at Pit 6 and North of Pit 5

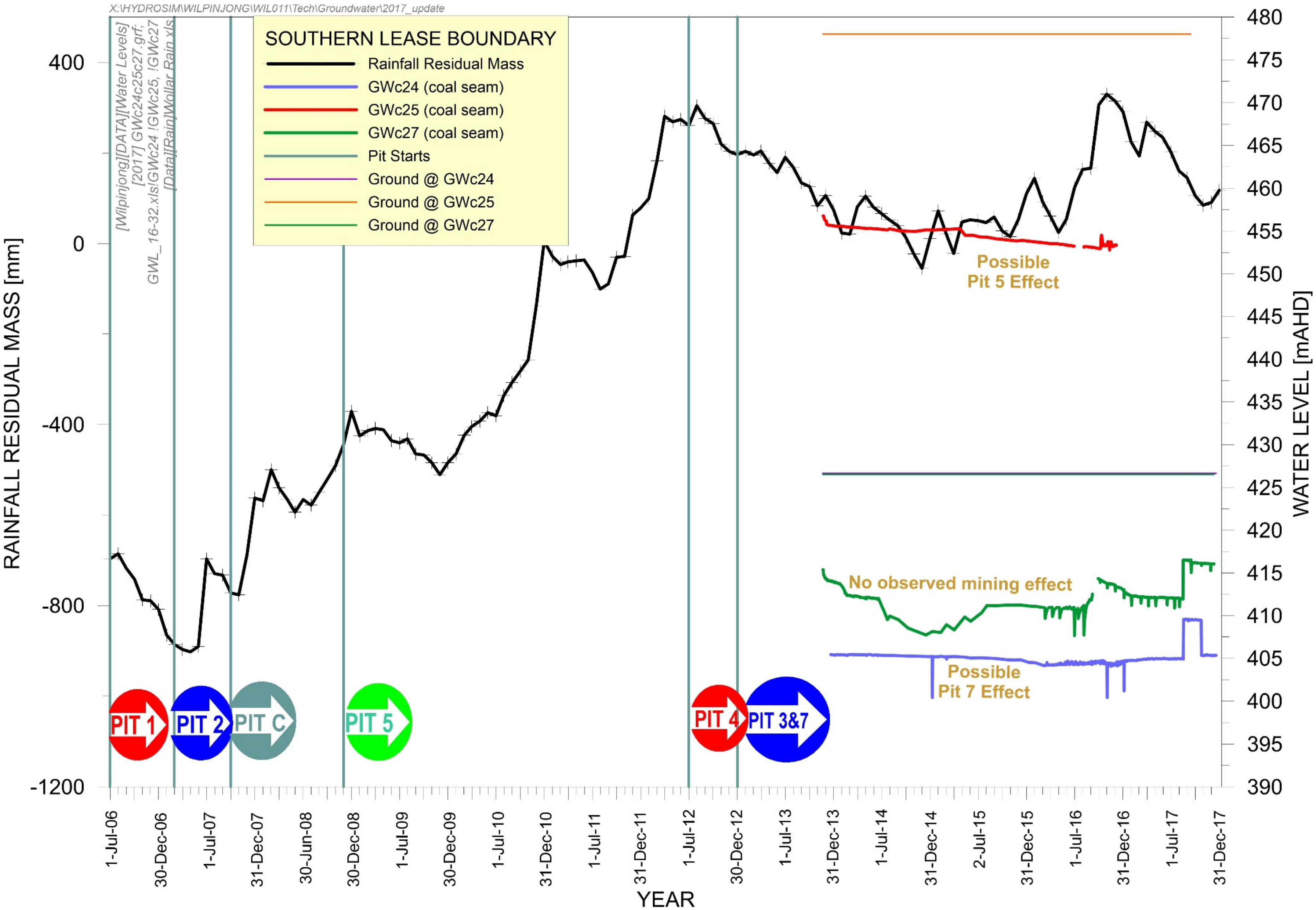


Figure A- 17 Groundwater Hydrographs at GWc24, GWc25 and GWc27 at the Southern Lease Boundary

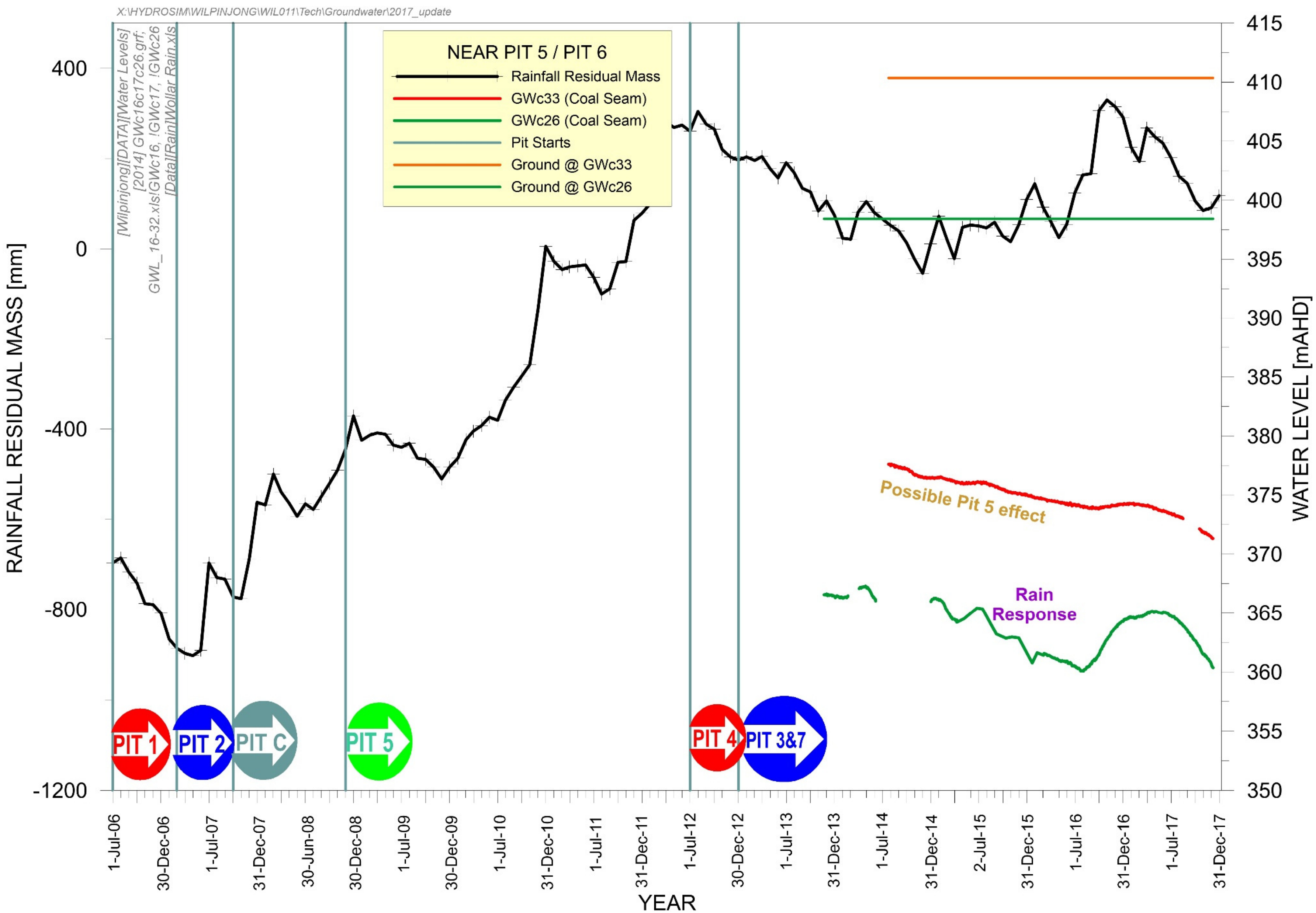


Figure A- 18 Groundwater Hydrographs at GWc26 GWc33 near Pit 6 and North of Pit 5

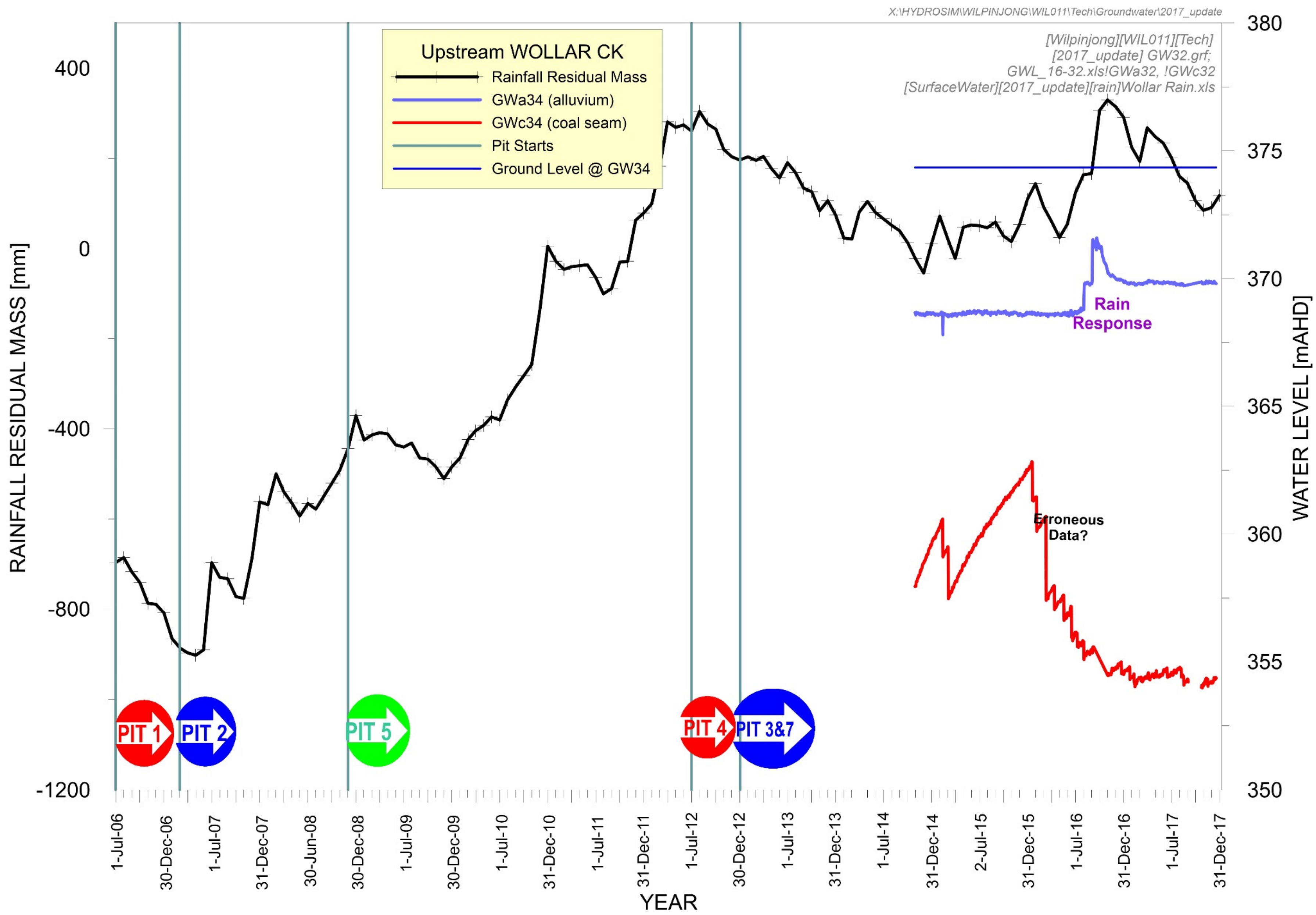


Figure A- 19 Groundwater Hydrographs at GWa34 and GWc34 adjacent to Wollar Ck ~3km south of Wollar

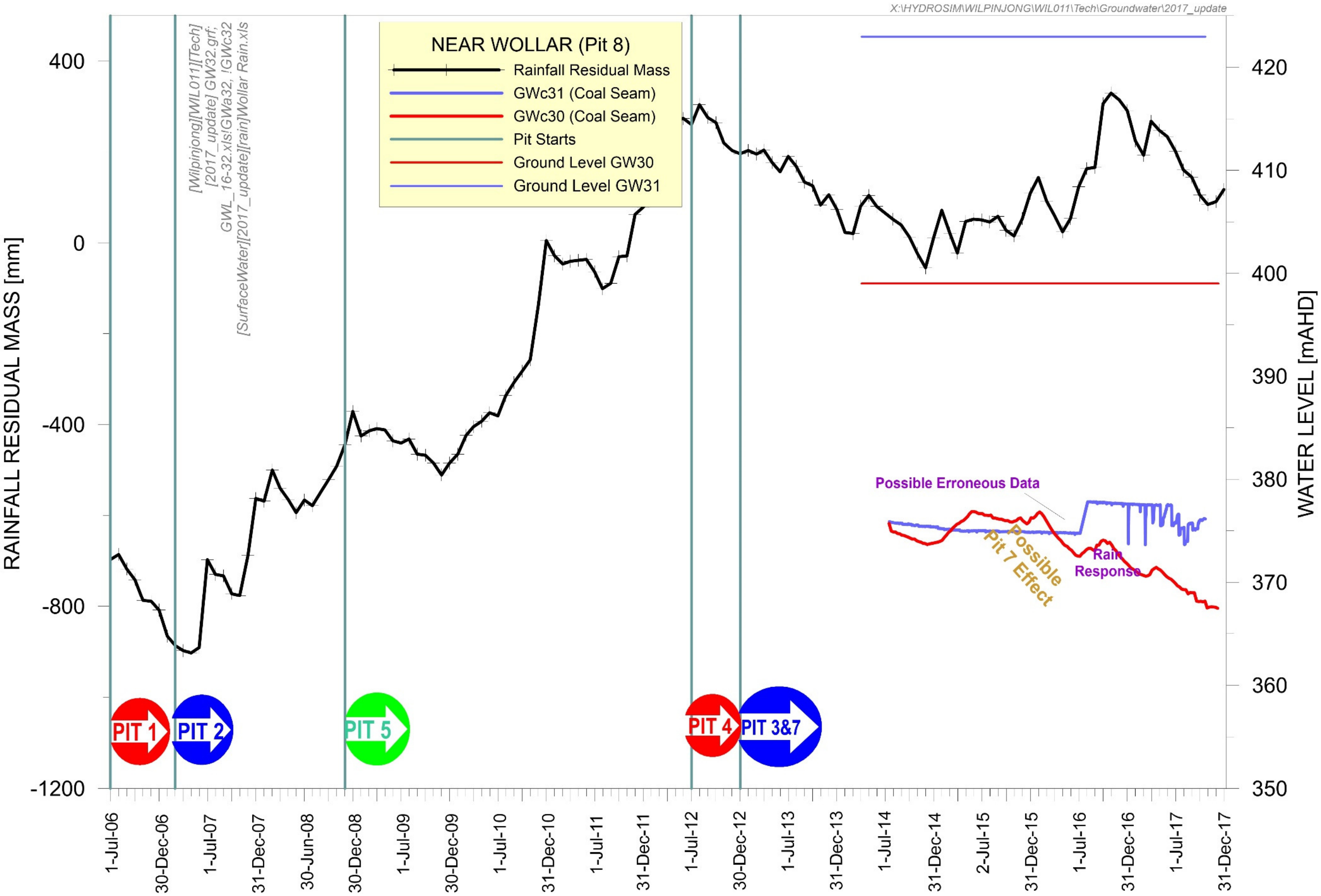


Figure A- 20 Groundwater Hydrographs at GWc30 and GWc31 within proposed Pit 8 boundary

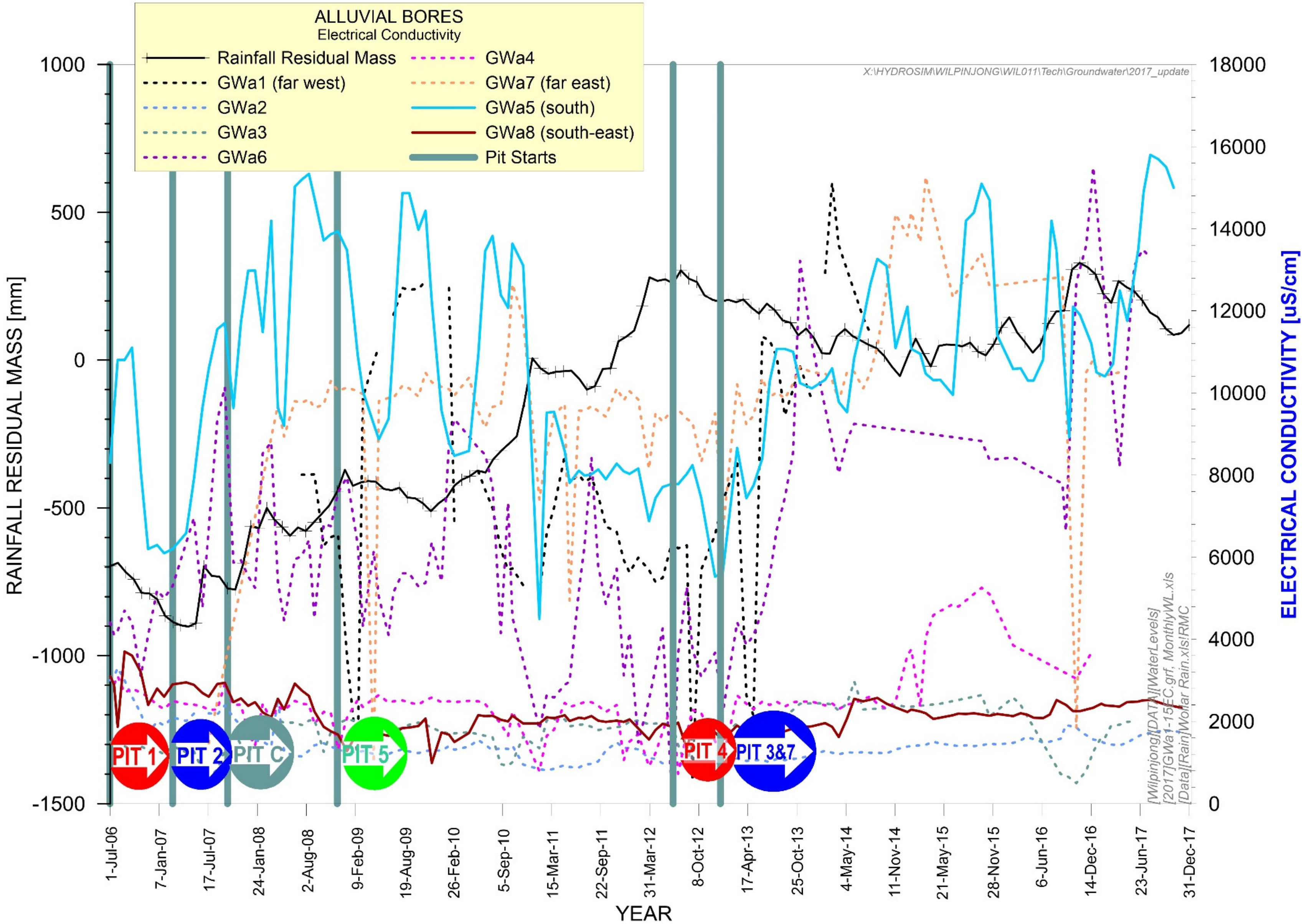


Figure A- 21 Alluvial Groundwater EC trends

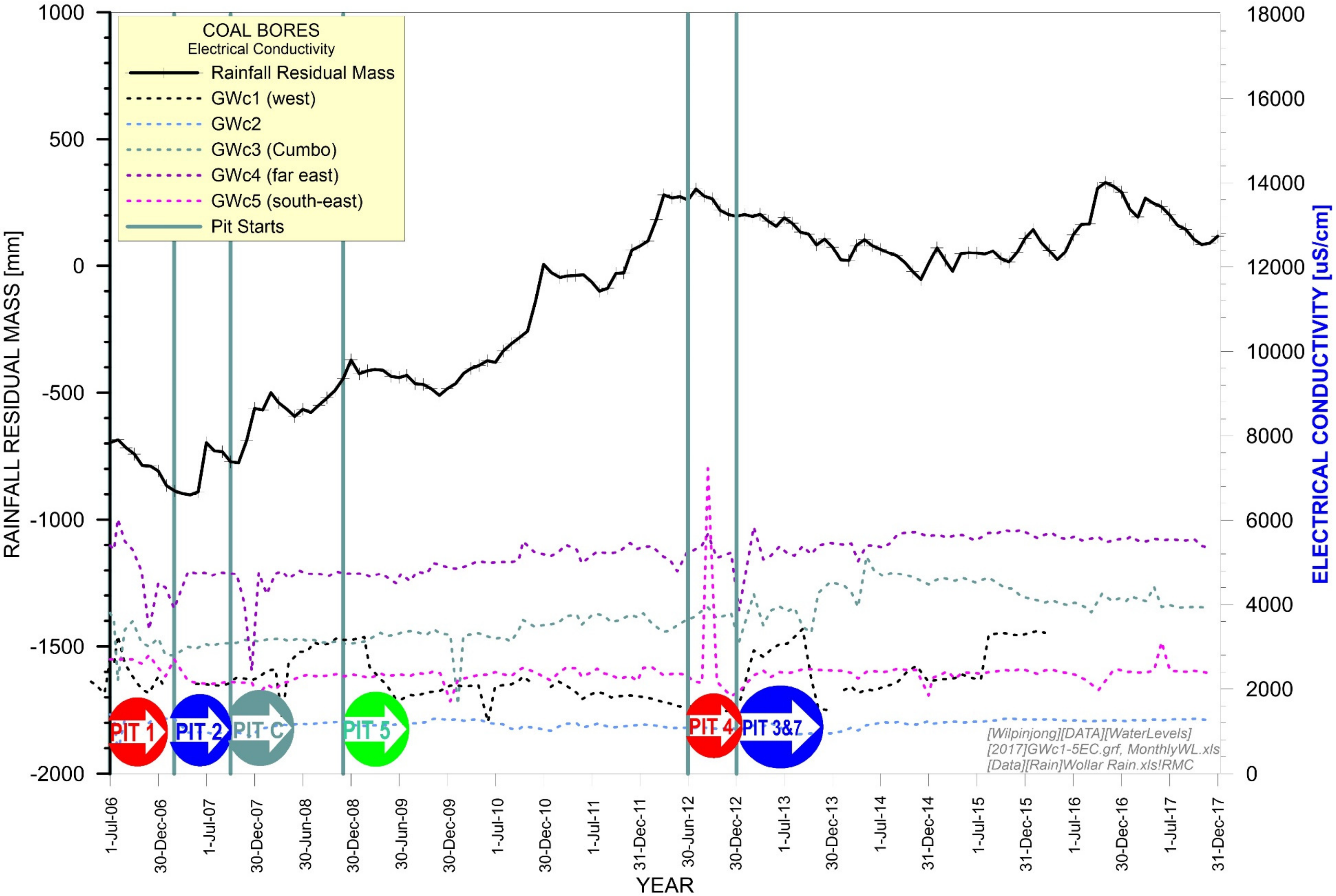


Figure A- 22 Coal Groundwater EC trends

APPENDIX B

Wilpinjong Coal Mine - Trigger Assessment Charts

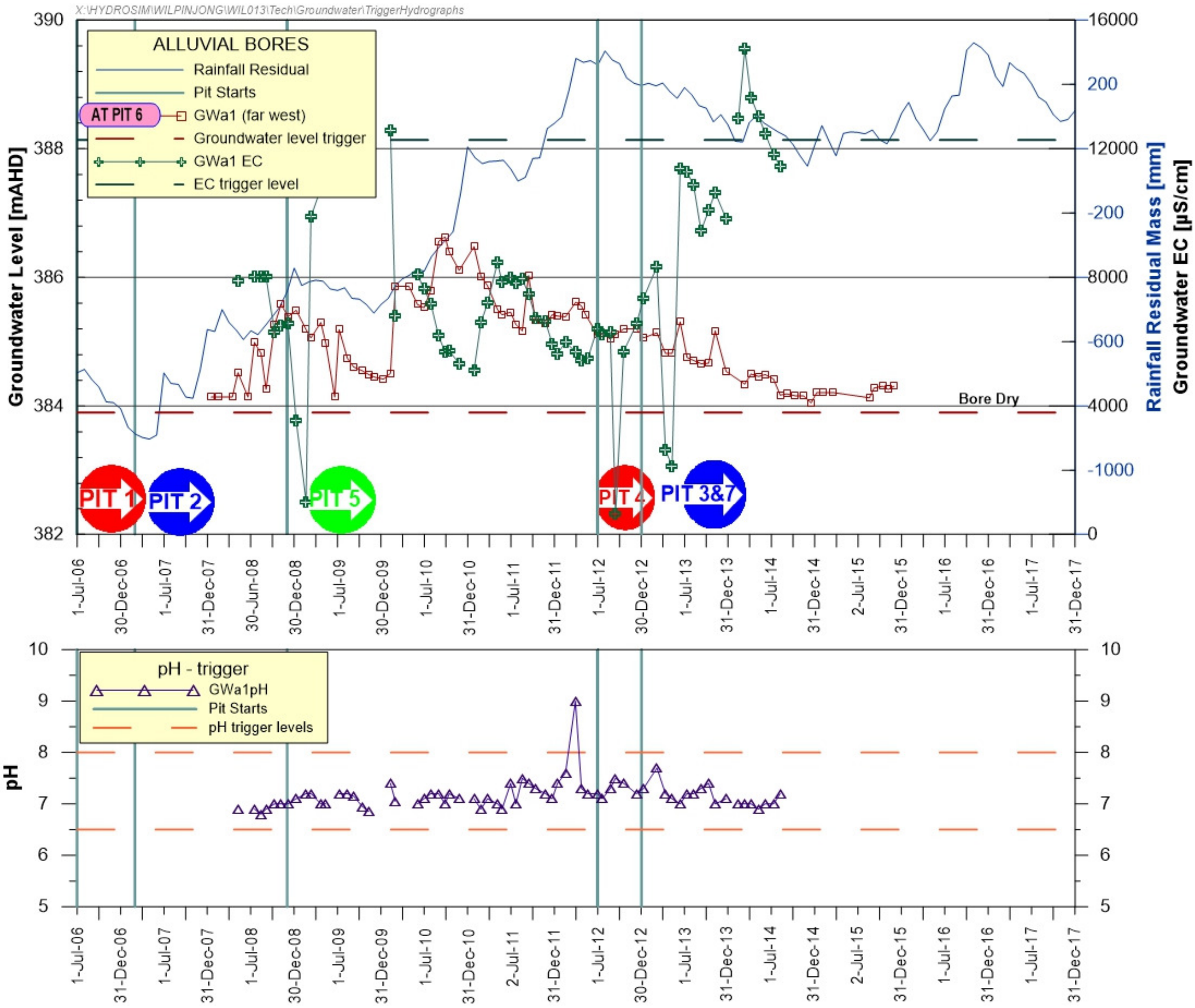


Figure B- 1 GWa1 trigger assessment chart

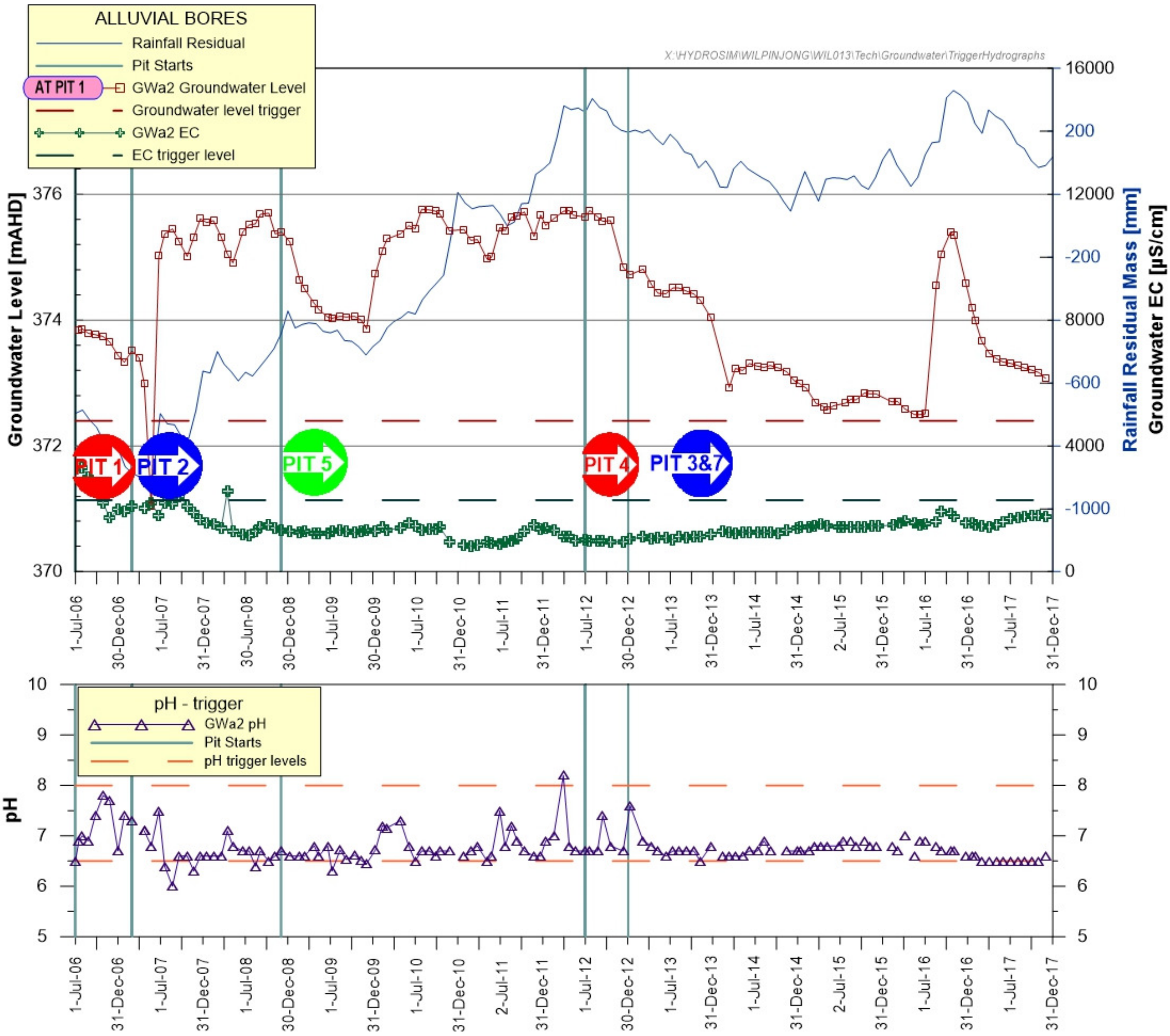


Figure B- 2 GWa2 trigger assessment chart

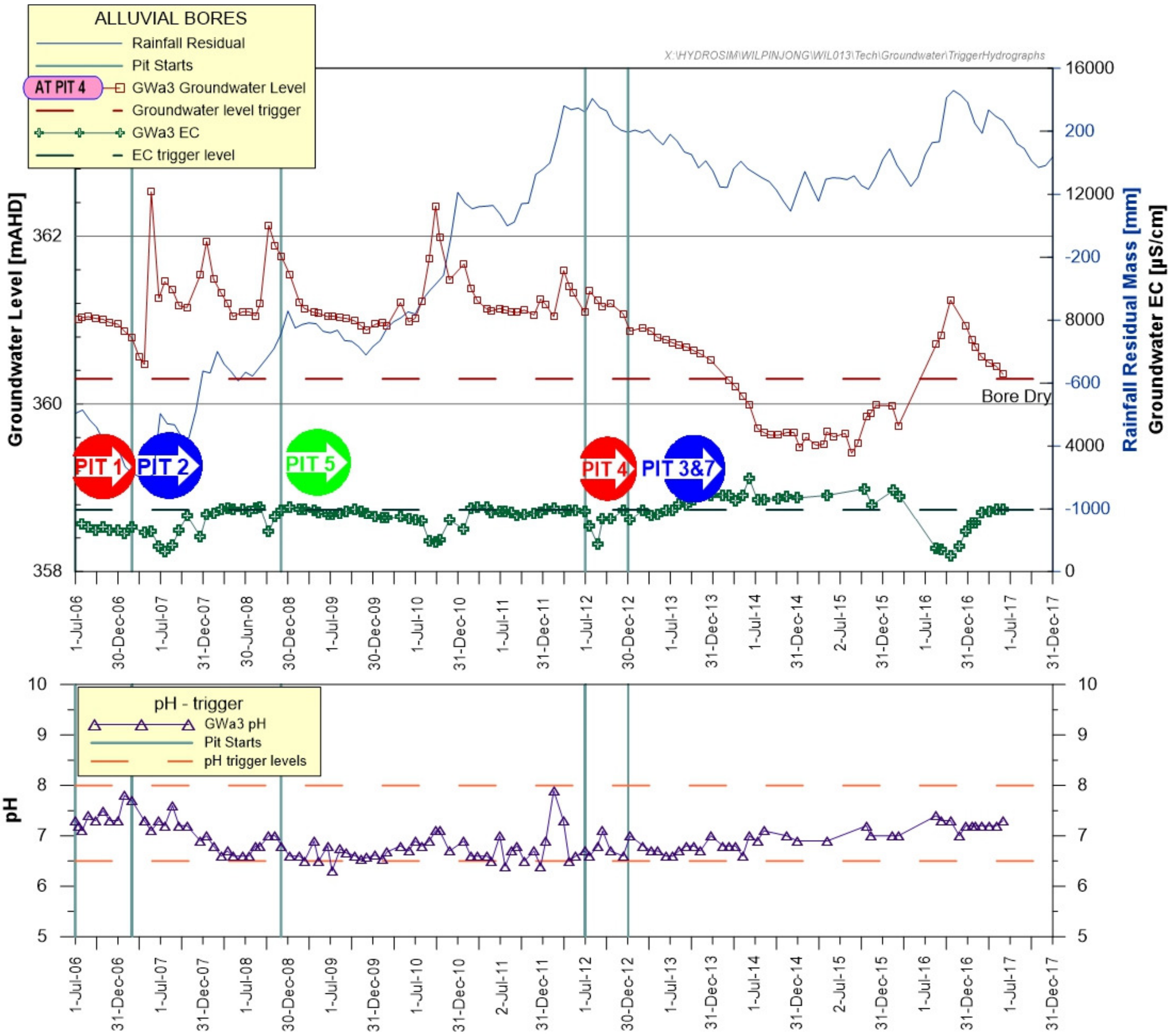


Figure B- 3 GWa3 trigger assessment chart

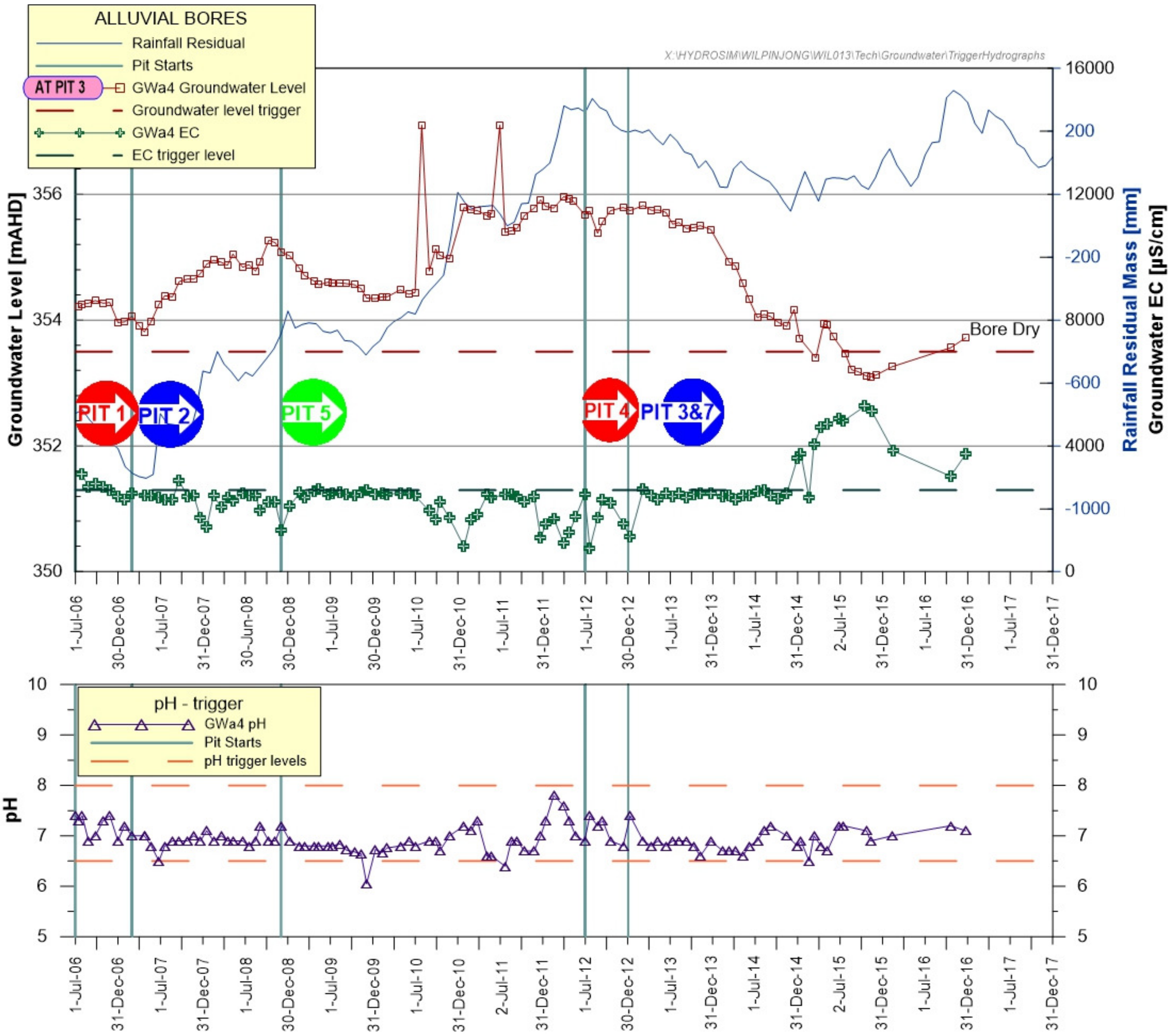


Figure B- 4 GWa4 trigger assessment chart

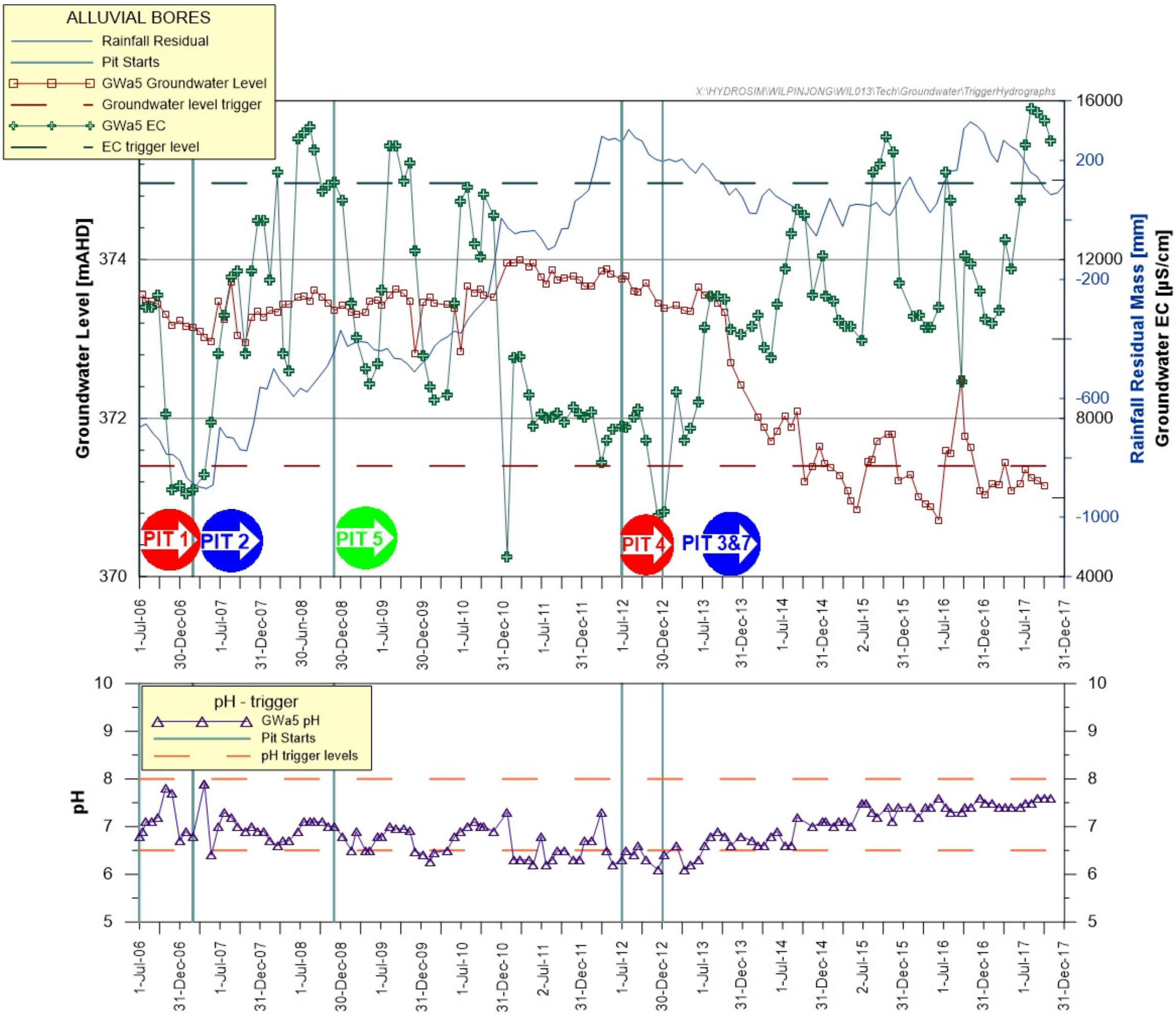
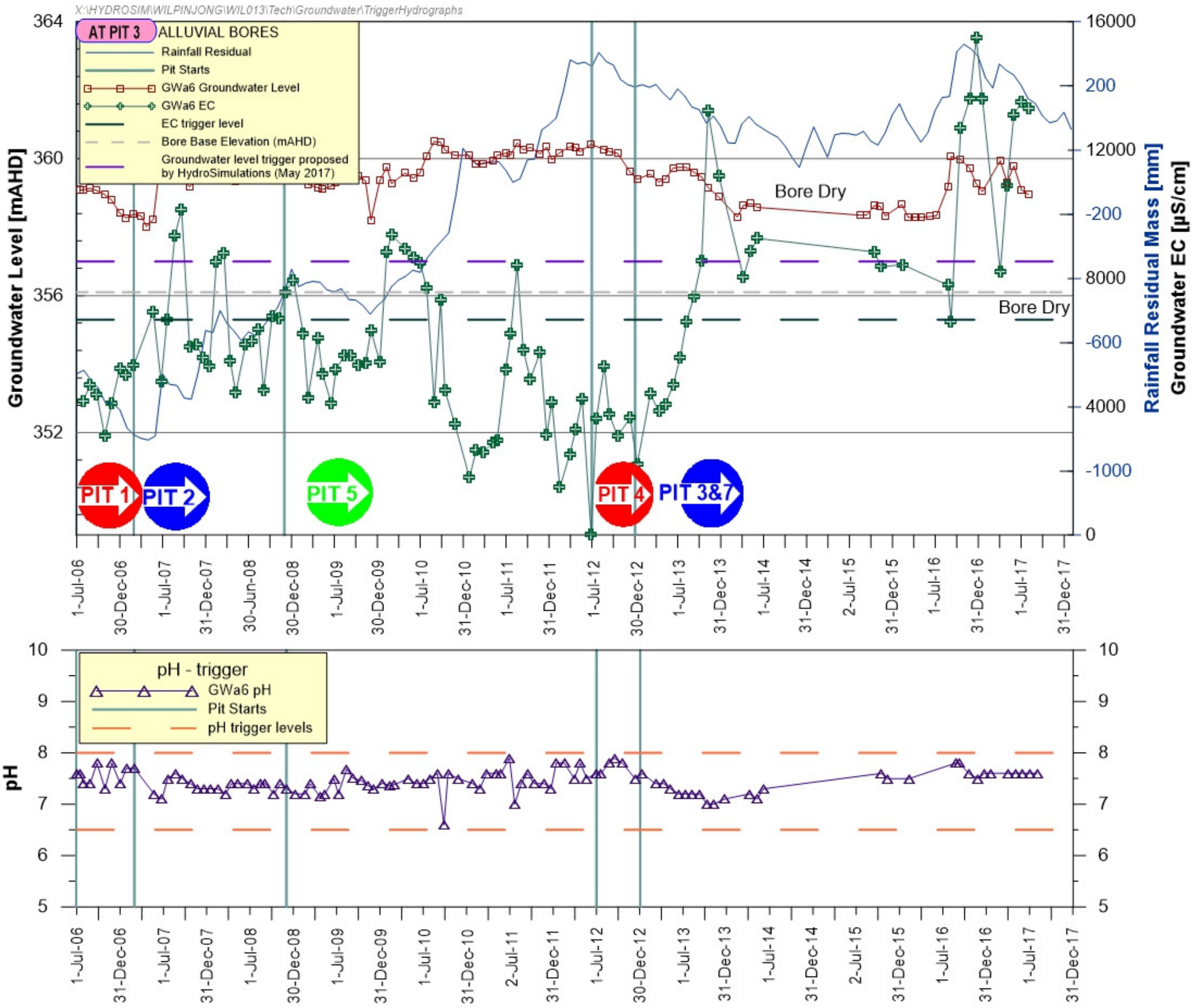


Figure B- 5 GWa5 trigger assessment chart



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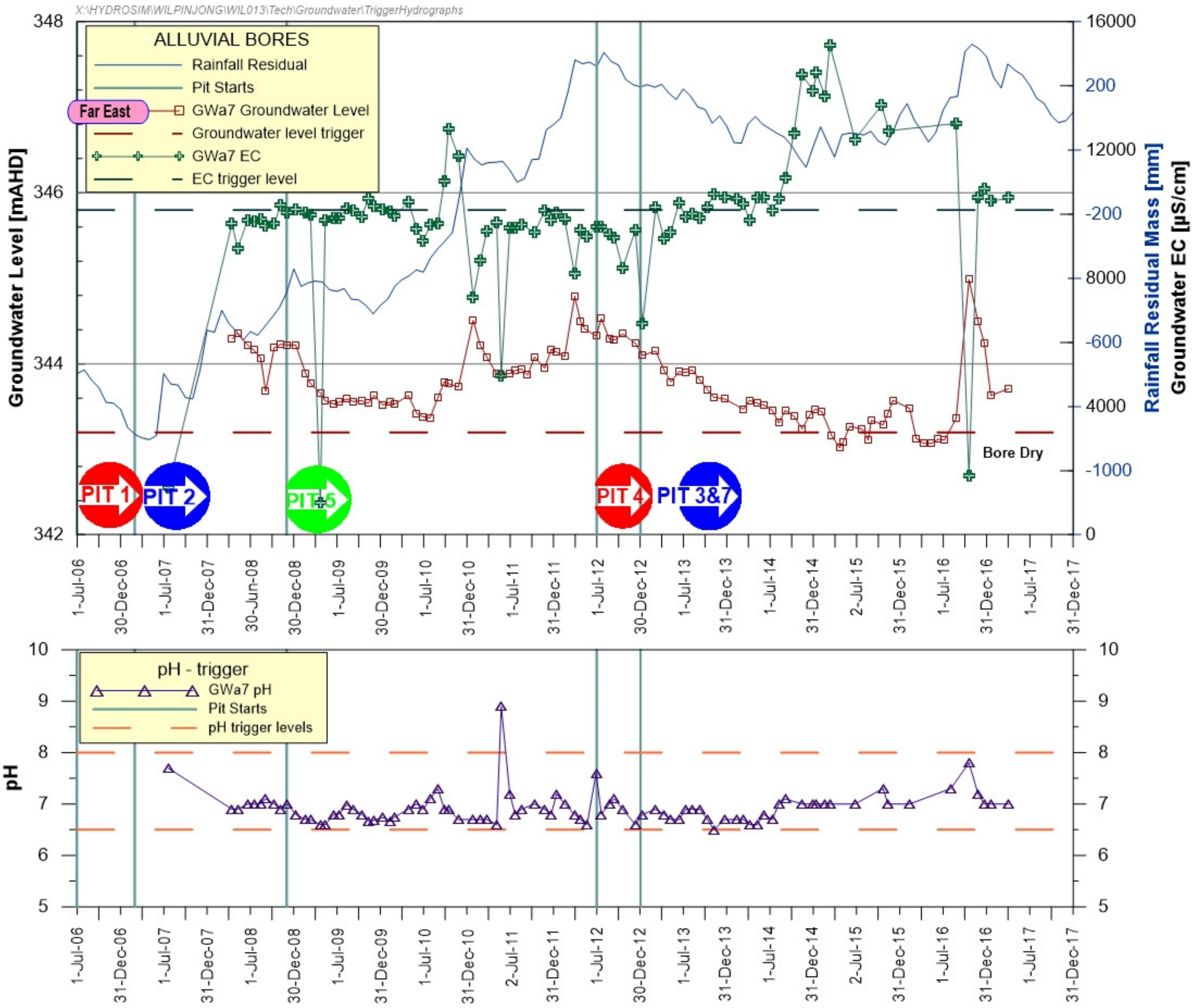
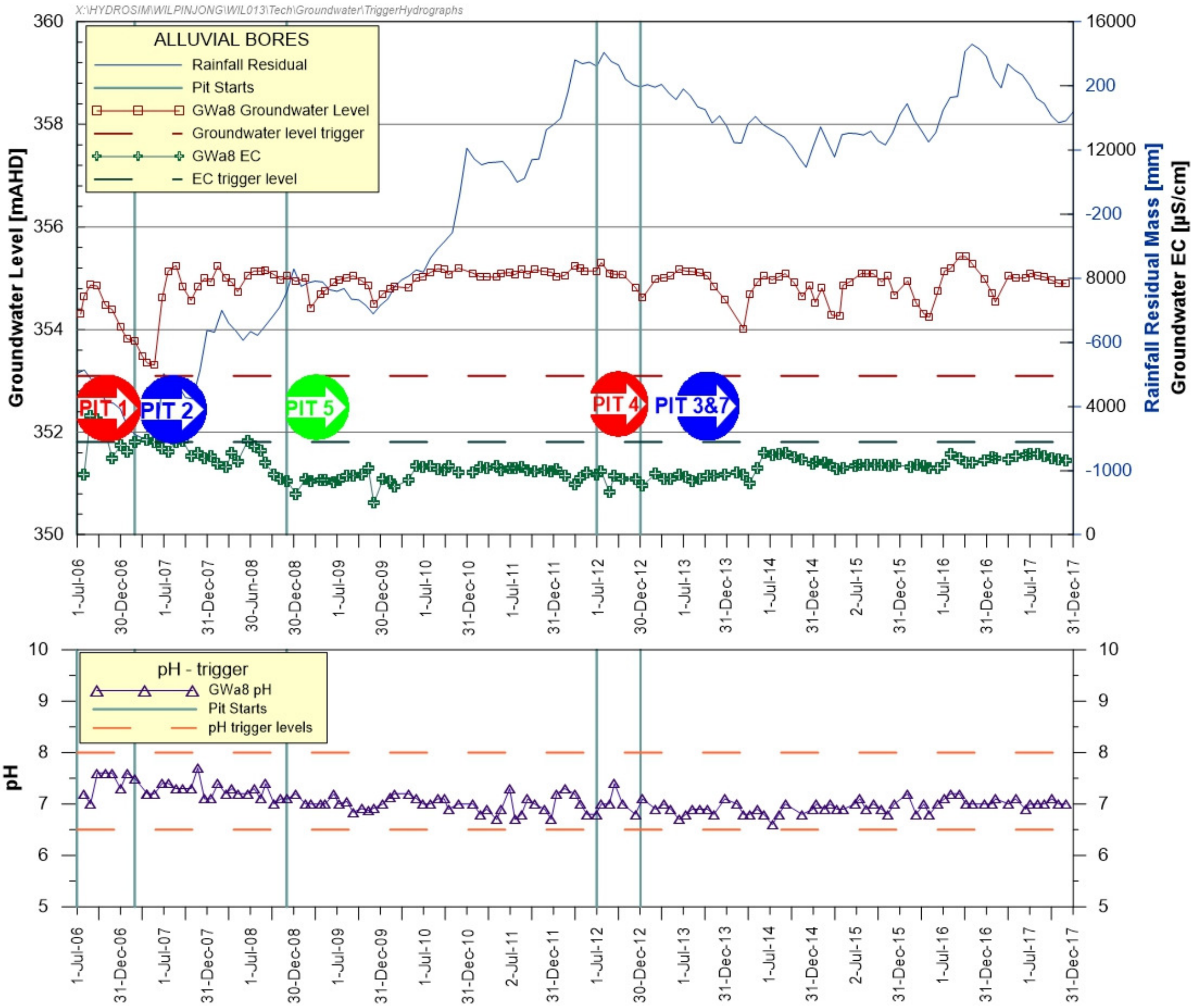


Figure B- 7 GWa7 trigger assessment chart



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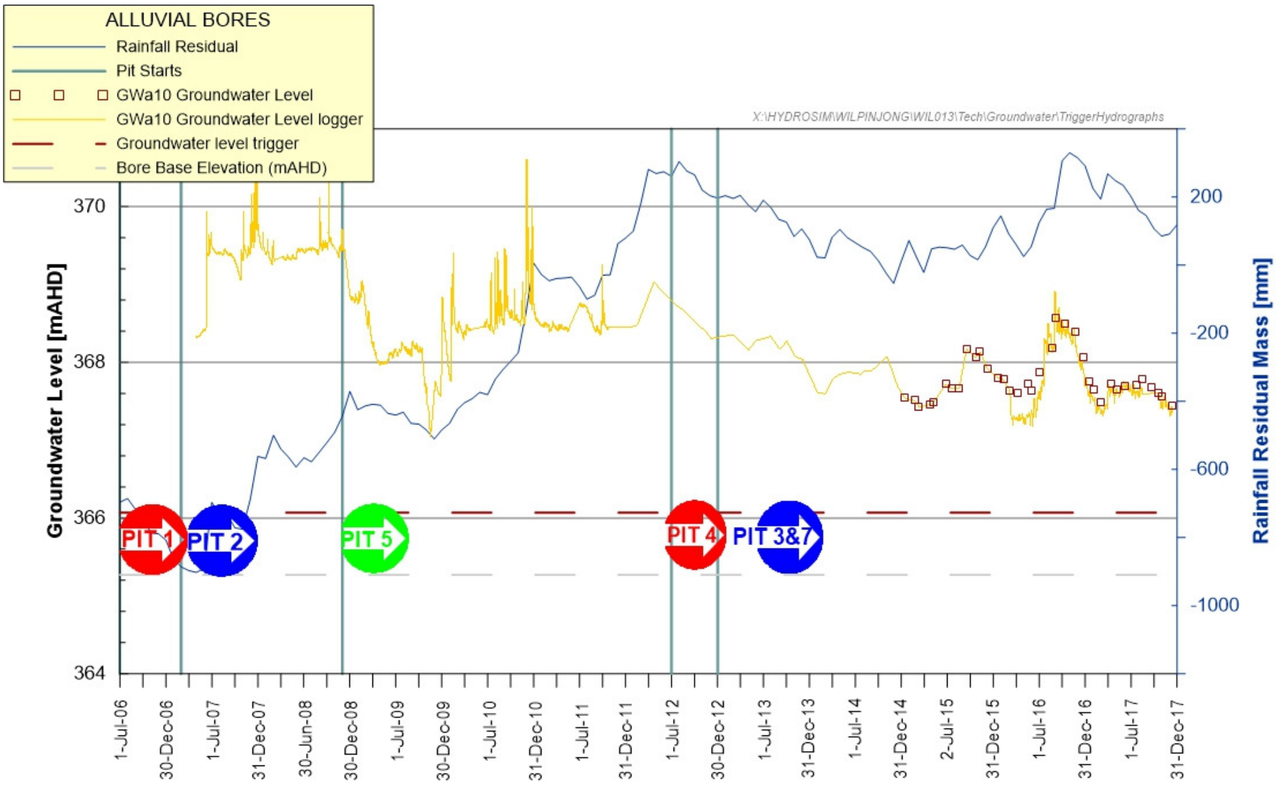


Figure B- 9 GWa10 trigger assessment chart

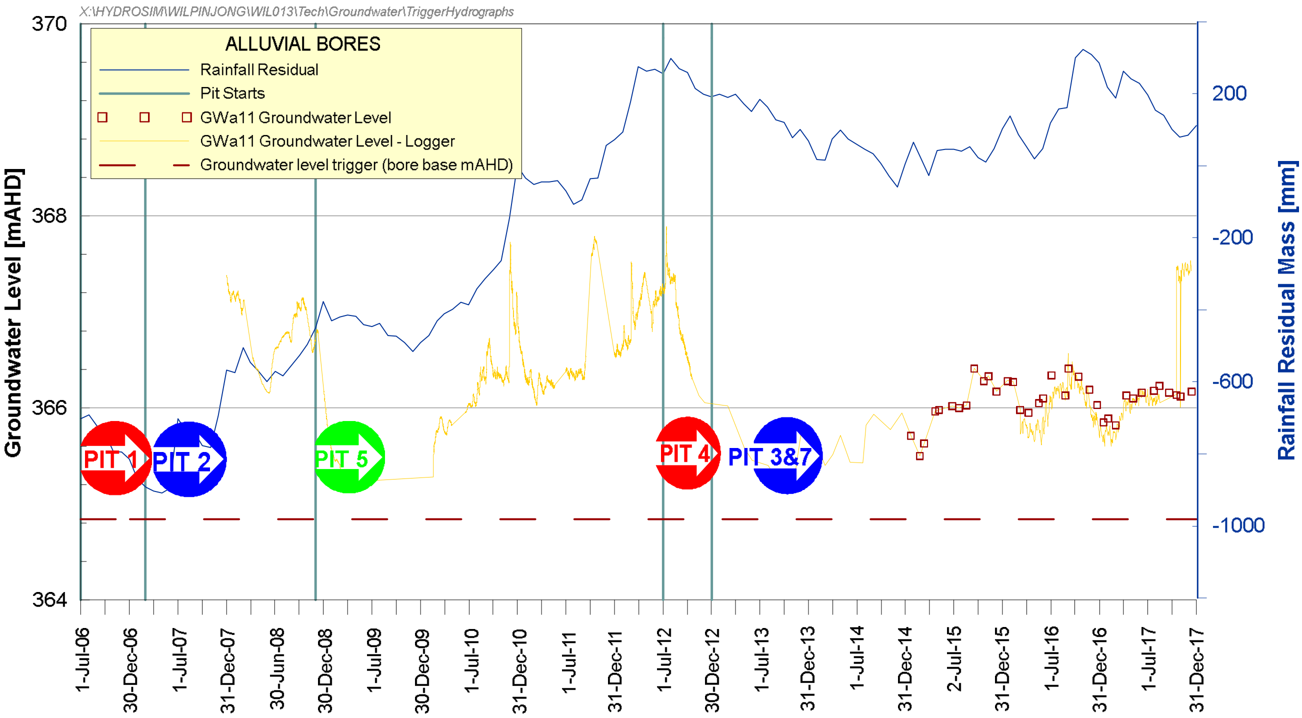


Figure B- 10 GWa11 trigger assessment chart

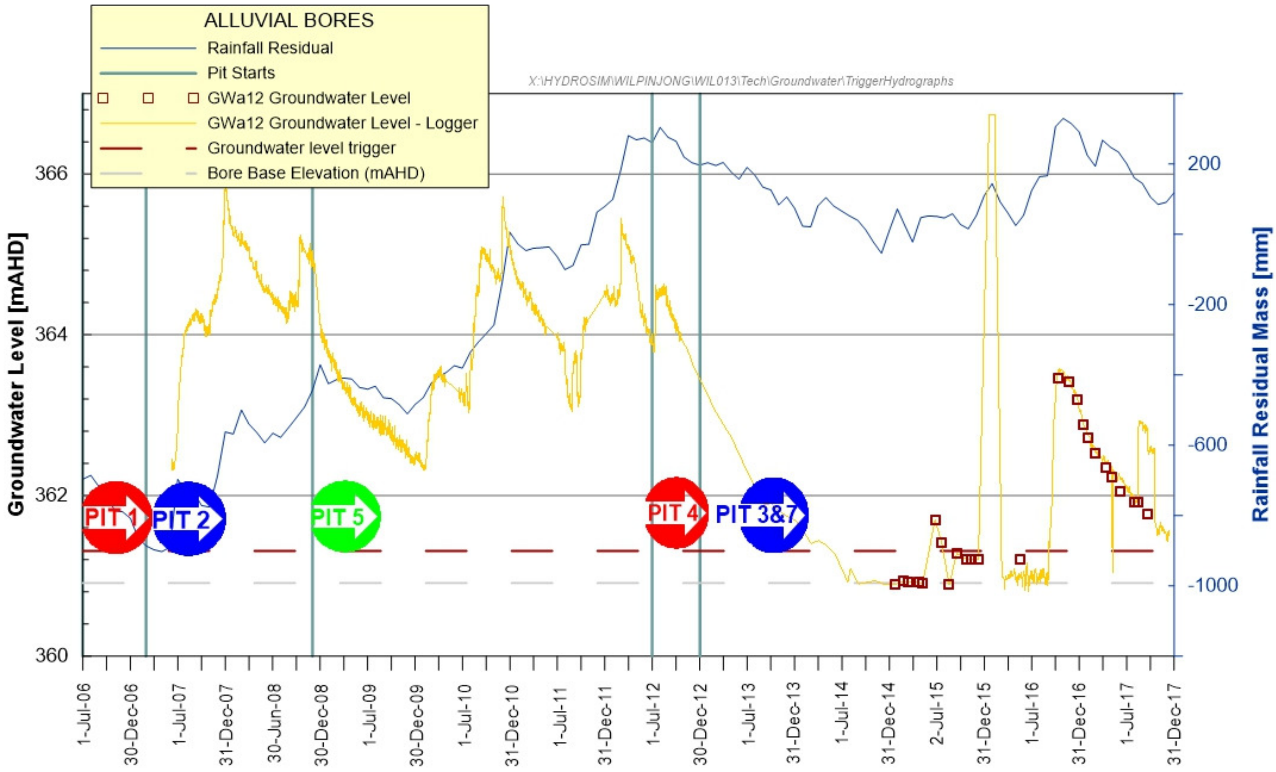


Figure B- 11 GWa12 trigger assessment chart

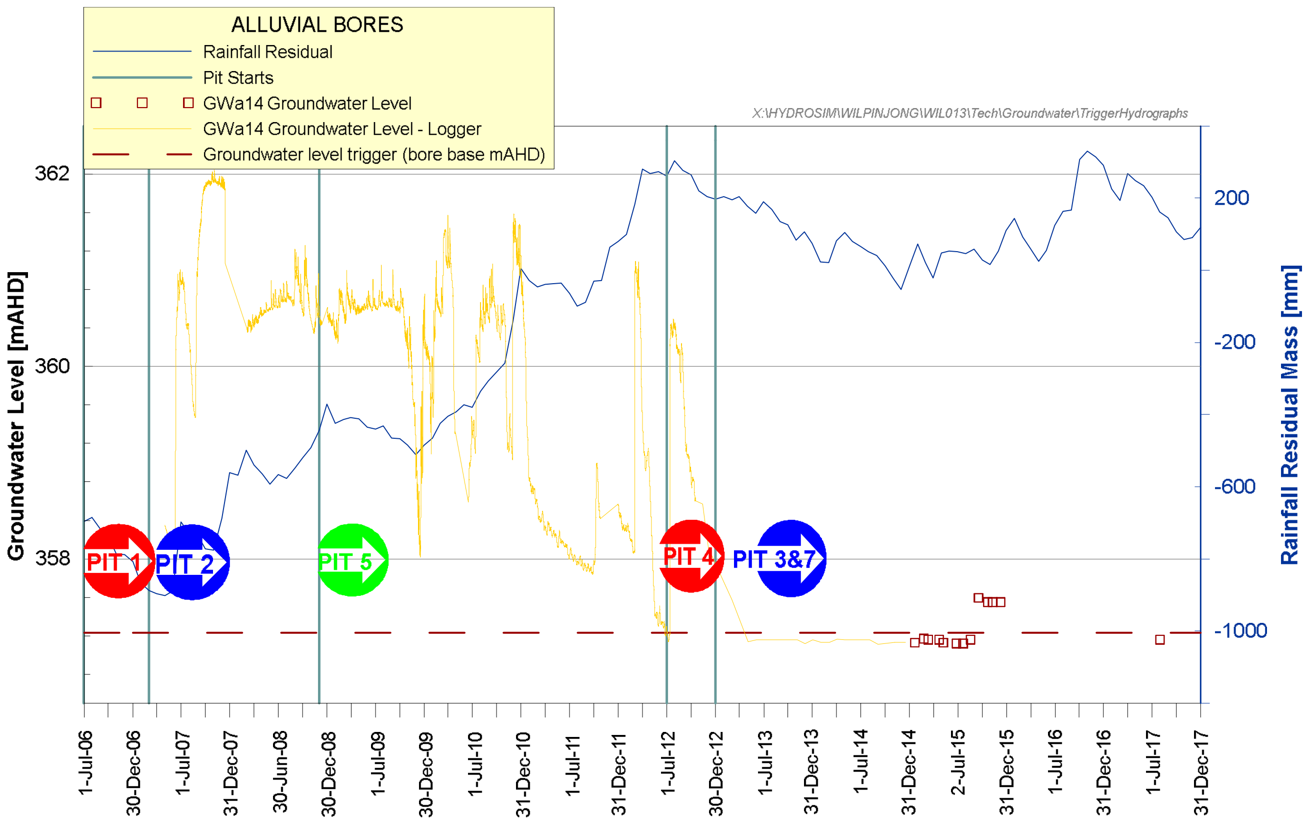


Figure B -12 GWa14 trigger assessment chart

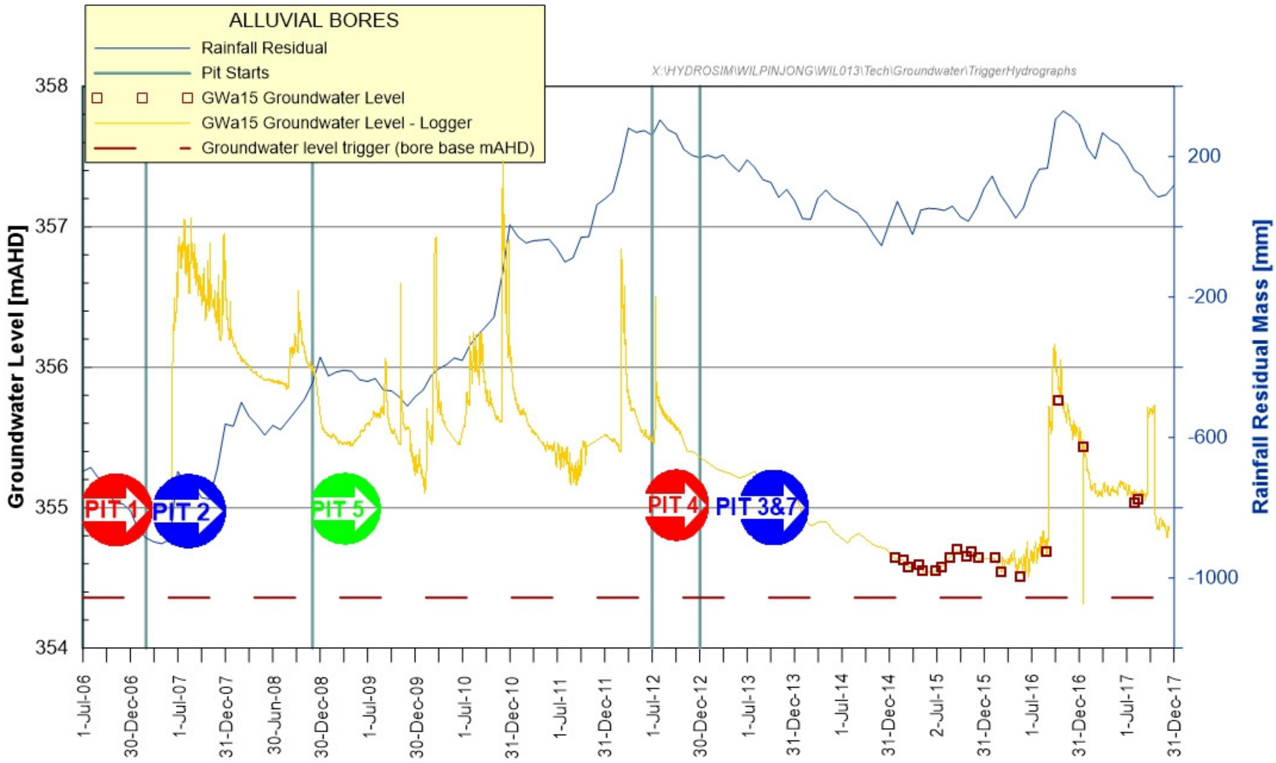


Figure B- 13 GWa15 trigger assessment chart

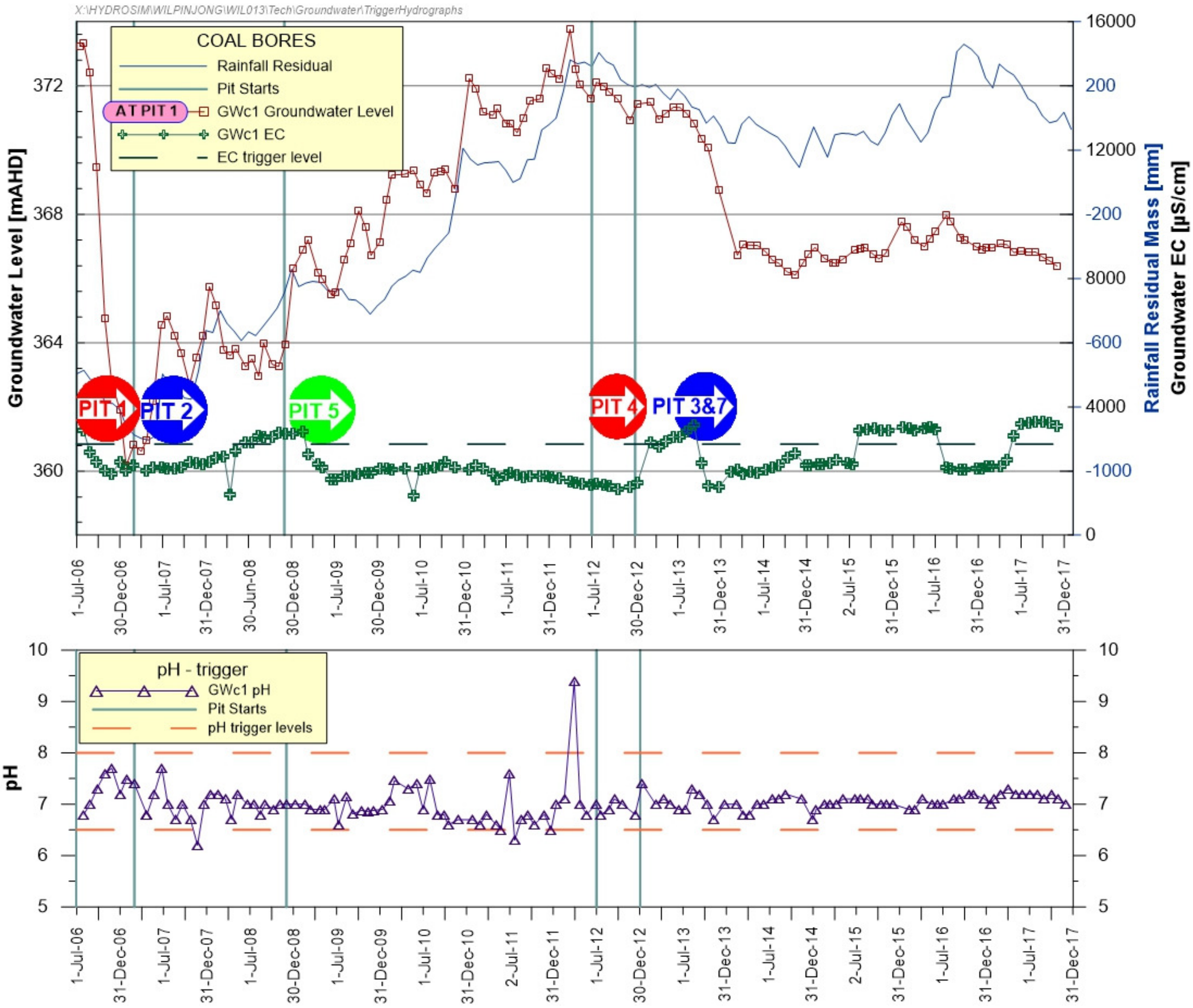
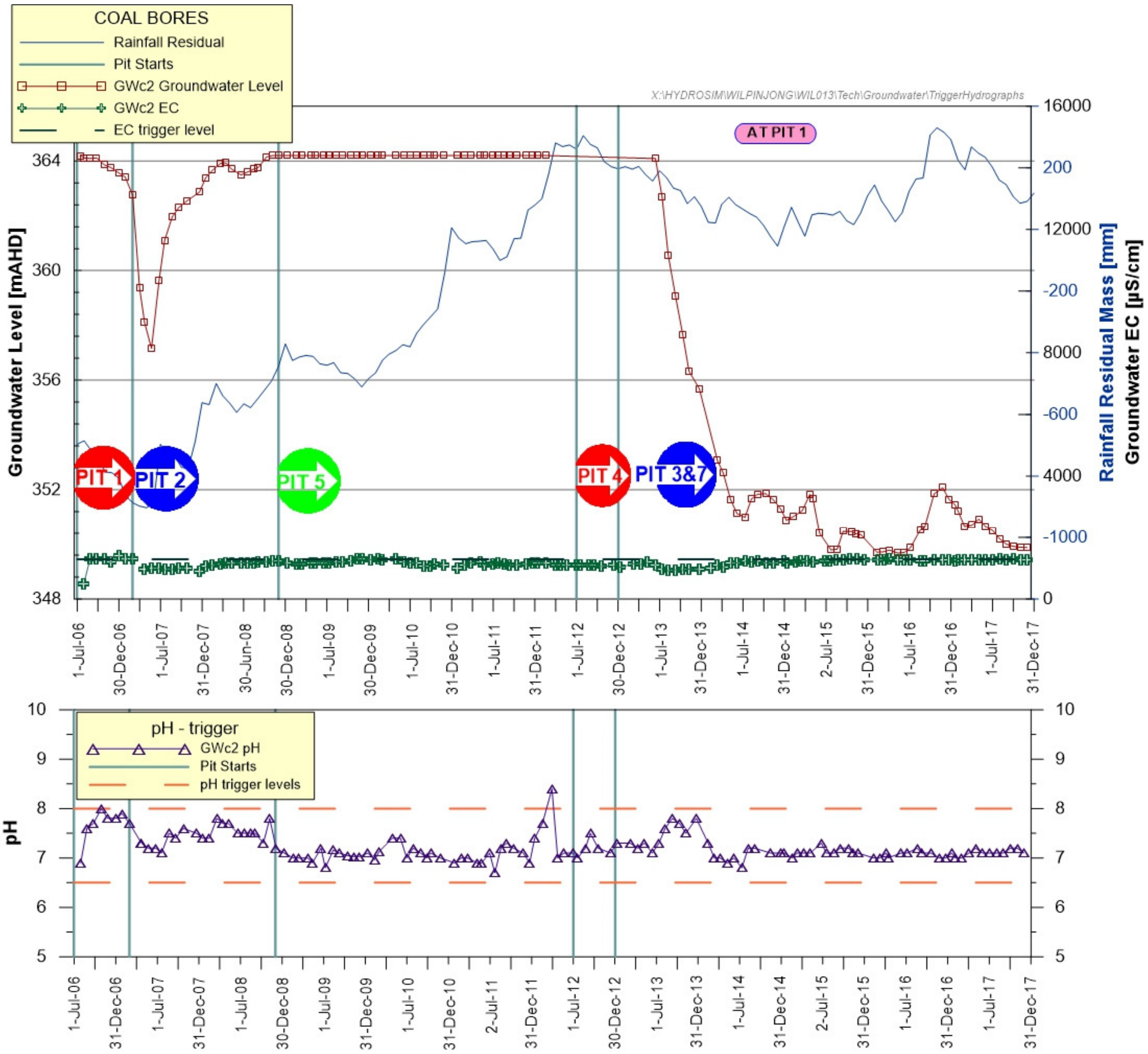


Figure B- 14 GWc1 trigger assessment chart



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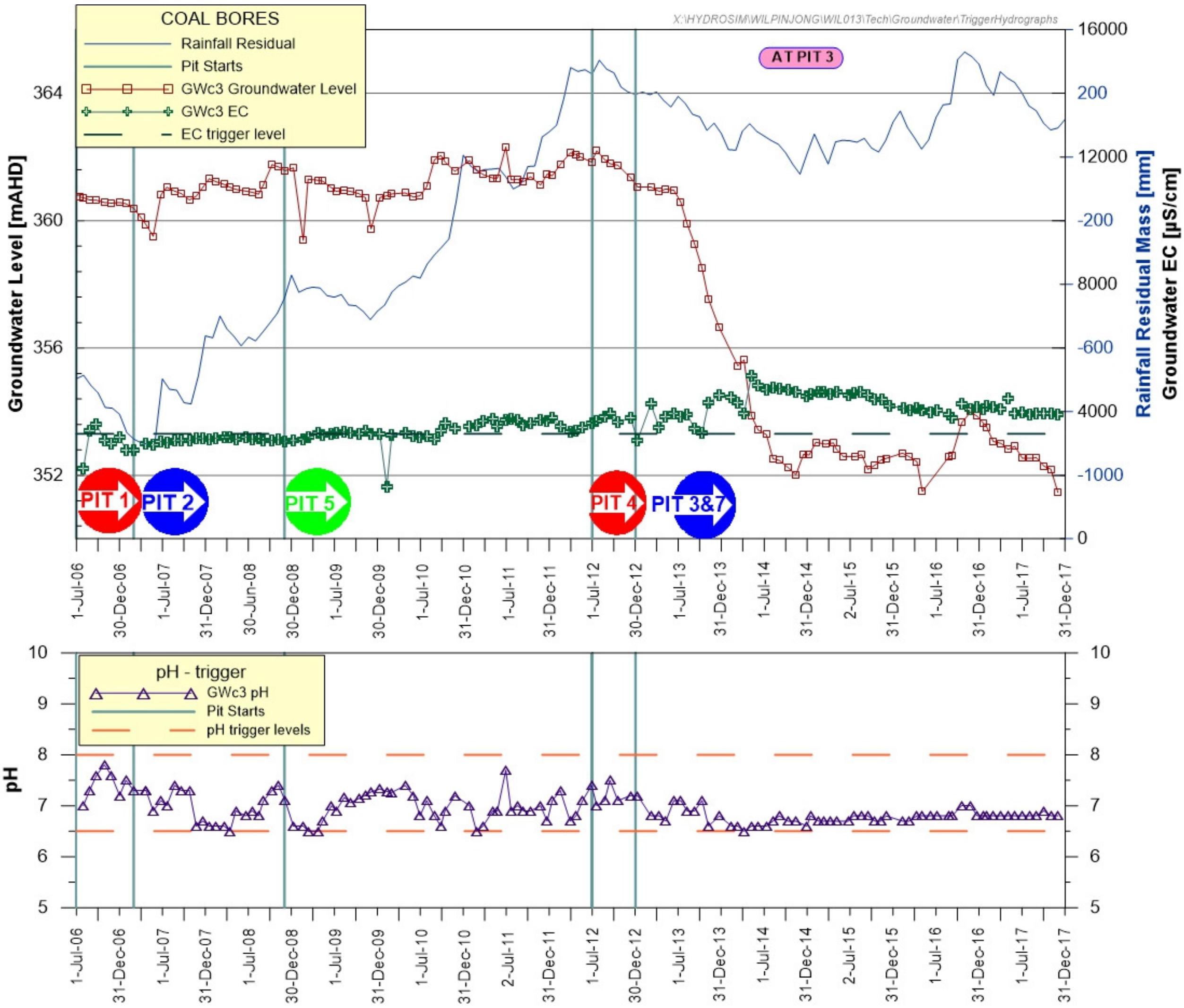

Figure B- 16 GWc3 trigger assessment chart

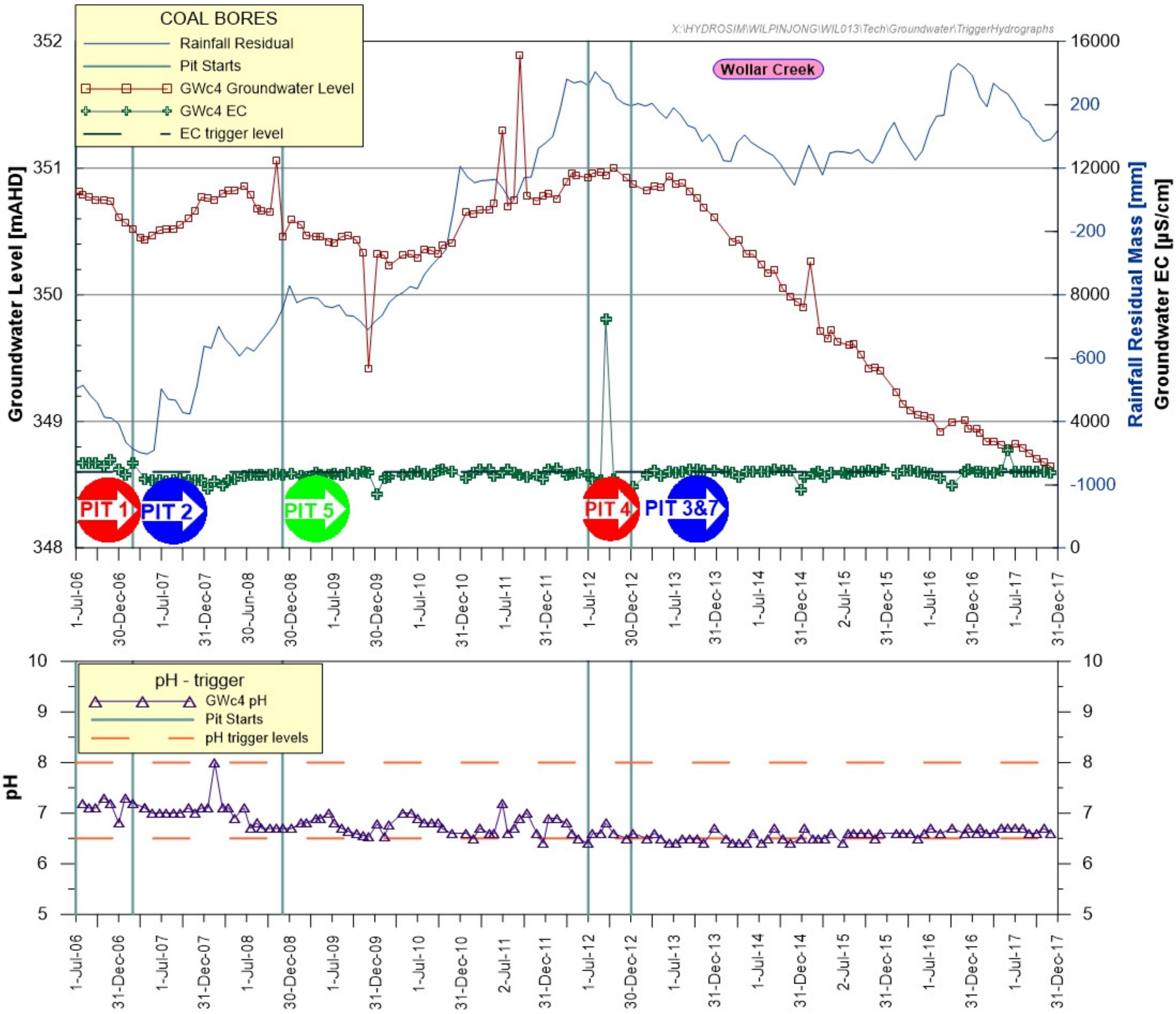

Figure B- 17 GWc4 trigger assessment chart

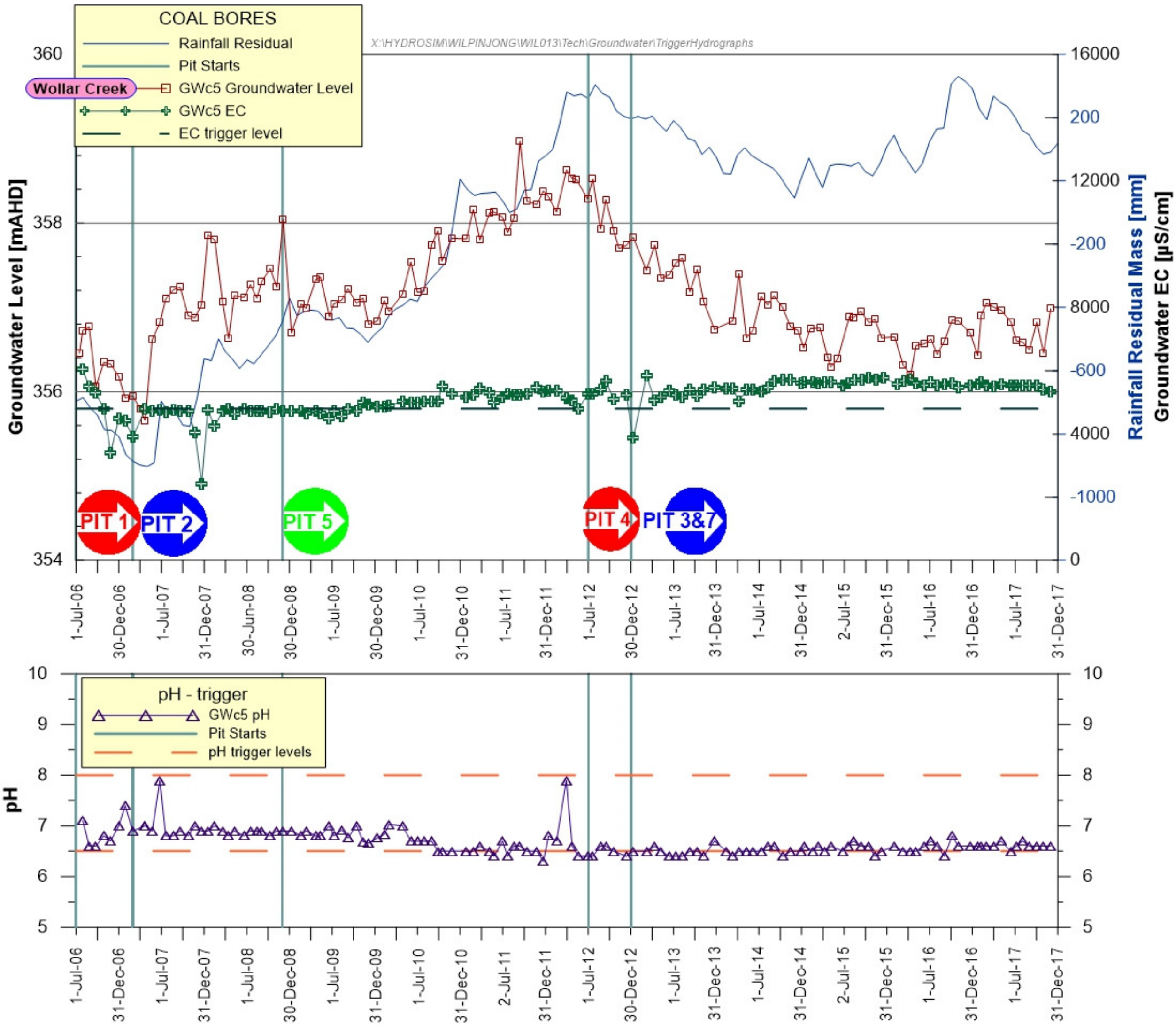

Figure B- 18 GWc5 trigger assessment chart

APPENDIX C

Wilpinjong Coal Mine – Model Performance Hydrographs

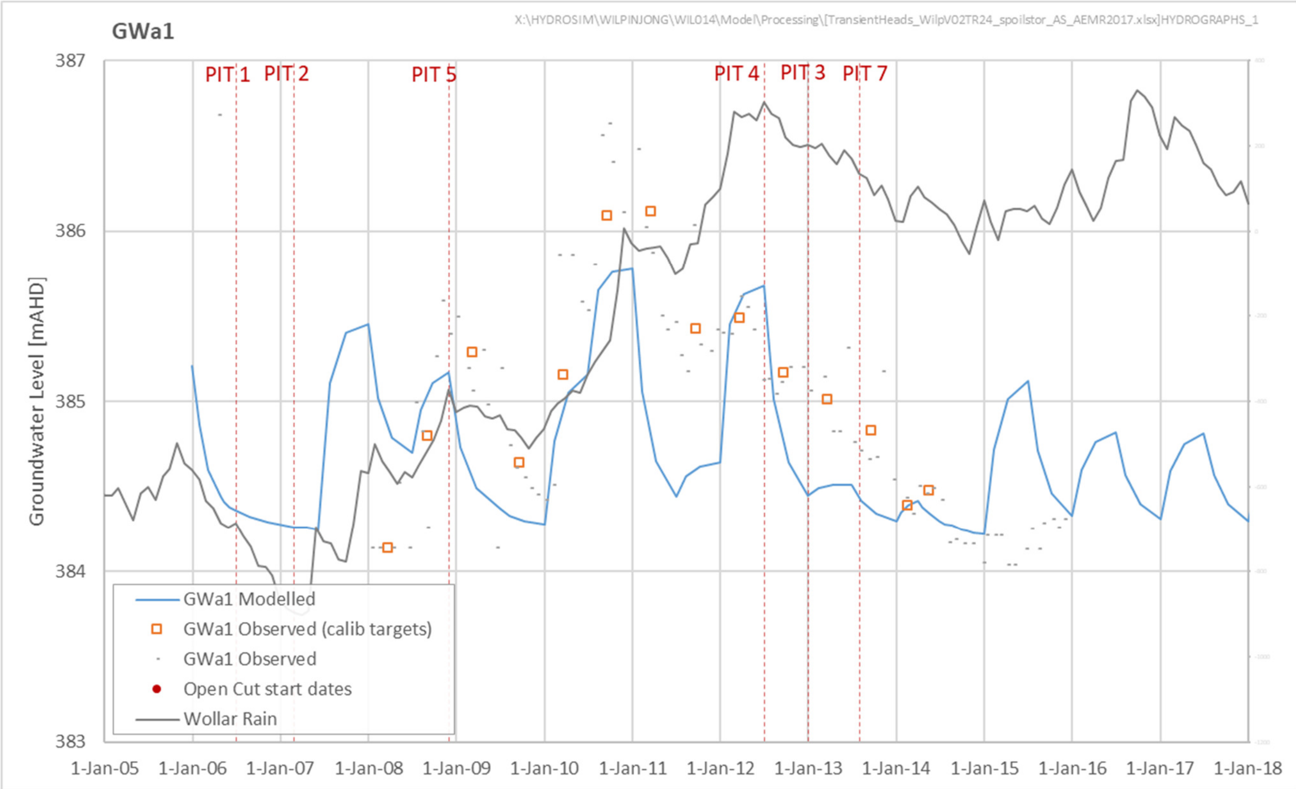

Figure C- 1 GWa1 Calibration Hydrographs

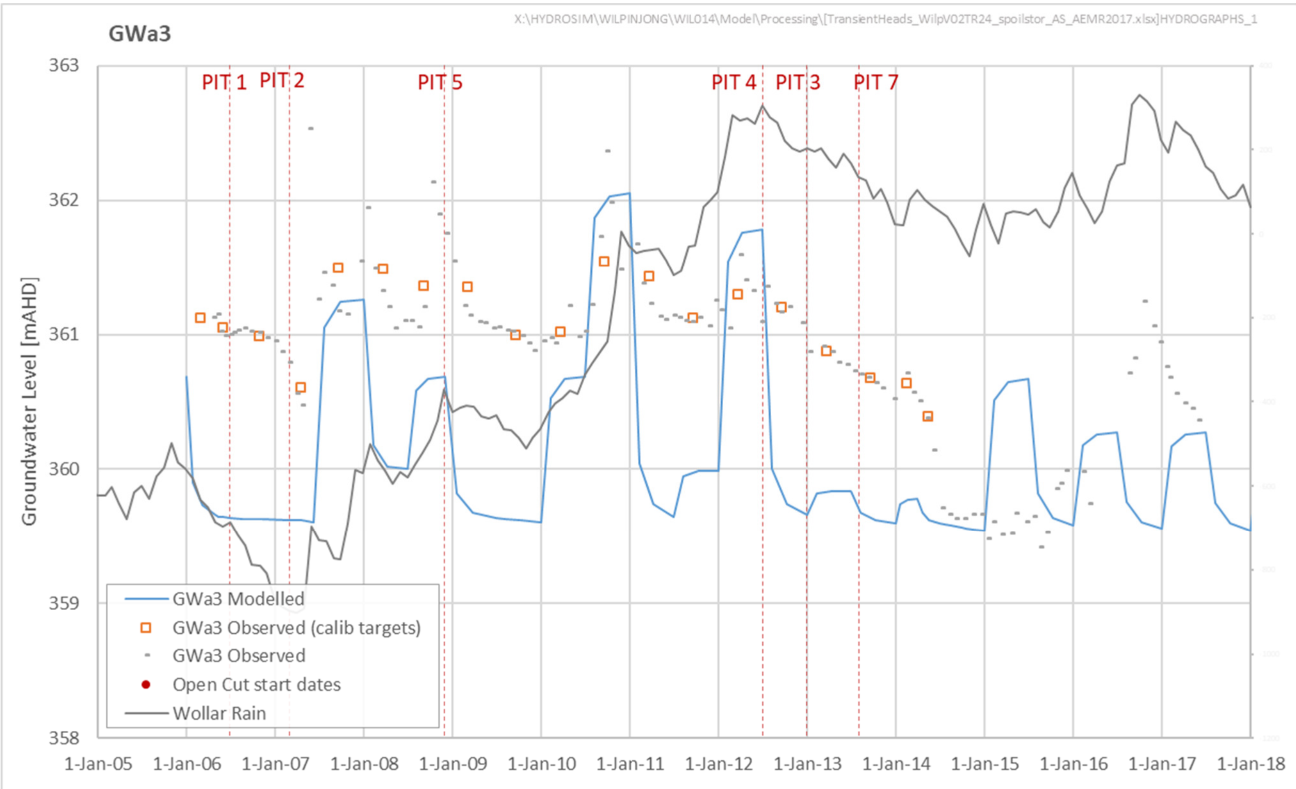

Figure C- 2 GWa3 Calibration Hydrographs

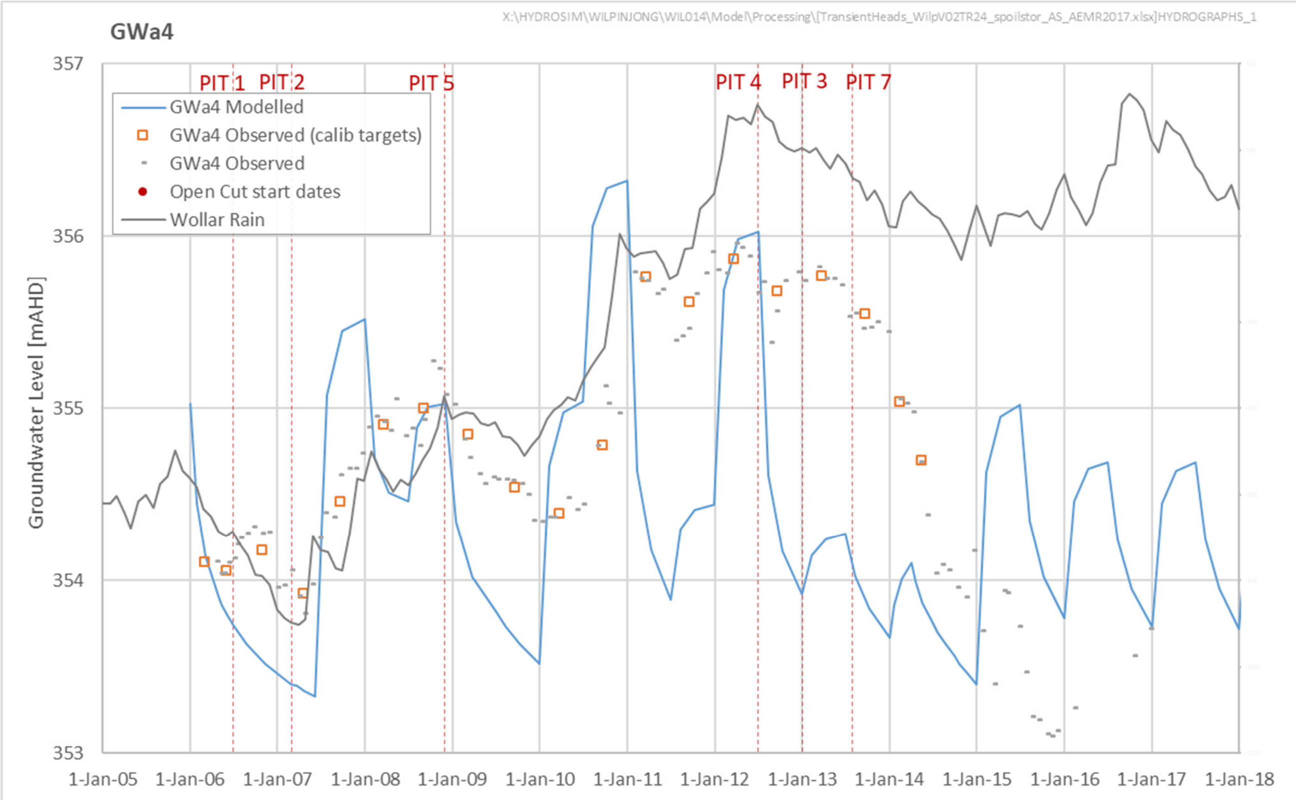

Figure C- 3 GWa4 Calibration Hydrographs

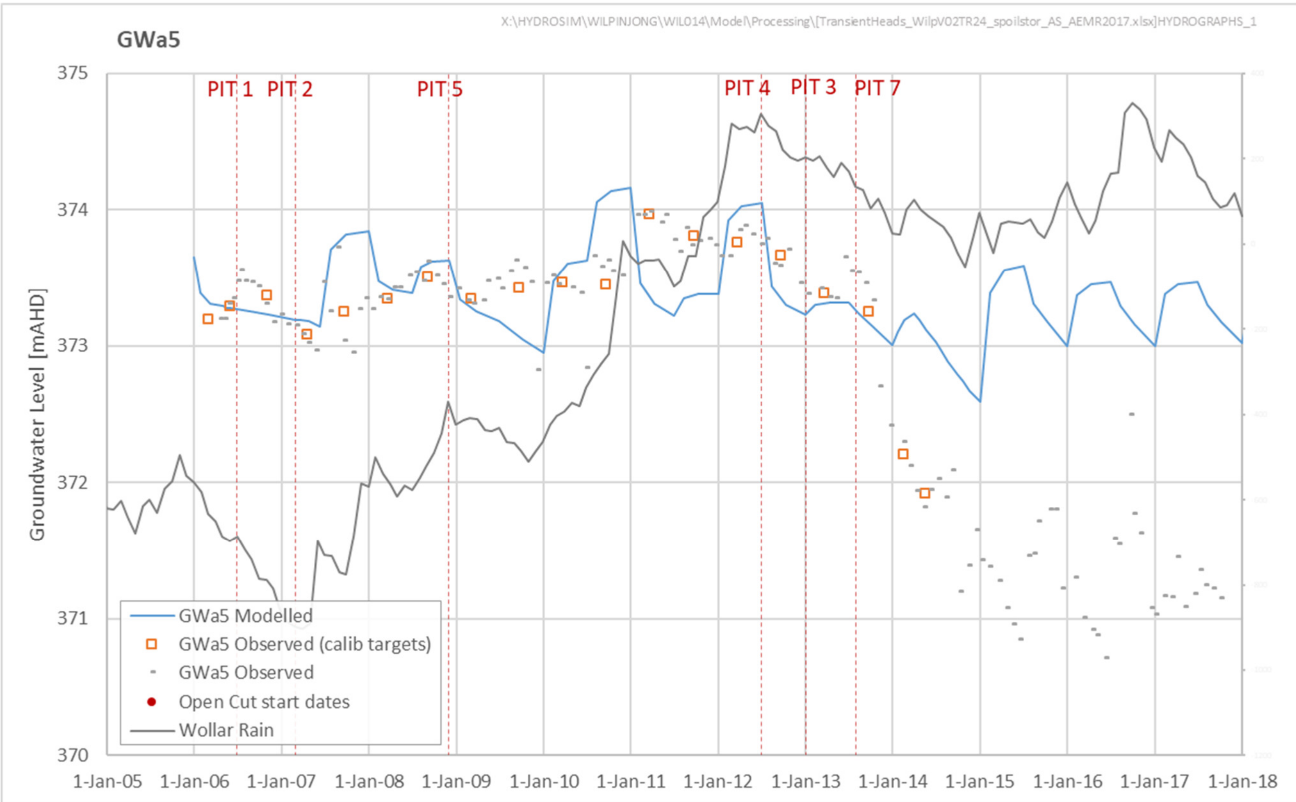

Figure C- 4 GWa5 Calibration Hydrographs

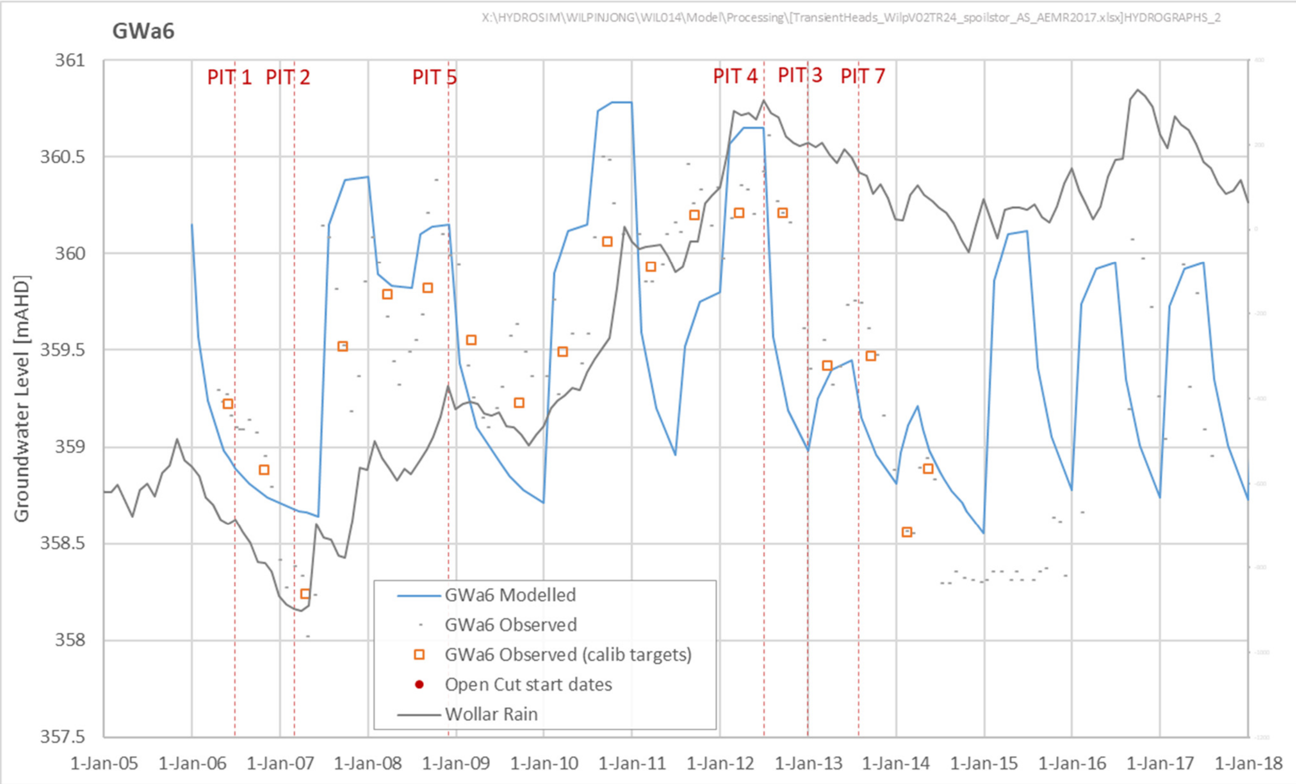

Figure C- 5 GWa6 Calibration Hydrographs

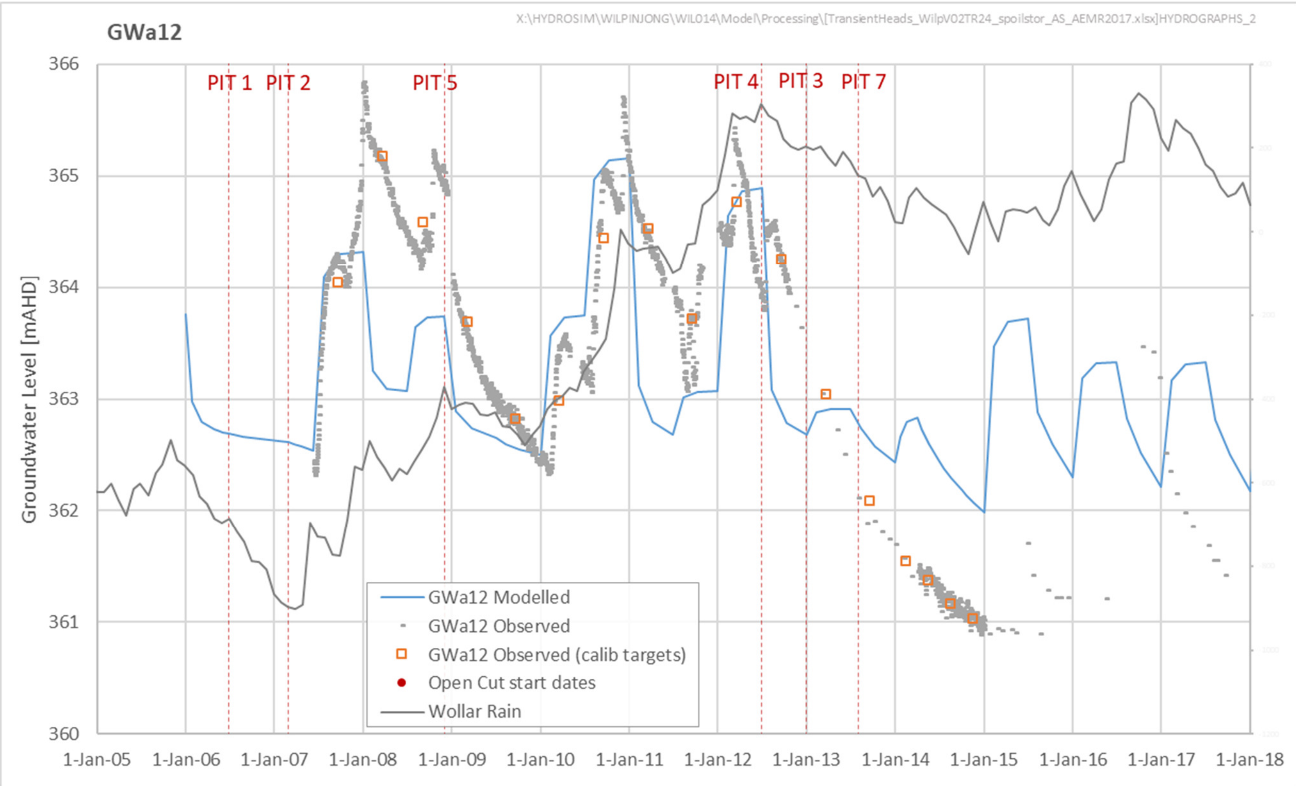

Figure C- 6 GWa12 Calibration Hydrographs

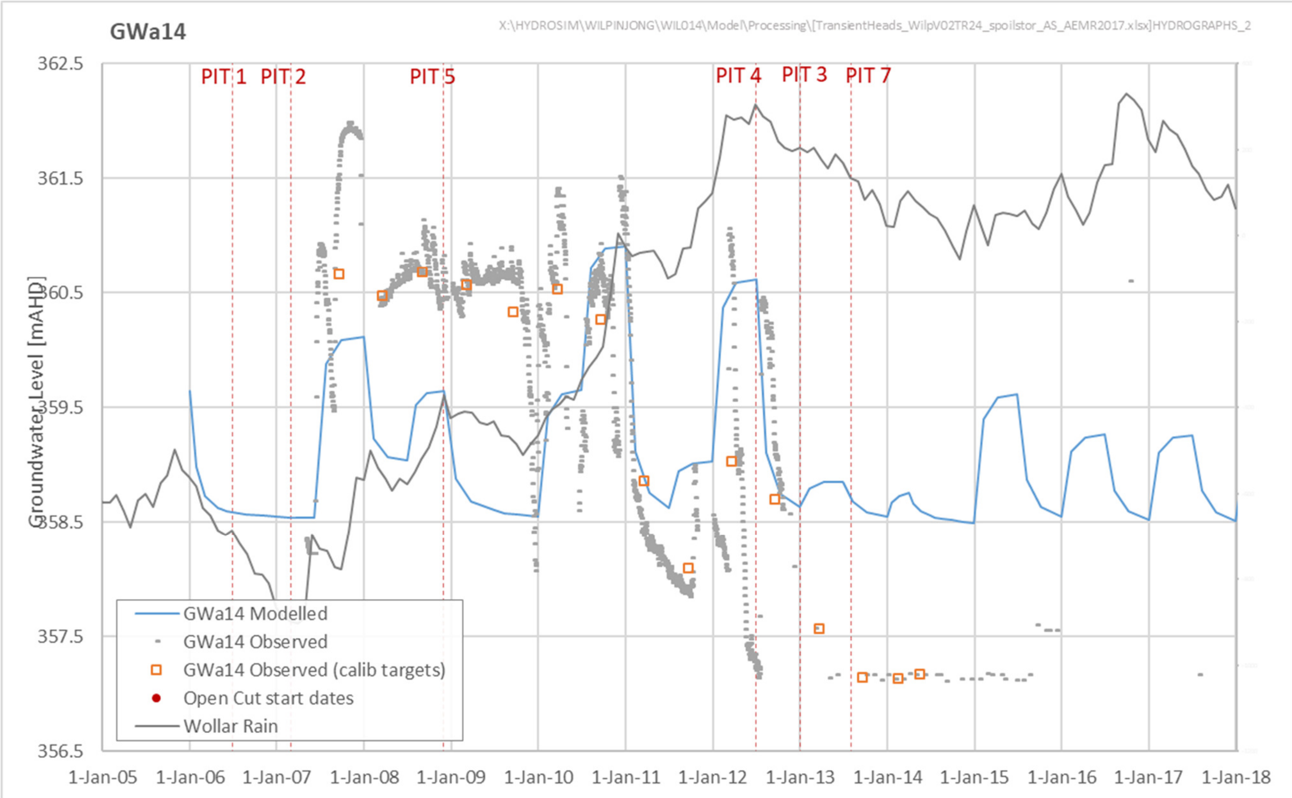

Figure C- 7 GWa14 Calibration Hydrographs

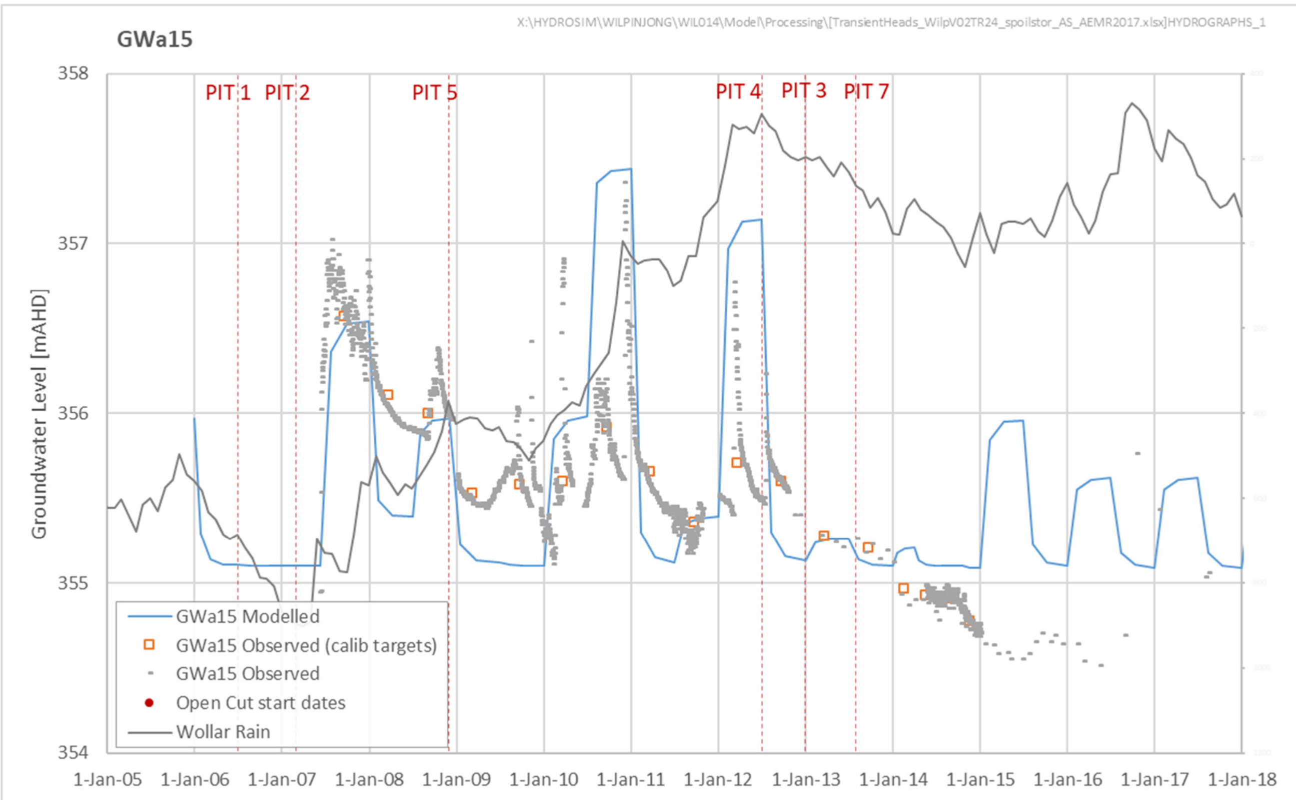

Figure C- 8 GWa15 Calibration Hydrographs

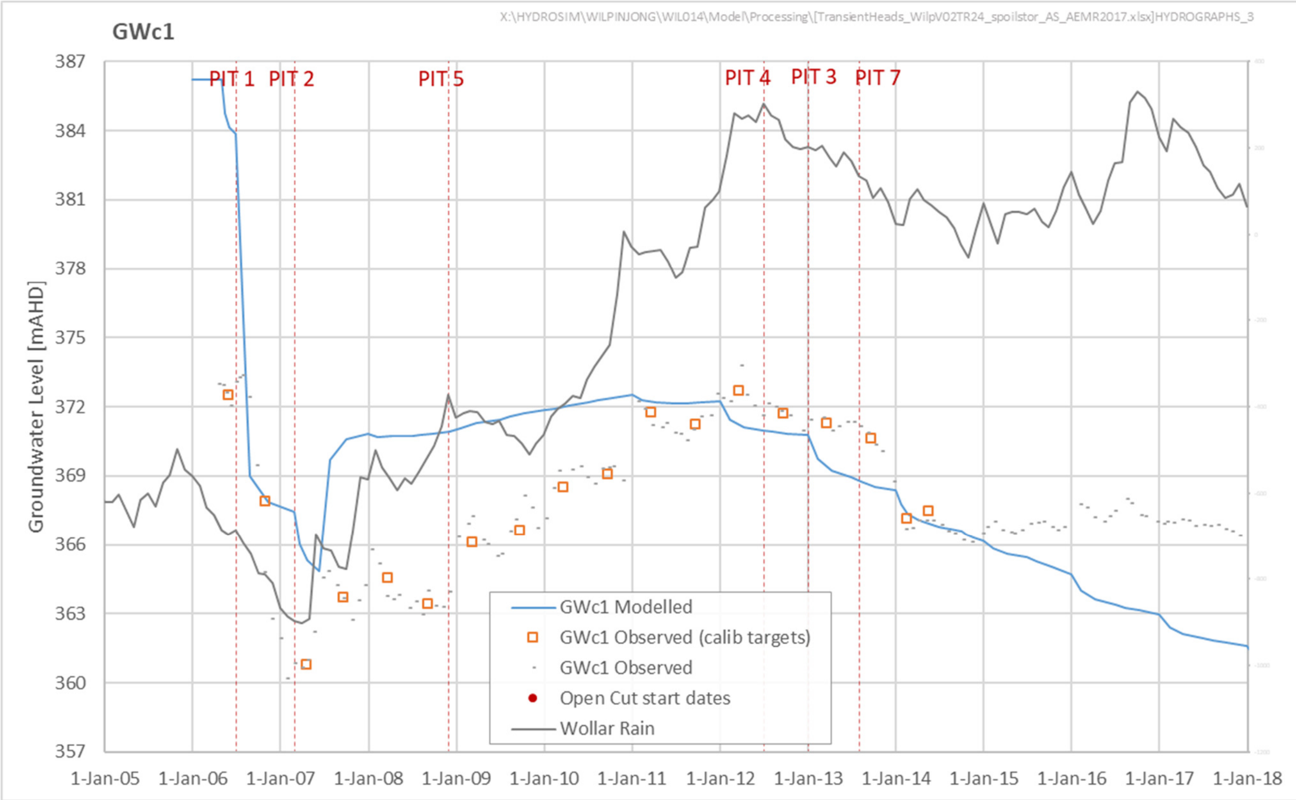

Figure C- 9 GWc1 Calibration Hydrographs

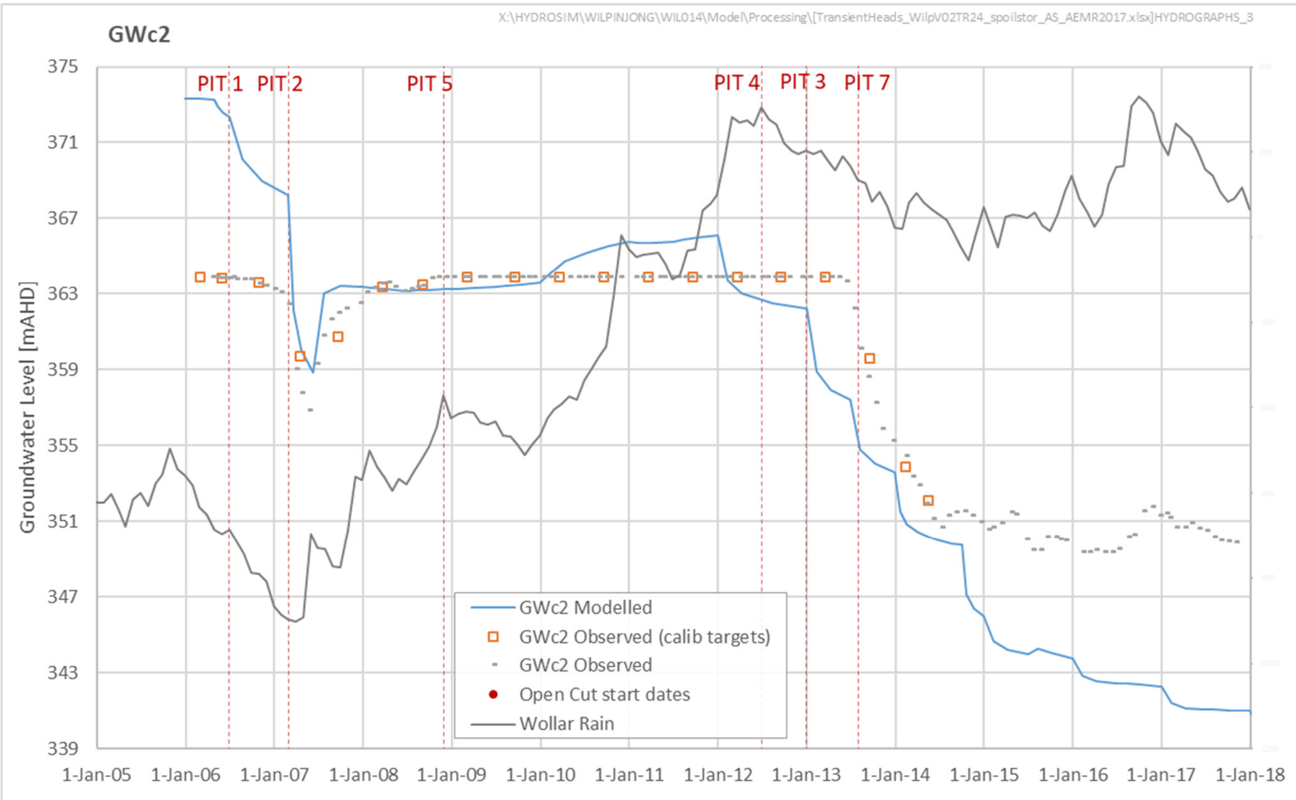

Figure C- 10 GWc2 Calibration Hydrographs

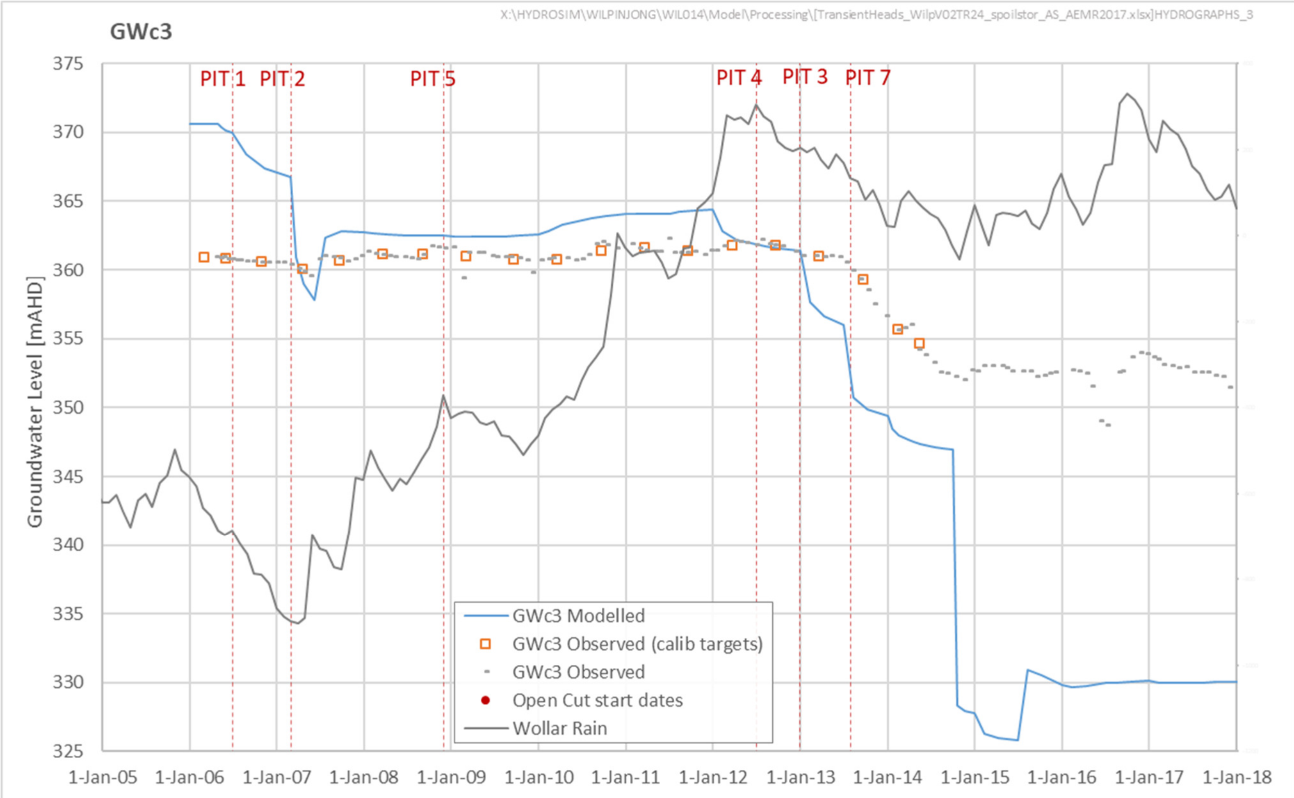

Figure C- 11 GWc3 Calibration Hydrographs

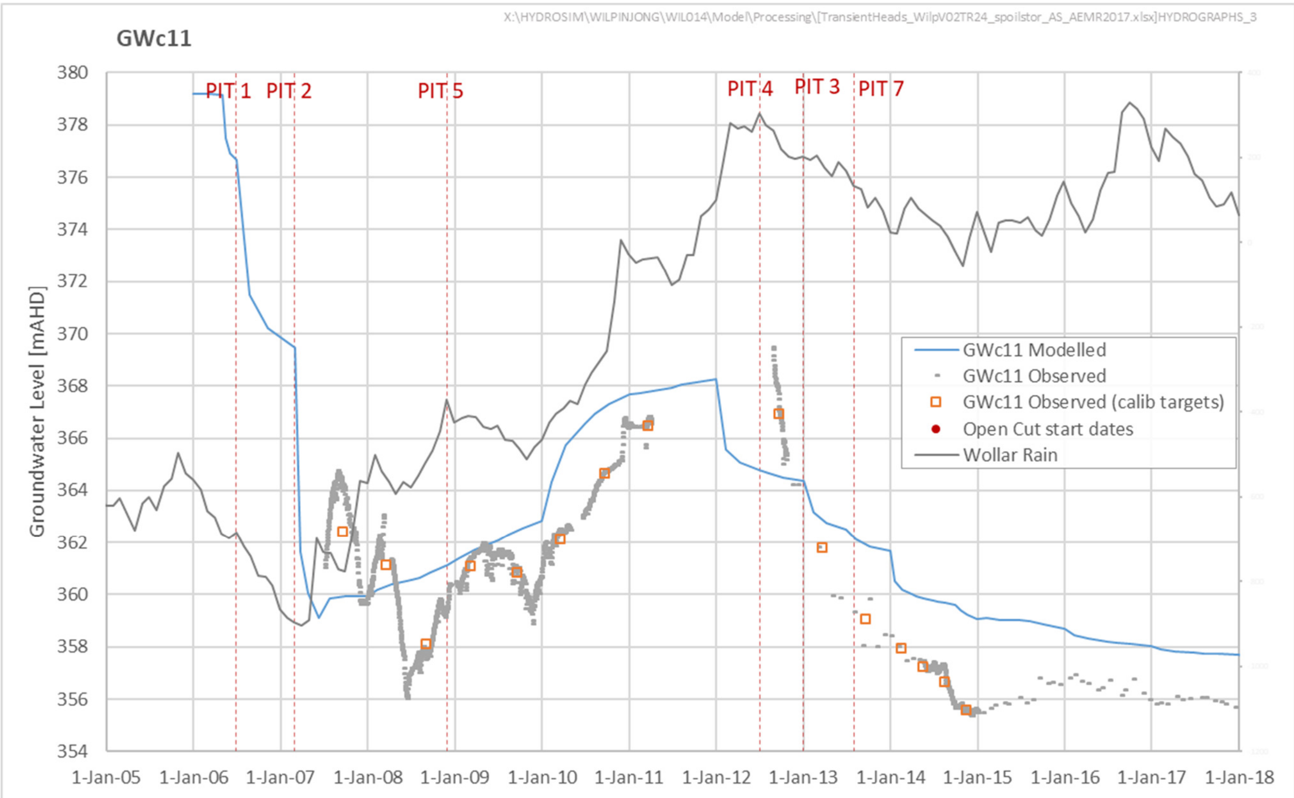

Figure C- 12 GWc11 Calibration Hydrographs

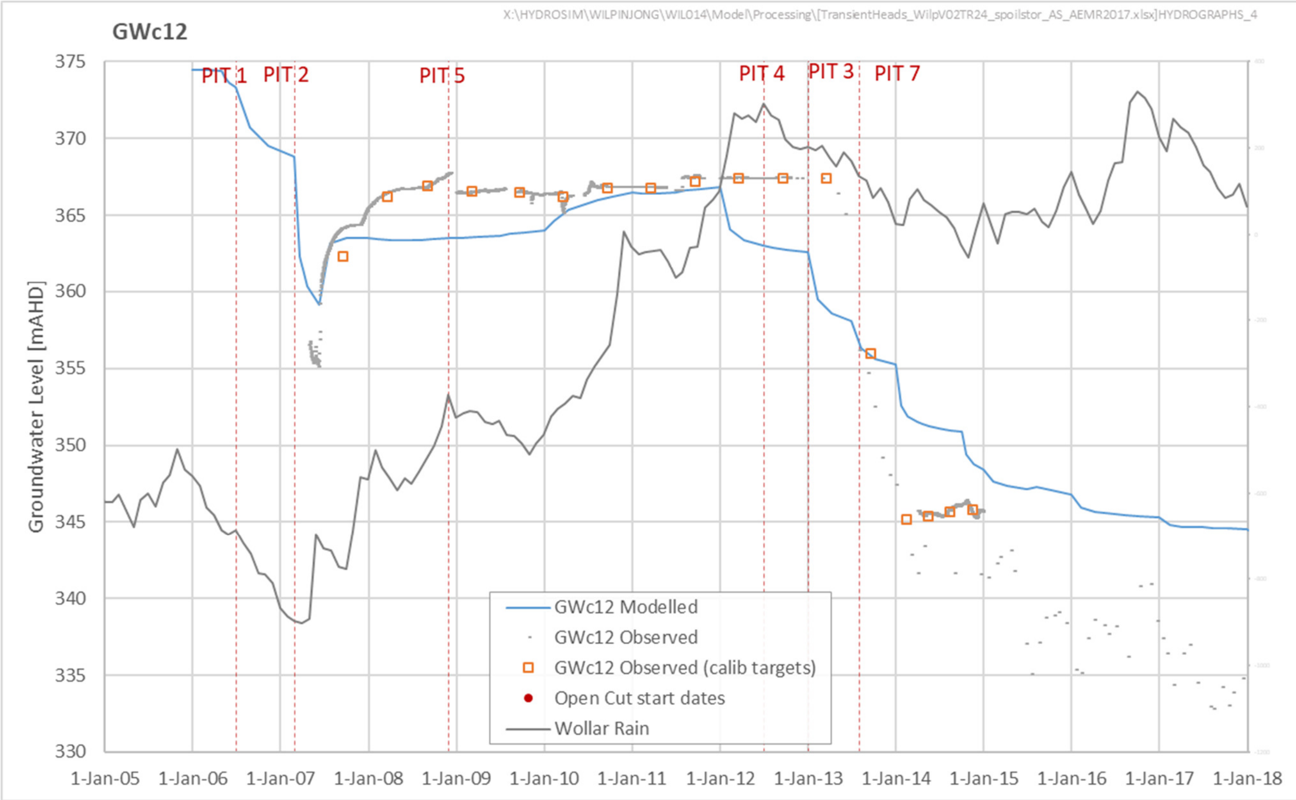

Figure C- 13 GWc12 Calibration Hydrographs

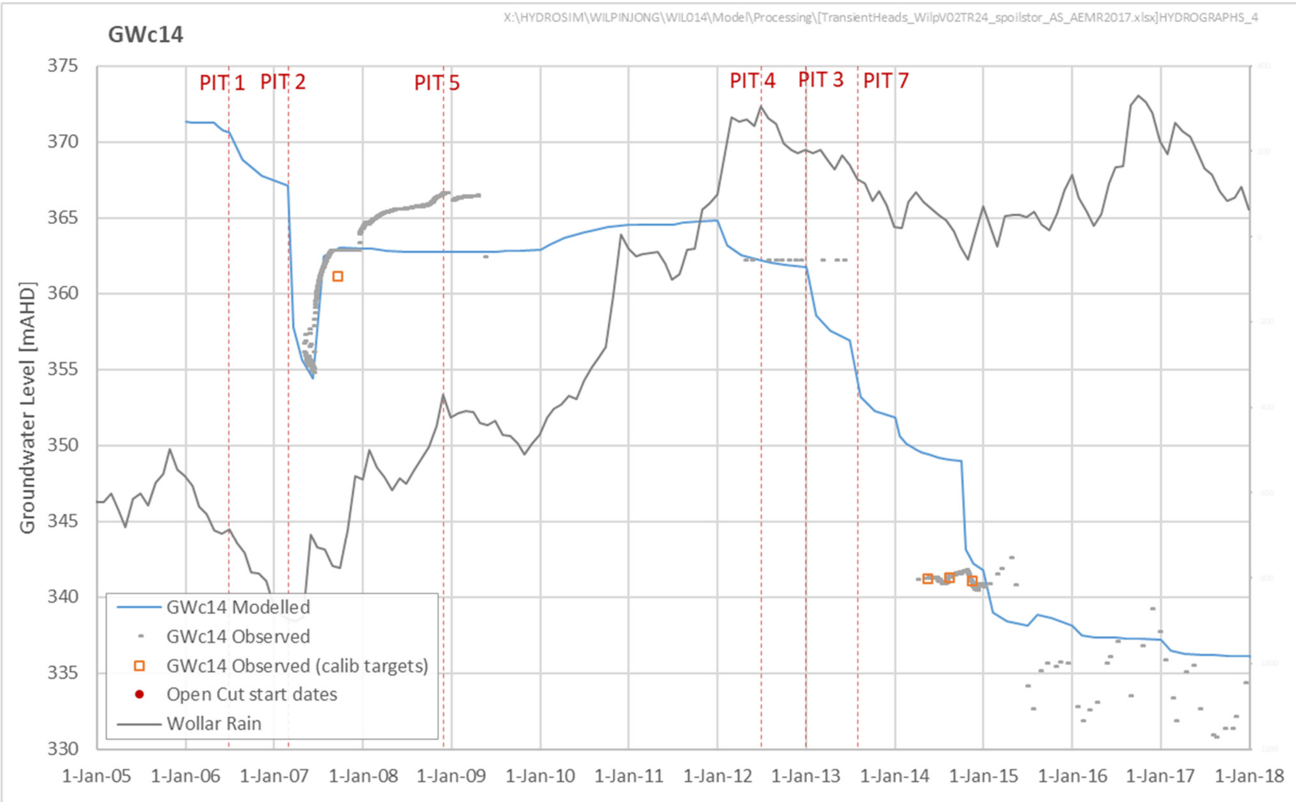

Figure C- 14 GWc14 Calibration Hydrographs

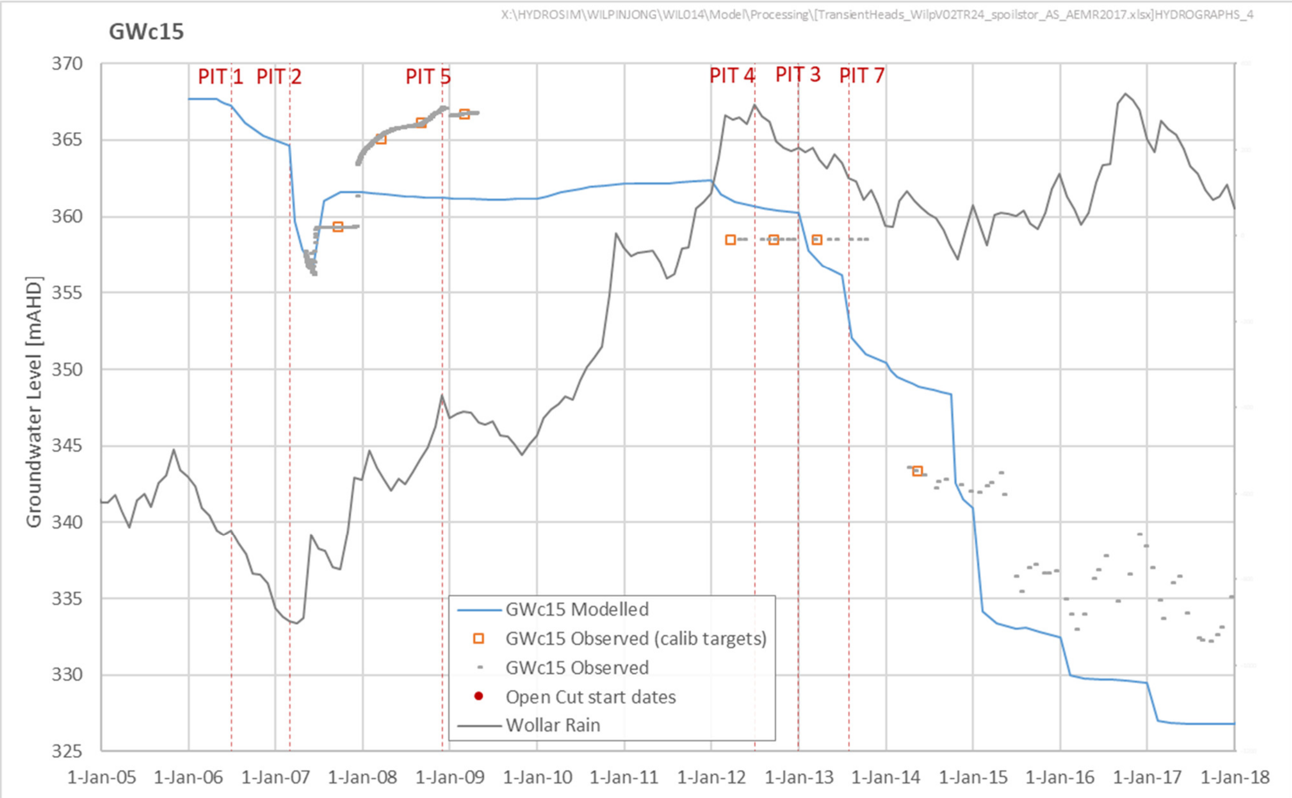

Figure C- 15 GWc15 Calibration Hydrographs

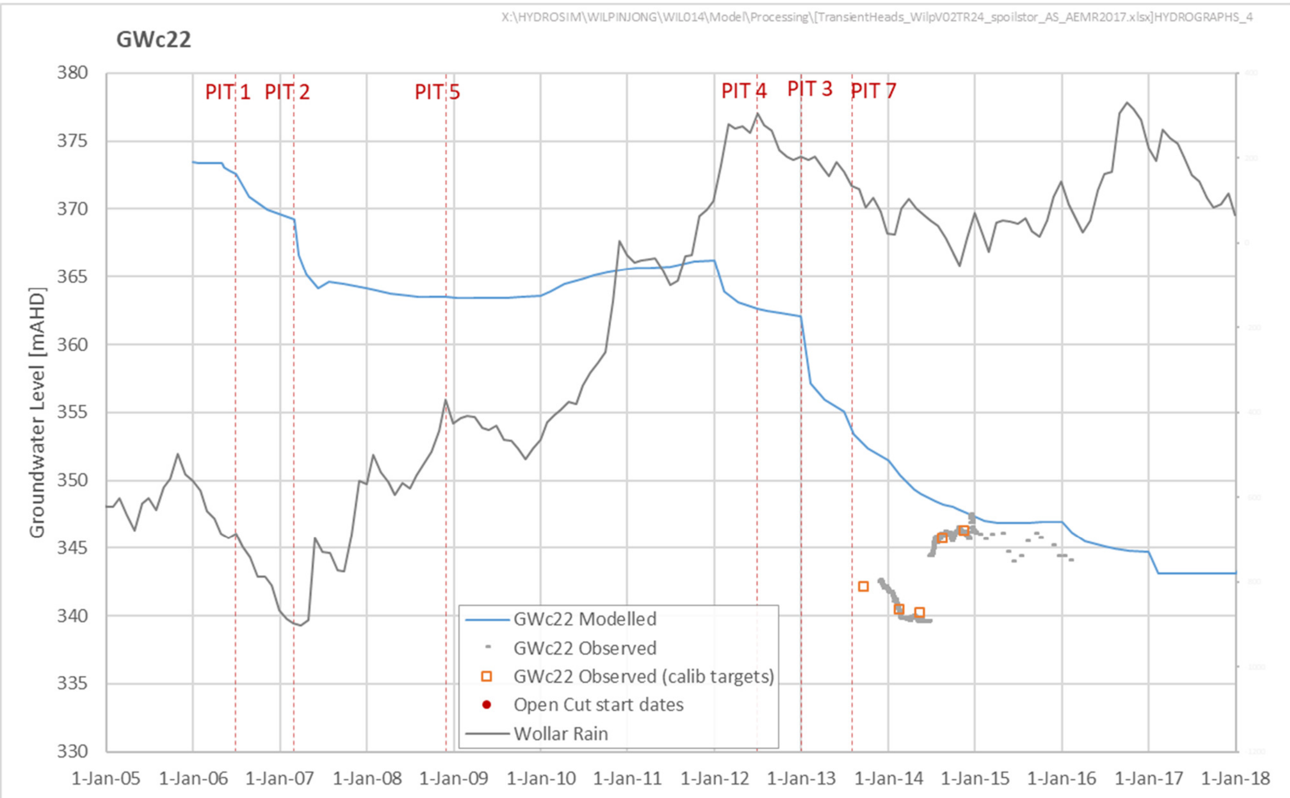

Figure C- 16 GWc22 Calibration Hydrographs

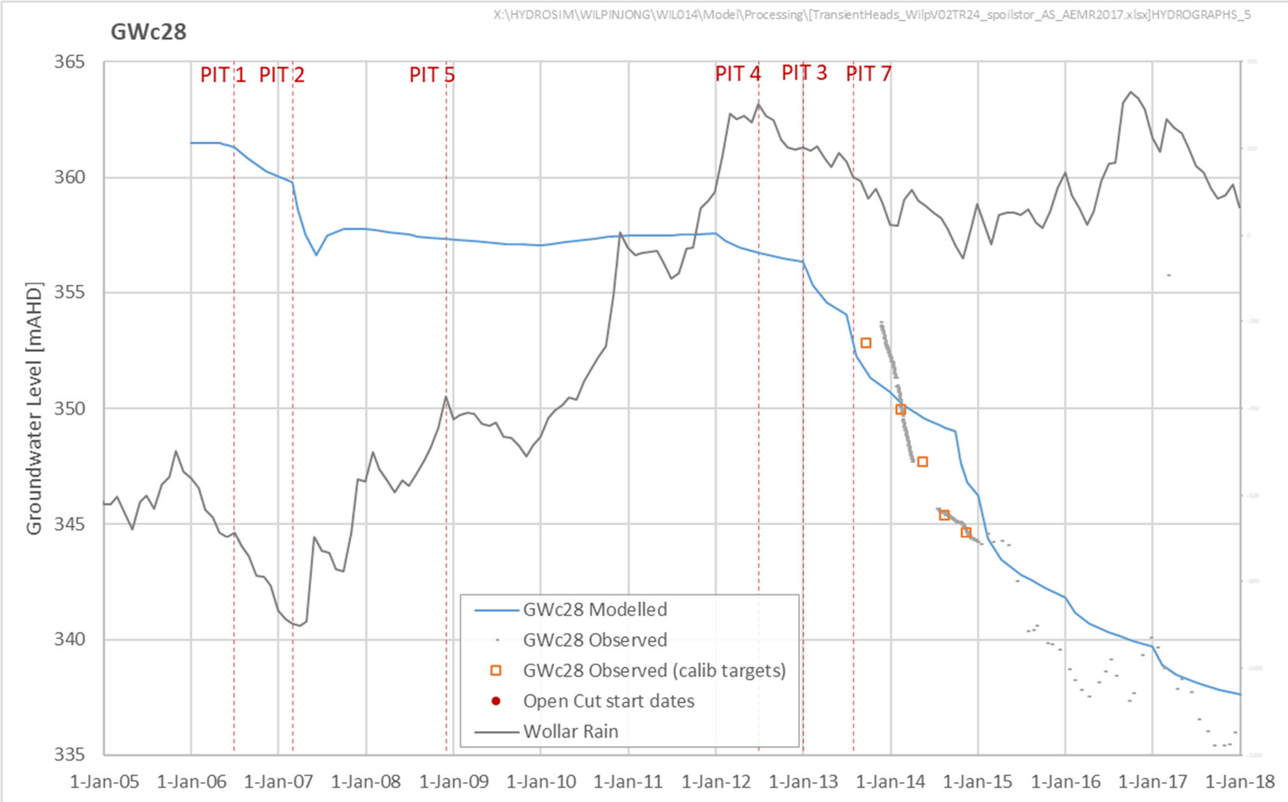

Figure C- 17 GWc28 Calibration Hydrographs

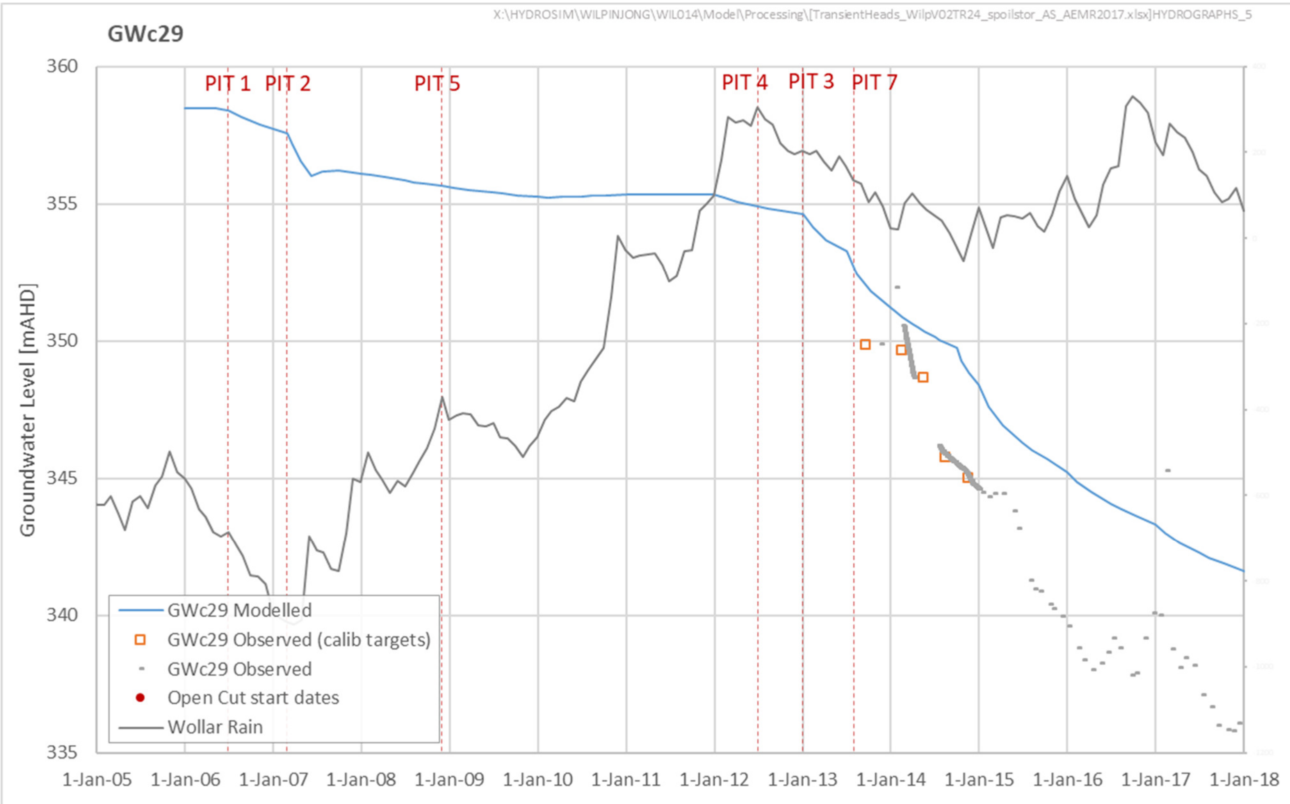

Figure C- 18 GWc29 Calibration Hydrographs

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DATE:	29 March 2018
TO:	Kieren Bennetts Environment and Community Manager – Peabody Energy
	Wilpinjong Coal Pty Ltd Peabody Energy Australia Locked Bag 2005, Mudgee NSW 2850
FROM:	Dr Derek Yates, Adam Skorulis, Maxime Philibert, Braiya White
RE:	Wilpinjong Annual Review Groundwater Analysis
OUR REF:	WIL014 – Report HS2018/07

INTRODUCTION

This letter report contains the analysis and information required to address licence conditions for pit extraction and dewatering bores for the 'water year' July 2016- June 2017. It also contributes to the Annual Review for the Wilpinjong Coal Mine (WCM) for the 2017 calendar year. The report is presented in three sections that address the following requests

1. Reporting against the commitments in the Groundwater Monitoring Program – January 2017 to December 2017.
2. Reporting against the licence conditions 2, 3, 4 and 6 for pit extraction – July 2016 to June 2017.
3. Reporting against the licence conditions 7, 9 and 10 for dewatering bores – July 2016 to June 2017.

While the commitments in the Groundwater Monitoring Program (GWMP) occupy a later period in time to the licence conditions, the data presented in reporting on the GWMP commitments will also be used in addressing licence conditions for both pit extraction and dewatering bores.

Pit names and pit progression during 2016-2017 are indicated in **Figure 1**. Groundwater monitoring bore locations are marked on **Figure 2**.

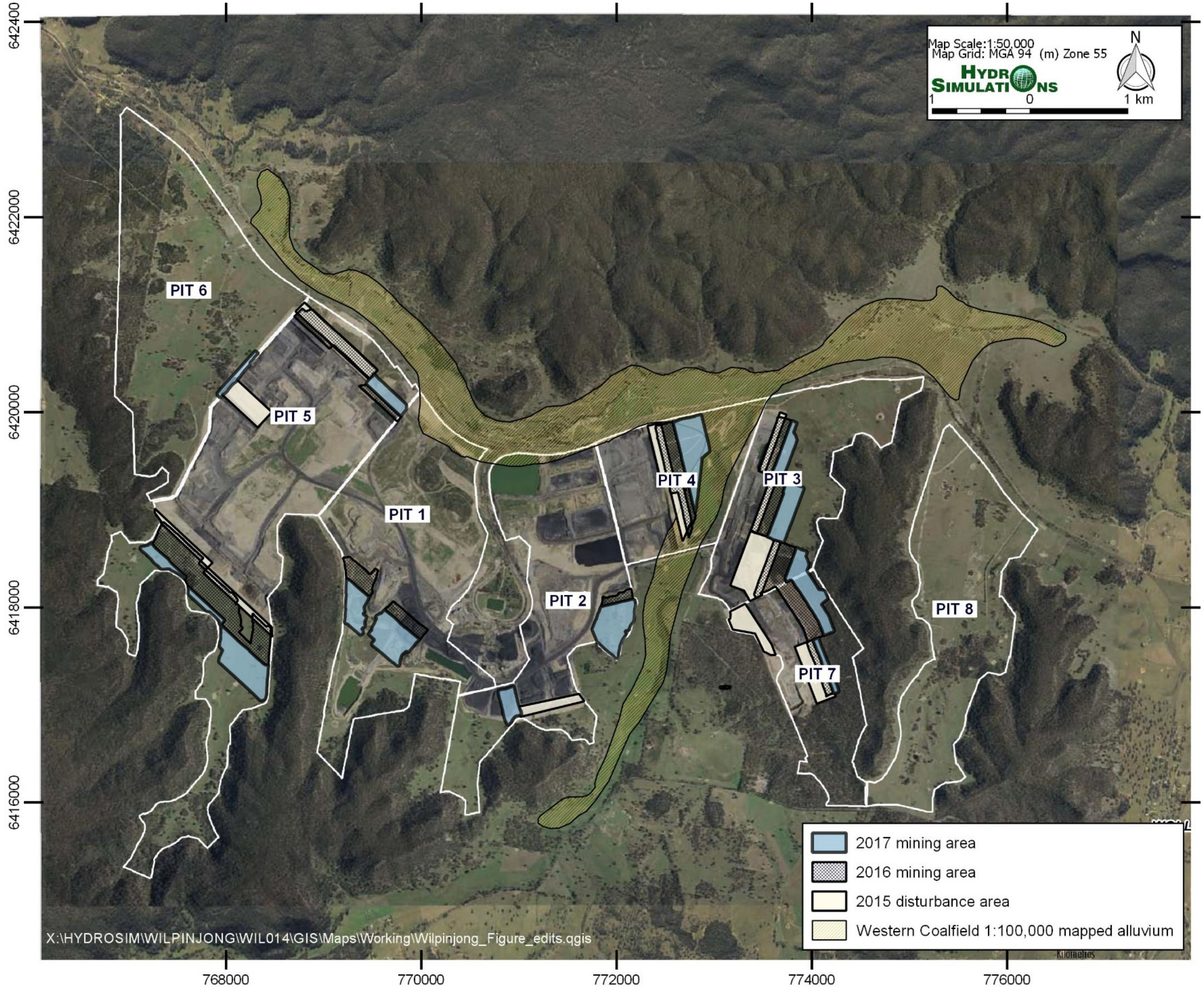

Figure 1 Wilpinjong Coal Mine open cut pit progression 2016-17

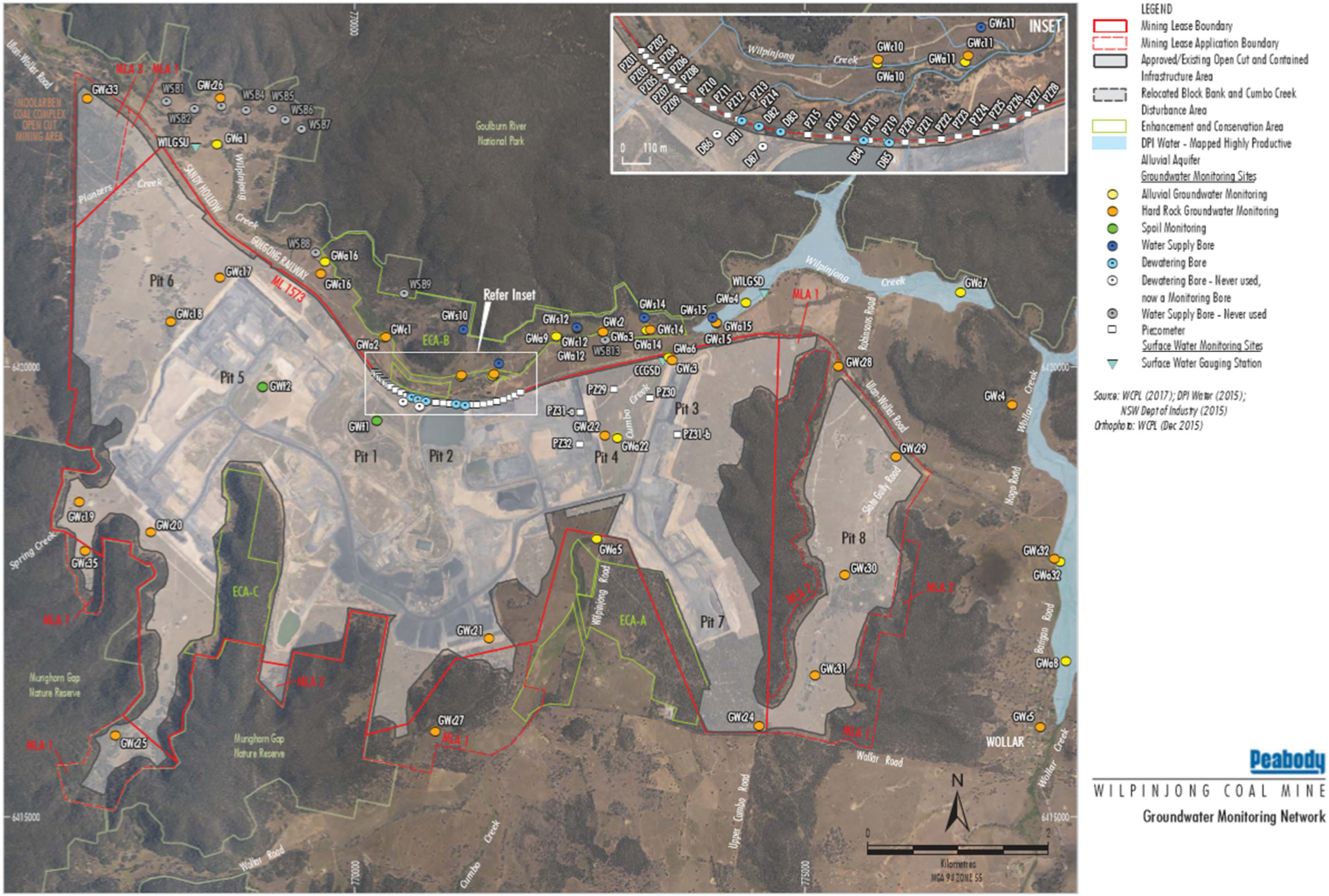

Figure 2 Groundwater Monitoring Sites at Wilpinjong Coal Mine

1 GROUNDWATER MONITORING PROGRAM

This section presents key groundwater level and groundwater quality data for the 2017 reporting period to address the conditions within the Wilpinjong Groundwater Monitoring Program (Peabody, 2016) relating to:

- Cause and effect analysis (Section 6.5.3).
- Triggers (Section 4.3)
- Modelling verification (Section 7.2)

Trends from the entire period of observation have also been assessed to provide context for the 2017monitoring period.

1.1 Cause and effect analysis

A groundwater monitoring network has been in place at the WCM since April 2006, as illustrated in **Figure 2**. Many paired monitoring bores have been drilled along the Wilpinjong Creek alluvium, with a shallow bore screened in the alluvium and a deeper bore screened across the coal seam. More recently, since late 2013, several new bores have been drilled around the periphery of the site, in Slate Gully and along Wollar Creek (**Figure 2**).

1.1.1 Review of Groundwater level data

For bores with sufficient record, groundwater levels around the WCM site have been investigated in detail to check for cause-and-effect responses in temporal water level changes which could result from rainfall recharge, creek dynamics, short-term dewatering/production pumping or a mining effect. The detailed analysis and presentation of hydrographs are included in **Appendix A**.

Summary bore hydrographs are shown in **Figure 3** (alluvial) and **Figure 4** (coal seam).

Figure 3 presents the groundwater hydrographs for all alluvial bores from the west (higher elevations) to the east (lower elevations), in relation to the long-term rainfall trend, along Wilpinjong Creek. There was a pronounced dry period from July 2006 to March 2007 which coincided with the commencement of Pit 1. Pit 2 commenced under normal climatic conditions but within two months was exposed to a very wet period. Both pits were exposed to another very wet period that commenced in October 2007. The transition from a very dry period to a very wet period explains the initial experience of unexpectedly low pit inflows followed by excessive groundwater discharges. Additional wet periods are indicated by the rainfall trend, especially from 2010 onwards. Following the commencement of Pit 4, conditions had been drier than normal. This meant that groundwater levels were naturally lower, complicating the detection of possible mining effects due to Pit 4 and/or Pit 3. At the end 2016 wetter climatic conditions prevailed and all bores showed increases in water level, before a pronounced dry period, occurring for most of 2017, subsequently caused widespread decline in groundwater levels. Where mining effects are considered a possibility, the individual hydrographs in **Attachment A** are annotated to that effect.

The groundwater table in the alluvium varies from about 385 mAHD to about 345 mAHD over a distance of 8.4 km from GWa1 to GWa7, with hydraulic gradient 0.5% (0.005). Groundwater responds to this gradient by flowing to the east through the alluvium.

Water table rises are evident at most bores in correlation with rises in the rainfall trend. This confirms the expectation that rainfall is an important source of recharge for the alluvial aquifer. Given the proximity of the alluvium to the elevated Goulburn River National Park to the north, groundwater discharge from the Park's Narrabeen sediments will provide another stable source of recharge to the alluvium.

Based on the analysis of the hydrographs in **Appendix A**, some mining effects are considered to have occurred or be ongoing at the following bores located in the Wilpinjong alluvium and Cumbo Creek alluvium (**Figure 3**) (albeit these effects are minor and therefore are difficult to discern from climatic variations):

- GWa1 at 1.2 km north of pit 5, in the order of 1 m from 2014 to 2016 before recording dry during from the beginning of the 2016 monitoring period.

- GWa3 at 450 m north of Pit 4, in the order of 1 m during 2014; and then reported as dry from mid-2017.
- GWa14 at 300 m north of Pit 4, approximately 1 m during 2013 and 2014. This bore has gone dry, probably due to a combination of climate and mining drivers, and so the estimate of drawdown is uncertain;
- GWa5 at Cumbo Creek between Pit 2, and Pit3, 500 m south of Pit4, in the order of 3 m from 2013 to 2017. It is noted that Wilpinjong Coal Pty Ltd (WCPL) is approved to relocate and excavate the lower reaches of Cumbo Creek
- GWa4 at 450 m north of Pit 3, in the order of 1 m from 2014 to 2016 and then reported dry during in 2017.
- GWa15 at 250 m north of Pit 3, less than 1 m but mining effect obscuring the rainfall response from 2012 to 2016;
- GWa6 at the northern junction of Pits 3 and 4, approximately 1 m during 2014 (this bore has gone dry at times, probably due to a combination of climate and mining drivers, and so the estimate of drawdown is uncertain).
- GWa12 at 300m north of Pit 4, in the order of 3 m in 2014 likely due to the excavation of Pit 4, then reported dry early 2015 before responding to short term rain fluctuations. Recovery in mid-2016 to a level ~1 m lower than observed pre-mining.

The other bore hydrographs from the Wilpinjong Creek alluvium (e.g., GWa2, GWa11, GWa10,) show no discernible mining effects.

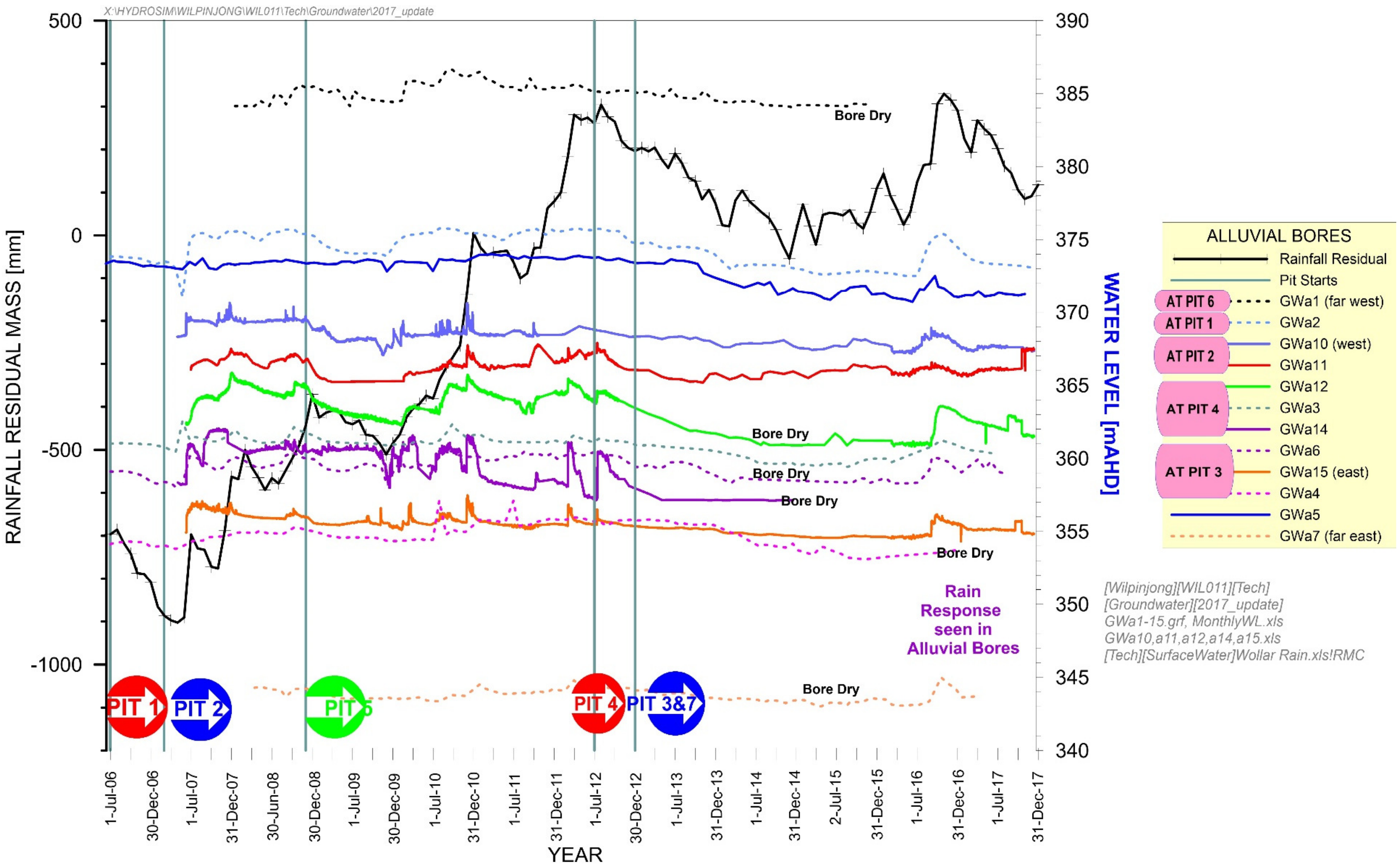

Figure 3 **Transition in Alluvial Bore Groundwater Levels from West to East along Wilpinjong Creek**

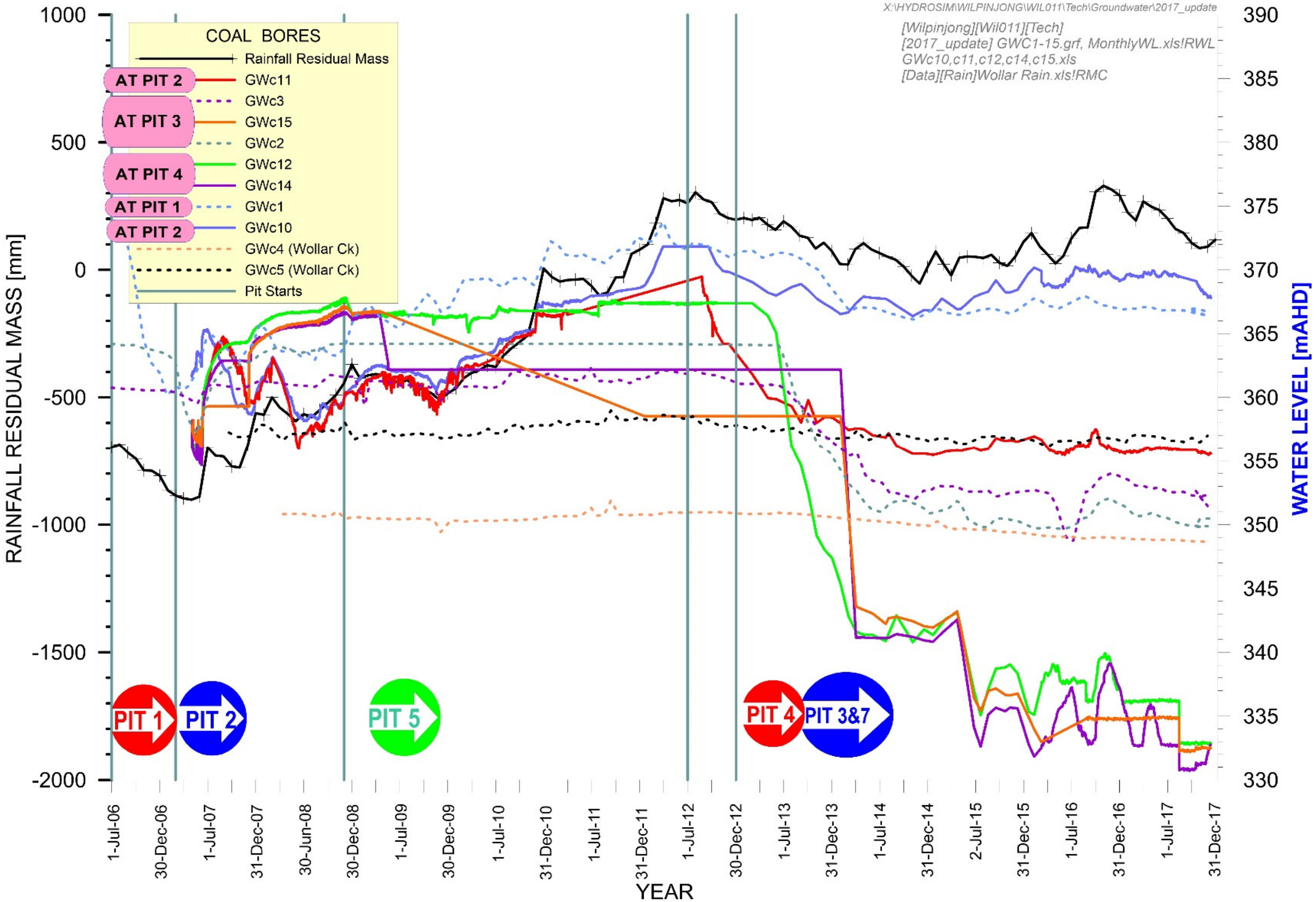

Figure 4 Transition in Coal Bore Groundwater Levels from West to East along Wilpinjong Creek

Figure 4 presents the groundwater hydrographs for all coal bores from the west (higher elevations) to the east (lower elevations), in relation to rainfall residual mass and the commencement of mining in each pit. Three bores (GWc1, GWc2 and GWc3) have records extending back to 2006. These hydrographs show clearly the drawdown caused by excavation of Pit 1 and Pit 2. At the bore closest to mining in Pit 1 (GWc1), the drawdown was about 13 m. At the bores closest to Pit 2 mining (GWc2, GWc3), the early drawdowns were about 7 m and 1 m respectively. The water level at GWc1 commenced recovering in mid-2007 and had returned to pre-mining levels by 2012.

Some bores, e.g. GWc14 and GWc15, show response to the short period of historical pumping at production bores at WCM. This is exemplified by the short and sharp drawdown and subsequent recovery seen in early to mid-2007.

At the other coal bores, the pre-mining water levels are not known exactly. The hydrographs show the expected response of drawdown contingent upon the distance from mining, with gradual recovery over about five years in line with the long-term rainfall trend. The most distant site (GWc5 at Wollar) shows no discernible drawdown effect from mining.

Three of the monitored coal sites are considered to have been unreliable (GWc14, GWc15 and GWc12) in early years at high pressures. It is noted that they display artesian conditions. However, readings in 2014 to 2017 appear plausible in response to depressurisation caused by Pits 3, 4 and 7.

In **Appendix A**, definite mining effects on monitored coal groundwater levels are noted at the following bores:

- GWc1 - primarily due to Pits 1 and 5 (**Figure A-3**) - drawdown about 3-4 m;
- GWc11 – primarily due to Pits 2 and Pit 4 (**Figure A-5**) - drawdown about 13 m;
- GWc12 - primarily due to Pit 4 (**Figure A-6**) - drawdown more than 30 m;
- GWc2 - primarily due to Pit 4 (**Figure A-7**) - drawdown about 14 m;
- GWc14 - primarily due to Pits 4 and 3 (**Figure A-8**) - drawdown more than 20 m;
- GWc3 - primarily due to Pits 3 and 4 (**Figure A-9**) - drawdown about 8 m; and
- GWc15 - primarily due to Pits 3 and 4 (**Figure A-10**) - drawdown more than 20 m;
- GWc4 – primarily due to Pit 3 (**Figure A-11**) – drawdown of approximately 1.5m;
- GWc33 – primarily due to Pit 5 (**Figure A-18**) – drawdown of about 5m;

For bores not displayed in **Figure 3** or **Figure 4**:

- There is a probable mining effect on the coal bore GWc22 adjacent to Cumbo Creek. There is assumed to be no effect on the companion alluvial bore GWa22, however this bore has been too close to the mining area to allow data collection since early 2016. (**Figure A-14**).
- There are definite mining effects at coal bores GWc28 and GWc29 in Slate Gully, approximately 15m of drawdown (**Figure A-15**).
- There are no obvious mining effects at any other bores.

The general trend is for mining-related drawdown to be apparent in coal seam hydrographs, typically within a few hundred metres of active mine areas, but drawdown is much less, if apparent at all, in alluvial bore hydrographs. This is due to the following properties:

- alluvial bodies not being directly connected to mined areas;
- rock strata overlying the coal seams and underlying the alluvium serving to mitigate the drawdown response because of low vertical hydraulic conductivity; and
- unconfined conditions and a greater aquifer storage in the alluvium than in the confined coal seams resulting in much lower head variation (drawdown) in the alluvium.

1.1.2 Review of Groundwater Quality Data

Groundwater electrical conductivity statistics have been computed from 1,595 measurements from April 2006 to December 2017 (**Table 1**). The median value of the measurements at the 13 monitoring sites is about 2,500 microSiemens per centimetre (µS/cm). The average for all monitoring sites is approximately 4,100 µS/cm, considerably higher than the median. However, the standard deviation of ~3,300 µS/cm is commensurate with the mean.

The lowest mean salinity in the alluvium holes is 1,500 µS/cm at GWa2, whereas the highest mean is 10, 500 µS/cm at GWa5. The lowest mean salinity in the coal holes is 1,200 µS/cm at GWc2, whereas the highest mean is 5,100 µS/cm at GWc5. On the whole, the alluvial groundwaters are more saline than the coal seam waters. This suggests that the alluvial waters are sourced from Permian sediments and are concentrated through evapotranspiration which is expected to be an active process.

Table 1 Groundwater Electrical Conductivity Statistics (µS/cm)

	Mean	Standard Deviation		Mean	Standard Deviation	Location
ALLUVIUM:			**COAL:**			
GWa1	7900	3300				North of Pit 6: Far west
GWa2	1500	480	**GWc1**	2300	580	North of Pit 1
GWa3	1700	480	**GWc2**	1200	120	North of Pit 4
GWa4	2500	790				North-east of Pit 3
GWa5	10500	2800				South of Pit 4 on Cumbo Ck
GWa6	6200	3000	**GWc3**	3700	580	Northern end of Cumbo Ck
GWa7	9900	2200	**GWc4**	2400	460	North-east of Slate Gully
GWa8	2200	420	**GWc5**	5100	530	Wollar: SE of Slate Gully

The highest salinities occur on Cumbo Creek to the south of Pit 4, on Wilpinjong Creek near Pit 6 and on Wilpinjong Creek to the north-east of Slate Gully. The lowest salinities are along Wilpinjong Creek from Pit 1 to Pit 4, upstream of the Cumbo Creek junction, and on Wollar Creek.

Temporal variations in groundwater salinity are illustrated in **Appendix A** (**Figure A-21** for alluvium and **Figure A-22** for the coal seam) and are compared with rainfall residual mass and pit commencements. Alluvial sites have a large range in salinities, from very high with large fluctuations to near fresh and stable that bear some apparent relationship with rainfall and mining. This is examined further in **Section 2**. The salinities in the coal holes are consistently stable. The different signatures for shallow and deep waters reflect dynamic evapotranspiration acting preferentially on shallow groundwater.

2 TRIGGER COMPLIANCE

The following section addresses the compliance of groundwater level and groundwater quality observations during the 2017 reporting period in relation to analysis performed on pre-mining, baseline monitoring data. **Table 2** presents the trigger levels from the Groundwater Monitoring Program (Peabody, 2017).

Time series charts showing groundwater level EC and pH in comparison with the trigger levels can be found in **Appendix B.**

Table 2 Peabody (2017) Groundwater Level and Quality Trigger Levels

Monitoring Site	Aquifer Type	Groundwater Level	Groundwater Quality		
		Trigger RWL (mAHD)	EC (µS/cm)	pH min	pH max
GWa1	Alluvium	No Trigger[1]	12,272		
GWa2	Alluvium	372.4	2,280		
GWa3	Alluvium	Dry[2]	1,970		
GWa4	Alluvium	Dry[2]	2,596		
GWa5	Alluvium	371.4	13,926	6.5	8
GWa6	Alluvium	#N/A	6,720		
GWa7	Alluvium	No Trigger[1]	10,126		
GWa8	Alluvium	Dry[2]	2,898		
GWa10	Alluvium	366.1			
GWa11	Alluvium	Dry[2]			
GWa12	Alluvium	361.3	#N/A	#N/A	#N/A
GWa14	Alluvium	Dry[2]			
GWa15	Alluvium	Dry[2]			
GWc1	Coal		2,844		
GWc2	Coal		1,290		
GWc3	Coal	#N/A	3,304	6.5	8
GWc4	Coal		2,412		
GWc5	Coal		4,798		

Not applicable – No trigger defined in GWMP (Peabody, 2017)

[1] GWa1 and GWa7 both had 'dry' observations prior to mining. No effective trigger level could be developed for these bores.

[2] Historical observations at these groundwater bores have indicated SWLs that represent less than 1 m of head in the bore. Therefore, these bores could go dry without indicating a mining effect that exceeds the predicted 1 m drawdown.

2.1 Trigger Level Exceedances

Numerical modelling conducted for Wilpinjong Coal mine (HydroSimulations, 2015b) predicts minimal drawdown (approximately 1m) to the alluvial groundwater system along Wilpinjong Creek, and even less in the more distant alluvial aquifers associated with Wollar Creek.

Trigger levels are required for alluvial monitoring bores to detect impacts and effects beyond those predicted by the groundwater modelling. As such, trigger levels have been established for alluvial monitoring bores at 1m below the minimum recorded water level during the baseline period. Three successive monthly exceedances (or two successive quarterly exceedances) of the lower threshold level will trigger an investigation (Peabody, 2017).

A bore that has indicated a head of less than 1 m prior to the approach of Wilpinjong Mining has a trigger level set at the base of the bore (**Table 2**). These bores could go dry without indicating a mining effect that exceeds the predicted 1 m drawdown. A statistical analysis on the number of dry observations at these bores is recommended within the GWMP (Peabody, 2017) to determine whether more dry days are occurring than under natural conditions. No statistical analysis has been completed for the 2017 monitoring period. The pronounced dry period that has occurred for most of 2017 has caused bores not impacted by mining, such as GWa7, to go dry and exceed the defined trigger level. Earlier dry periods have not resulted in GWa7 going dry and indicate a statistical analysis may incorrectly identify a mining effect. The groundwater level trends for all bores that have exceeded their defined trigger level are still discussed in the following section.

Water quality statistics for April 2006 to December 2009 have been analysed at alluvium and coal bores to develop trigger levels for EC and pH. An exceedance of a trigger level on three consecutive monthly (or two consecutive quarterly) observations results in the initiation of the groundwater impact investigation protocol found in the SGWRP (Surface and Groundwater Response Plan). A single trigger exceedance may also result in a preliminary investigation to identify anomalous data or whether further testing is required.

- EC trigger levels are based on 80th percentile values from the historical monitoring period.
- The 20th and 80th percentile values for pH taken at Wilpinjong monitoring locations between April 2006 and December 2009 are captured within the ANZEC and ARMCANZ (2000) default trigger values (6.5-8). As such, these are used for triggers at all coal and alluvial monitoring sites.

Table 3 presents the occurrence of trigger level exceedances for the 2017 monitoring period.

Table 3 Trigger Level exceedances in the 2017 monitoring year

Bore	Trigger Level Exceedance in 2017 Observations			
	Minimum RWL (mAHD)	EC	pH min	pH max
GWa1^	#N/A	*No measurements in 2017*		
GWa2				
GWa3^	2	^		
GWa4^	4^	^		
GWa5^	3^	1		
GWa6	#N/A	2		
GWa7^	#N/A			
GWa8				
GWa10		#N/A	#N/A	#N/A
GWa11				
GWa12				
GWa14	Y			
GWa15				
GWc1	#N/A	2		
GWc2				
GWc3		4		
GWc4		1		
GWc5		4		

Blank cells represent no trigger exceedance, #Not applicable, Y= Yes (trigger exceedance recorded), ^ Bore was dry/ goes dry during 2017,

2.1.1 Groundwater Level Trigger Exceedances

The following section examines trigger exceedances at Wilpinjong alluvial monitoring bores during the 2017 monitoring period (**Table 3**), to identify whether their cause can be attributed to a climatic or mining effect. If a mining effect is likely, further investigation may be required as per the Groundwater Monitoring Program (GWMP) (Peabody, 2017).

The current GWMP does not provide a trigger level for GWa1. The pre-mining groundwater level is within 1 m of the base of the bore, meaning that it may go dry in response to normal climatic fluctuations. This limits the ability for a trigger level to identify mining effects. An analysis of the groundwater level trends in response to the long-term rainfall trend has shown no significant rainfall response and a general decline in groundwater level since early 2011, with dry or near-dry observations occurring from mid-2014 to the end of the 2017 monitoring period (**Figure B-1**). No rainfall response is observed at GWa1 in relation to the wetter than average period in late 2016, in which many other alluvial bores showed increases in groundwater level of ~1-2 m. It is possible that GWa1 is experiencing an ongoing mining effect associated with Pit 5 extraction. However, GWa1 is nearly 2 km from active mining at Wilpinjong and shows a greater apparent effect than other alluvial bores which are much closer to active mining. While a mining effect is possible, it also possible that the bore screen may be obstructed and unable to give correct measurements. HydroSimulations recommends an investigation in to the status of GWa1

Groundwater level at GWa3 was recorded below the trigger value for the first half of the 2016 monitoring period (**Figure B-3**), with a 'dry' reading for four of these months (April-July) observed. This was followed by groundwater level recovering to above the trigger level for the last five observations of the year (August-December), correlating with an increase in the rainfall trend. Historically, groundwater levels are observed to be below the trigger level from early 2014, through to July 2016 correlating well with a declining rainfall trend. However, from early 2011, there is a decrease in the magnitude of the groundwater level response to the rainfall trend, possibly indicating a mining effect. This is apparently ongoing, with the recovery observed in late 2016 approximately 1 m below the groundwater level peaks in response to rainfall pre-2011. Groundwater level at GWa3 decreased by 1m for the first half of the 2017 monitoring period before reporting as dry and indicating a trigger exceedance from July until the end of 2017. Low groundwater level in 2017 correlates well with the decreasing trend in rainfall, indicating that the trigger level was exceeded at GWa3 due to the combination of a mild mining effect and a decrease in average rainfall.

GWa4 reports a dry bore for nine (9) months of the 2016 monitoring period with the January 2016 observation below the trigger level. Only October and December 2016 observations are above the trigger level, correlating with a period of above average rainfall (**Figure B-4**). GWa4 reported as dry for all observations in 2017 indicating a trigger level exceedance. This trigger exceedance likely indicates an ongoing mining effect following the start of Pit 3 extraction, with drawdown exacerbated by a period of below average rainfall

At GWa5, early observations in the 2016 monitoring period exceed groundwater trigger level, before increasing above the trigger level from June to September in line with an increasing long-term rainfall trend (**Figure B-5**). Following the peak in September 2016, groundwater level again declined to below the trigger level by December 2016 and remained below the trigger level for all 2017 observations aside from April 2017, indicating a trigger on multiple occasions. This exceedance can be attributed to an ongoing mining effect that possibly began in late 2011. This is indicated by a lack of groundwater level response to an increasing rainfall trend. A definite effect is observed from early 2014 with a drawdown of ~3 m occurring through to December 2017. Groundwater level still shows a response to the rainfall trend following early 2014 although the average water level is approximately 2 m lower and shows far greater fluctuations. The excavation of the lower reaches of Cumbo Creek and mining at Pit 2 are the likely causes of the effect seen at GWa5.

GWa6 (**Figure B-6**) is no longer included in the GWMP as an alluvial bore to be assessed using a trigger level. A bore depth of 3m had previously been indicated for GWa6, which was above the elevation used for the trigger level assessed in earlier years (HydroSimulations, 2016, 2017), meaning the trigger level would have been ineffective in determining a mining impact. In completing the 2017 Annual Review, HydroSimulations has managed to locate the construction log for GWa6, which states a constructed depth of 4.5 m. This revised bore depth means at least 1.9 m of water was present within GWa6 for all observations prior to Pit 3 extraction, and enables a trigger level for the bore to be created using the criteria indicated in the current GWMP (Peabody, 2017). No comments are made within this report relating to trigger exceedance in line with the current GWMP, but (**Figure B-6**) shows the trigger level as proposed by HydroSimulations.

Observations have reported GWa6 as dry following the beginning of nearby Pit 3 extraction. While this correlates with a period of below average rainfall, previous periods of below average rainfall as seen in early observations did not result in 'dry' observations at GWa6. Groundwater level responds to an increase in the rainfall trend in mid-2016 that is sustained until mid-2017, with observations reporting a readable groundwater level. Gwa6 reports as dry from September 2017 until the end of the monitoring period. It is likely an ongoing mining effect is observed at GWa6 caused by Pit 3 and Pit 4 extraction that has been enhanced by low rainfall. Groundwater levels are now observed to fluctuate by and extra 2m when compared to pre-mining conditions.

As for GWa1, GWa7 is no longer assessed using a trigger level in the current GWMP (Peabody, 2017) (**Figure B-7**). GWa7 is located over 3 km east of current mining at Wilpinjong, so it is not likely to be directly affected by mining. The decrease in water level correlates with the declining rainfall trend, and the full recovery following the mid-2016 increase in the rainfall trend confirms this. Reportable groundwater level is observed in January and April 2017 before being reported dry for the rest of the monitoring period, this is likely due to a decline in the rainfall trend.

GWa14 has reported a near-zero groundwater level, below the trigger level, and has shown minimal response to rainfall since mid-2013. Groundwater was observed to decrease by 2 m in late-2012, likely due to both a mining impact from Pit 4 and the beginning of a period of below average rainfall. A five (5) month period of observations above the trigger level occurring in late 2015 are the last non-dry observations until a single groundwater level was reported in mid-2017; below the trigger level. There is no observed response to the period of above average rainfall in late-2016. A trigger exceedance has occurred for the entire 2016-17 water year and 2017 monitoring period An ongoing mining effect is likely occurring at GW14, caused by Pit 4 extraction, that has been be exacerbated by periods of below average rainfall. It is not possible to determine whether the drawdown at GWa14 exceeds the model predictions (HydroSimulations, 2015b) as the lowest pre-mining observation is within 1 m of the base of the bore.

2.1.2 EC Trigger Exceedances

The following section provides analysis and assessment of the EC trigger exceedances recorded in **Table 3** based on the time series plots from **Appendix B**.

Trigger exceedances in EC at alluvial bores occur at GWa5 and GWa6 (**Figures B-5 and B-6**). While no specific trigger exceedance is observed for GWa3, GWa4 and GWa7 (**Figures B-3, B-4 and B-7**), the bores have gone dry during 2017 with the last recorded EC above the trigger level and have been commented on below. All mentioned alluvial bores follow similar trends despite varying baseline EC levels. As detailed in the above section, these bores reported a declining groundwater level that either correlated with a declining rainfall trend and a mild mining effect (GWa3, GWa4, GWa5 and GWa6) or a declining rainfall trend only (GWa7), with the timing of the decline in groundwater level showing a good match with increases in groundwater EC. This reduction in water level may result in increased groundwater EC as the water table is now being sourced proportionally more from higher salinity Permian sources. Groundwater EC is observed to decline in all these bores with the increase in the rainfall trend in late 2016. They do not require further investigation.

The only possibly anomalous bore is GWa6, at the downstream end of Cumbo Creek, which reports its highest ever EC measurement in the last observation of 2016. However, the explanation for this is likely found in historical trends between groundwater level and EC. Recessions in groundwater level are commonly accompanied by peaks in EC, as observed in: July 2007, March 2008, December 2009, August 2012, July 2013, August 2016, January 2017 and July 2017 (**Figure B-6**), The two most recent peaks occurred during and soon after a period of below average rainfall that is likely coupled with an ongoing mining effect. The concentration effect that would occur with increased evapotranspiration (especially in late 2016 following an extended period of the bore being dry) would enhance the EC peaks that are observed following other groundwater level recessions.

Trigger exceedances for coal bores are observed in GWc1, GWc3, GWc4 and GWc5 (**Figures B-14, B-16, B-18**), with the exceedances at GWc1 and GWc5 unable to be linked to a Wilpinjong Coal Mine effect. GWc1 is observed to be at a consistent level approximately 500 µS/cm above the trigger level for the first half of the 2016 monitoring period. EC then drops to a consistent level approximately 750 µS/cm below the trigger level. Both periods occur apparently separate to any mining, groundwater level or climatic influence. The same EC trend is observed for the 2017 monitoring period with a consistent EC level approximately 750 µS/cm below the trigger level for the first half of 2017 and approximately 500 µS/cm above the trigger level for the second half of 2017. GWc5 is located on Wollar Creek, upstream of the confluence of Wilpinjong Creek and 3.5 km from active mining in Pit 7. EC has increased gradually since early 2010, apparently separate to climatic or groundwater level influence and is now relatively stable at approximately 5,500 µS/cm.

GWc3 at the downstream end of Cumbo Creek reports the only exceedance that may be attributable to WCM mining. All EC observations during 2016 are above the trigger level and have been since the beginning of nearby Pit 3 extraction. The observed drawdown of about 8 m may have resulted in groundwater now being sourced from more saline material with EC observations approximately 4,000 µS/cm for 2016 and 2017 observations, 700 µS/cm above the trigger.

GWc4 reported four consecutive trigger exceedances in EC from May to August 2017, exceeding the trigger level at its highest by 700 µS/cm in June 2017. However, EC values show a stable level throughout the active mining period from 2006 to 2017 and very stable when compared to mining related decrease in groundwater level since 2013. From the modelled alluvial water inflow at Wollar Creek., alluvial water loss to Permian formation is negligible. As for GWc5, EC at GWc4 is likely to be separate to climatic or groundwater level influence.

2.1.3 pH Trigger Exceedances

No exceedances of pH trigger levels were observed during the 2017monitoring period

3 GROUNDWATER MODEL VERIFICATION AND REFINEMENT

Previous reporting (HydroSimulations, 2015a; Peabody, 2016) has utilised the HydroSimulations (2013) groundwater model to assess likely impacts of the WIlpinjong Coal Mine and ensure sufficient water licences are purchased prior to a water year. This model was converted from the original numerical groundwater model used by AGE (2005).

A more recent groundwater model has been constructed (HydroSimulations, 2015b) that has been used in this report. As is required by the Groundwater Monitoring Program (Peabody, 2017), the following section reports on the new model and presents the results of the model verification.

3.1 Updated groundwater model

The new model (HydroSimulations, 2015b) is a complete rebuild of the previous Wilpinjong groundwater models to now utilise MODFLOW-USG, which allows refinement of the model grid that is limited to areas of interest as well as model cells of various sizes. Further information on the model can be found in Section 5 of the HydroSimulations (2015b) report for the proposed Wilpinjong Extension Project, with some of the key features summarised below:

- The active model extent is centred on Wilpinjong Coal Mine and includes the full extent of the neighbouring Moolarben Coal Complex as part of the cumulative impact assessment. The Wilpinjong and Cumbo Creek catchments as well as most of the Upper Goulburn River catchment are also included within the active model extent.
- The stratigraphic section is represented by eight (8) layers.
- The model domain is discretised into 56,430 cells for each layer, using a Voronoi-based mesh. This has the advantage being irregular while maintaining the property that a line connecting adjacent cell-centres is perpendicular to the shared cell boundary. The mesh was generated using the proprietary HydroAlgorithmics (2014) software 'AlgoMesh', which provides significant control over the mesh generation process.
- Model grid resolution in key areas of interest is as follows:
    - 70 m in most WCM open cut pit areas;
    - 80 and 100 m in Moolarben longwalls and 100 m in Moolarben open cut areas;
    - 20 m in the area between Pit 4 and Pit 3, which is the area of the mine lease through which Cumbo Creek flows;
    - 30 m regular hexagonal grid in alluvium near to WCM (Wilpinjong Creek, Wollar Creek and Cumbo Creek); and
    - 100 m regular hexagonal grid in alluvium in areas away from the WCM.
- Maximum cell dimension of about 1 km in areas away from the WCM
- Spatially and temporally variable groundwater recharge rates based upon outcropping geology.
- Temporal variation in rainfall recharge based on a daily timestep water balance that accounts for runoff, soil moisture deficit and recharge from inputs of rainfall and potential evaporation

3.2 Model Verification

Hydrographs of observed groundwater levels and HydroSimulations (2015b) modelled groundwater levels are found in **Appendix C**. The following section contains an assessment of the modelled groundwater levels where mining impacts might be observed.

3.2.1 Model Performance at Alluvium Monitoring Bores

At each alluvium monitoring site along Wilpinjong Creek, modelling predicts less than 2 m drawdown for the life of approved mining. However, substantial drawdowns in excess of 2 m are expected at most of the coal monitoring bores.

The alluvial bores examined in this section have been identified from the cause and effect analysis (**Section 2**) or the trigger level analysis (**Section 3**) as likely to show a Wilpinjong Coal Mine mining effect. The performance of the model at these sites can be seen in **Appendix C** (**Figures C-1** to **C-8**)

The timing of the mining effects modelled at the alluvial bores shows good correlation with the observed effect and often indicates a repressed response to rainfall that is also seen in the observed data. The drawdown observed is often greater (e.g. GWa5, GWa12, GWa14) than is seen in the modelled data but this is likely due to the below average rainfall during this period contributing to the decline in groundwater level rather than the model underestimating the mining effect. A recovery of groundwater level is also observed to occur in the modelled data following a 5-year mining effect. The length of time a mining effect is observed at alluvial bores is often longer than is predicted by the model, but this is expected when coupled with the low rainfall effect. Most alluvial bores have again started responding to the rainfall trend as is observed in the modelled data.

3.2.1.1 Comments on possible discrepancies

Observed data at GWa1 shows no recovery from the drawdown beginning in 2011, while the modelled groundwater levels show recovery and begin to again respond to climatic influences in early 2015 (**Figure C-1**). It is possible that the cumulative effect of mining related drawdown coupled with below average rainfall has lengthened the period that GWa1 has been affected. Although groundwater level has been below an observable elevation for much of the period from 2015 - 2017, obscuring observations of climatic fluctuations. As has been stated earlier, no response was observed in the water level despite a period of above average rainfall during 2016. This may indicate that mining activity is a more dominant control on the depressed water level observed at GWa1.

The drawdown in the observed groundwater level at GWa5 is about 1.5 m greater than the model predicts for the same period from mid-2013 to the end of 2016 (**Figure C-4**). However, a lack of flow in Cumbo Creek associated with the below average rainfall may serve to explain this discrepancy. Both modelled and observed groundwater levels continue to show good correlation with spikes in the rainfall trend despite the difference in head.

Similar trends are seen at GWa14 between observed and modelled groundwater levels (**Figure C-7**). The drawdown in observed groundwater level is about 1.5 m greater than that modelled, with limited ongoing response to rainfall trends. This is likely again to be attributable to the period of below average rainfall during the mining affected drawdown. Gwa14 has been reporting dry and near dry conditions since 2014, meaning the full extent of the drawdown or groundwater level response to climatic influence is unable to be observed. However, a large peak in groundwater was observed in late 2017, in accordance with a period of above average rainfall. The observed water levels were measured at ~360.6mAHD, approximately 2m above the level predicted by the model for the same period. This response provides promise for the continued recovery of GWa14.

3.2.2 Model Performance at Coal Monitoring Bores

Figures C-9 to **C-18** show the comparison between modelled and observed groundwater levels at coal bores identified from the cause and effect analysis (**Section 2**) to show a mining effect. The largest drawdowns are expected to occur while Pit 3 and Pit 4 are being excavated, with continued drawdowns seen in some bores following the extraction of Pit 5. Noting the uncertainty in interpreting the climate-related versus the mining-related component of the observed drawdown, modelled groundwater levels at the coal bores generally show a good correlation with the timing and magnitude of observed drawdown.

A comparison of predicted and observed drawdowns at coal bores (from July 2006 to Dec 2017) is offered in **Table 4**.

Table 4 Predicted and Observed Drawdown (m) at Coal Monitoring Bores at December 2017

	GWc1	GWc2	GWc3	GWc11	GWc12	GWc14	GWc15	GWc28^	GWc29^
Predicted	12.7	24	25	10.6	21	26	33	21	13.8
Observed	3-4	14	8	13	>30	>25	>25	18	16

^observations at GWc28 and GWc29 began after a mining effect had already begun.

4 REVIEW OF WATER BALANCE AND GROUNDWATER 'TAKE'

The following describes a review of dewatering or pumping records at the WCM, and the method to estimate 'groundwater take' from those records.

4.1 Trends in inflow

Figure 5 presents the 'inferred groundwater inflow' at Wilpinjong Coal Mine, with the most recent value for the 2016-17 water year based on the WRM (2017) estimate of gross inflow at 2.76 ML/day. The figure includes the historical data used in previous groundwater licensing audits for 2013-14 and 2014-15 water years (HydroSimulations, 2014; HydroSimulations 2015a). It should be noted that the 2006-11 data is not corrected for runoff or other processes, and so represents the inferred maximum groundwater inflow. The monthly data for 2006-2011 is distinguishable from both:

- the daily data in the period late-2012 to 2014; and
- the 2014-15 data, that is presented as a daily average based on the WRM (2015) estimated upper limit of total annual inflow.

Moving average trends of 6-months and 12-months have been plotted, as well as the 'Rainfall Residual Mass' (rainfall trend) curve. Steep slopes in either direction are indicative of more extreme rainfall patterns.

The results suggest that there is some correlation between mine inflow trend (12-monthly dotted trend line) and the rainfall trend, e.g. there is a rise in mine inflow in 2006-2009 which is congruent with above average rainfall in this period. However, this period is also congruent with the commencement of several of the pits at Wilpinjong Mine. In 2009-10, the inflow hydrograph and trend lines decline in line with the rainfall trend curve, along with a short-term rise in 2011.

From late 2012 the graph on **Figure 5** is based on the net pump-out from each of the pits, minus an estimate of runoff to each area, minus the water accumulated in storages and tailings dams near to active pits (as an attempt to account for recirculation from these). After 2012 the pumping rates appear to have increased (**Figure 5**) although it should be noted that these increased rates do not agree with the rates subsequently estimated as part of WRM's water balance. Further analysis of these discrepancies is discussed in HydroSimulations (2015a).

With respect to groundwater inflow determined from the site water balance (the pink series 2013-2015 labelled as 'Inferred GW Inflow (6-month averages 2013-2015 on **Figure 5**), the rise in inflow in 2013 does not correspond to a rise in rainfall trend. The subsequent levelling out of the inflow curve corresponds to average rainfall conditions from early 2014 into 2016.

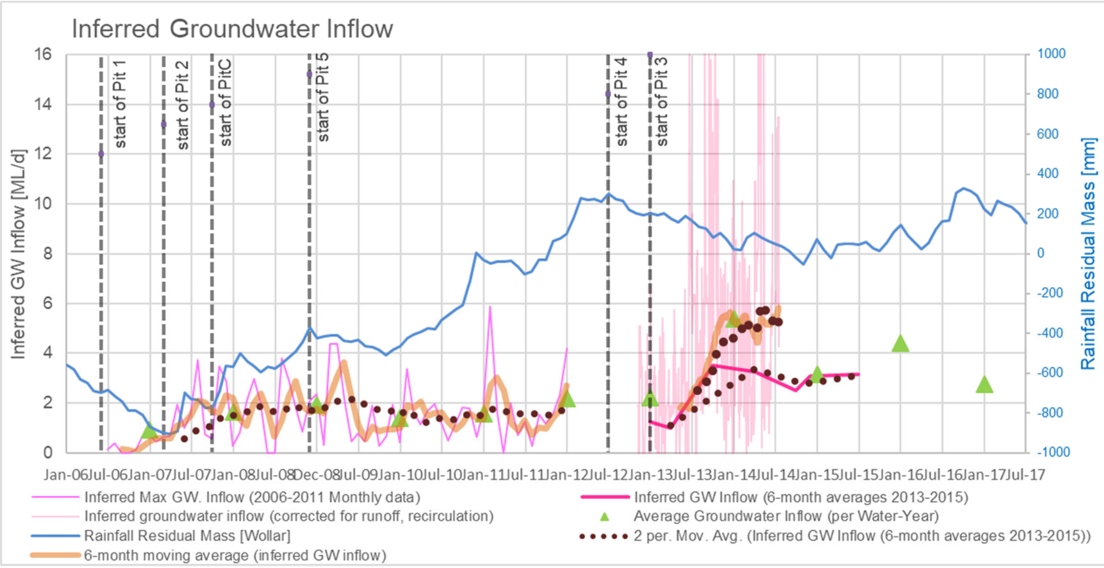

Figure 5 Historical Trends in Inferred Groundwater Inflow

4.2 Assessment of Annualised Groundwater Inflow against Licence

As of the water year 2016-17, WCPL holds a consolidated licence (number 20BL173513) to cover the extraction of water from all pits. The total authorised volume of groundwater extraction is 2,021 ML/a which is equivalent to the combined total of the individual pit entitlements for the 2014-15 water year (authorised by licences 20 BL173513, 20BL173514, 20BL173515, 20BL173516 and 20BL173517).

Previously:

- WCPL held two licences from 2006 until 2008 that entitled a combined groundwater take of 697 ML in any 12-month period.
- A third licence was added in 2008 that covered another mine pit, but without additional volume attached (i.e. still a combined 697 ML).
- In 2013 WCPL sought additional licensed volume, to a total of 1,730 ML/a. Licences were granted to cover each of the five active or soon-to-be-active pits (Pits 1-5). The total entitlement held by WCPL at that time was 2,021 ML/a.

When annualised from a daily inflow value of 2.76 ML/day, the WRM (2017) estimate for the 2016-2017 water year is about 1009 ML/a. **Table 5** presents the relevant entitlement volume of the now consolidated licence, the estimated inflow or 'take' for 2016-17, as well as a summary of the groundwater take from each of the pits, as inferred, for 2012-13, 2013-14, 2014-15 and 2015-16. It also presents an assessment of compliance to the allocated licence volumes for each water year. The WRM (2017) annualised estimate is within the allocated licence volume for the 2016-17 water year.

The modelled estimate for groundwater take (HydroSimulations, 2015b) also indicates the predicted inflow falls beneath the licensed volume for the 2016-17 water year.

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Table 5 Summary of Annual Volume of Inferred Maximum Groundwater Take (water years: 2012-17)

Licence	Pit	Limit [ML/a]	Inferred Groundwater Inflow [ML]								
			2012-13*	2013-14	2014-15		2015-16			2016-2017	
					WRM inflow pro-rata w/ modelled	Modelled inflow (HS, 2015b)	License Consolidated	Hatch (2017)	Modelled inflow (HS, 2015b)	WRM inflow (2017)	Modelled inflow (HS, 2015b)
20BL173517	Pit 1	1	0	0	6-11	13		1600	1043	1009	1033
20BL173516	Pit 2	190	<1	<1	4- 7	9					
20BL173515	Pit 3	680	38- 54	890-1270	210- 351	433					
	Pit 7			10 to 16#	10 to 16#	20#					
20BL173514	Pit 4	350	136-273	345-695	100- 168	207					
20BL176513	Pit 5	800	160-453	140-405	347- 579	714					
	Pit 6		not yet mined (commencement in 2018)								
TOTAL		**2021**	**335-780**	**1380-**	**678-1133**	**1397**		**1600**	**1043**	**1009**	**1033**

Full year (or scaled full year) of pumping data assessed: Compliant (based on available pumping data)

Pit 7 inflow should be considered under the Pit 3 licence (680 ML/a)

4.3 Assessment of Annualised Groundwater Take

Comparisons of the annualised total inflow to the mine (based on pumping records) and WCPL's groundwater extraction licence are made in **Figure 6** and **Figure 7** with predicted total annual inflows from two versions of the groundwater model for the WCM. **Figure 6** shows the results from the earlier model (HydroSimulations, 2013), as used to support Modification 5, while **Figure 7** shows the results for the better calibrated current model (HydroSimulations, 2015b), as used to support the Wilpinjong Extension Project (WEP).

In each figure, the total entitlement volumes are displayed as a red dashed line and the bar charts show the annualised inflow volumes from groundwater modelling. The totals from WRM's (2017) water balance are shown as a continuous brown line (the "Annualised Inferred GW inflow").

Given that the simulated mine plans differ a little, the models are in good agreement for most years with respect to estimated groundwater take. Exceptions in simulated differences in groundwater take occur in the two most recent (2015-16 and 2016-2017) water years when the models differ by 50 percent and 44 percent respectively. In the 2015-16 water year, the earlier model predicted about 2,000 ML/a while the current model predicts a little over 1,000 ML/a. The two estimates bracket the independent water balance estimate of 1,600 ML/a. In the 2016-2017 water year, the earlier model predicted a groundwater take about 1862 ML/a compared to 1033 ML/a for the current model. The new model estimate matches well with the independent water balance estimate of 1,009 ML/a (WRM, 2017)

The inferred groundwater inflow (from the independent water balance) tracks the total predicted inflow quite well for the period 2006-2011, except for 2007-08 for the earlier model (**Figure 6**). Except for that year, during this period, inflows peak at 600-700 ML/a in agreement with the licensed volume at that time.

Pumping records suggest increased inflows from 2012, and two lines (on **Figure 6** and **Figure 7**) are used to indicate the likely range in groundwater inflow for 2012-13 to 2014-15. In 2013-14 a total of 1,870 ML (the upper estimate in the likely range) was estimated as being pumped from all pits, compared to the total site-wide entitlement of 2,021 ML.

Predicted inflows increased materially from 2012 due to concurrent progression of Pits 3, 4 and 5 to the north). Pit pumping rates are likely to have been exacerbated by problems with recirculating water after it is pumped from open cuts to nearby storages (i.e. water storages and tailings dams).

The two models agree exactly for the 2014-15 water year but give opposite trends in the 2015-16 water year. This could be due to the difference in mine progression simulated in that year. Lower inflow is to be expected when developing areas to the south, which is both up-dip and away from the major drainage lines (**Figure 1**).

Both models show stable groundwater inflow rates in the 2016-17 water year compared with 2015-16 predictions. The older model (HydroSimulations, 2013) overestimates inflow by nearly double, while the current model (HydroSimulations, 2015b) agrees very well with the estimated groundwater inflow. The current model performs better at estimating groundwater take for 2016-17 than the previous model (HydroSimulations, 2013), and is more appropriate to use in terms of predicting impacts caused by Wilpinjong Coal Mine. Inflow as predicted by the groundwater model (HydroSimulations, 2015b) and the independent water balance assessment as conducted by WRM (2017) are both under the authorised volume of 2021 ML/a.

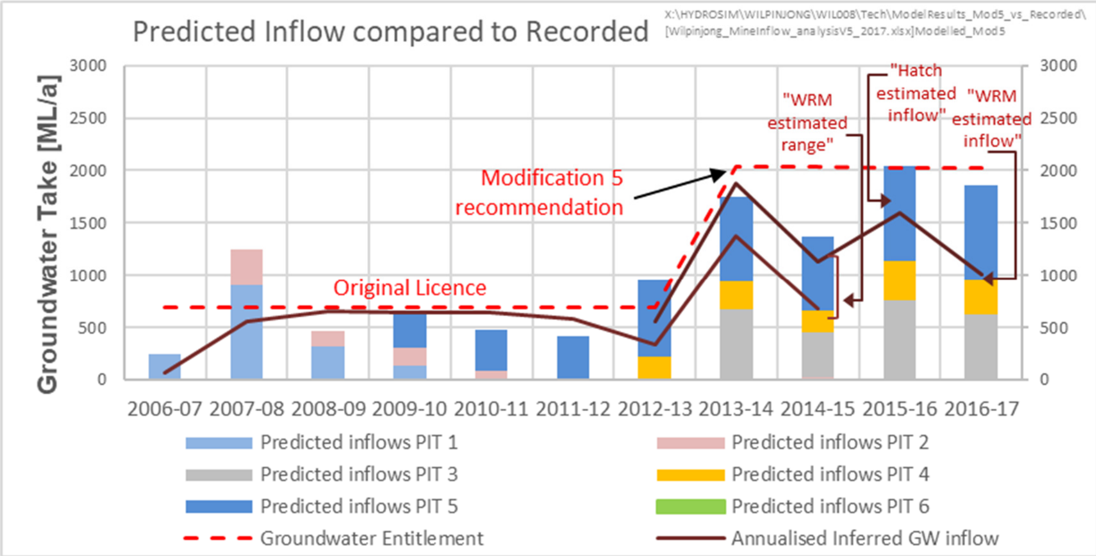

Figure 6 Comparison of Predicted and Pumped Volumes against Groundwater Entitlement for the HydroSimulations (2013) Groundwater Model

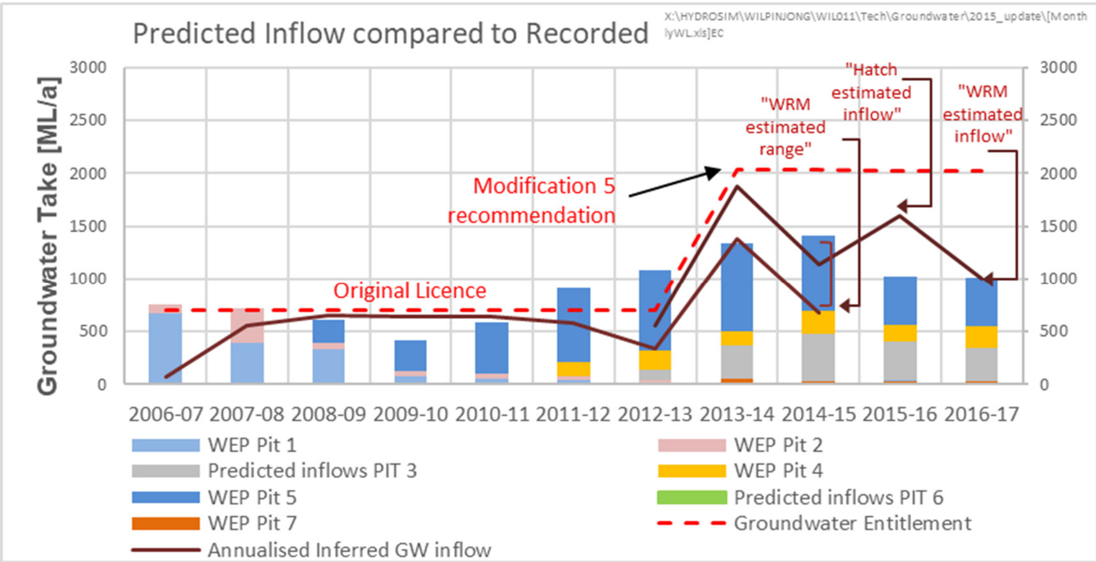

Figure 7 Comparison of Predicted and Pumped Volumes against Groundwater Entitlement for the HydroSimulations (2015b) Groundwater Model

4.4 Alluvial Groundwater Inflow

Groundwater can be lost from alluvium to underlying Permian sediments through natural processes or as incidental take in response to mining. As there are no physical means by which this volume of alluvial water can be measured, groundwater modelling is necessary to quantify the expected loss.

The HydroSimulations (2015b) model has predicted the likely alluvial take during the 2016-2017 water year, as shown in **Figure 8** for both Wilpinjong Creek alluvium and Cumbo Creek alluvium. The predicted loss from Wollar Creek is negligible.

For the 2016-2017 water year the additional alluvial water loss, over and above what occurs naturally, is estimated to be about 0.20 ML/day from Wilpinjong Creek alluvium and about 0.12 ML/day from Cumbo Creek alluvium. This gives an alluvial groundwater take of about 119 ML/year.

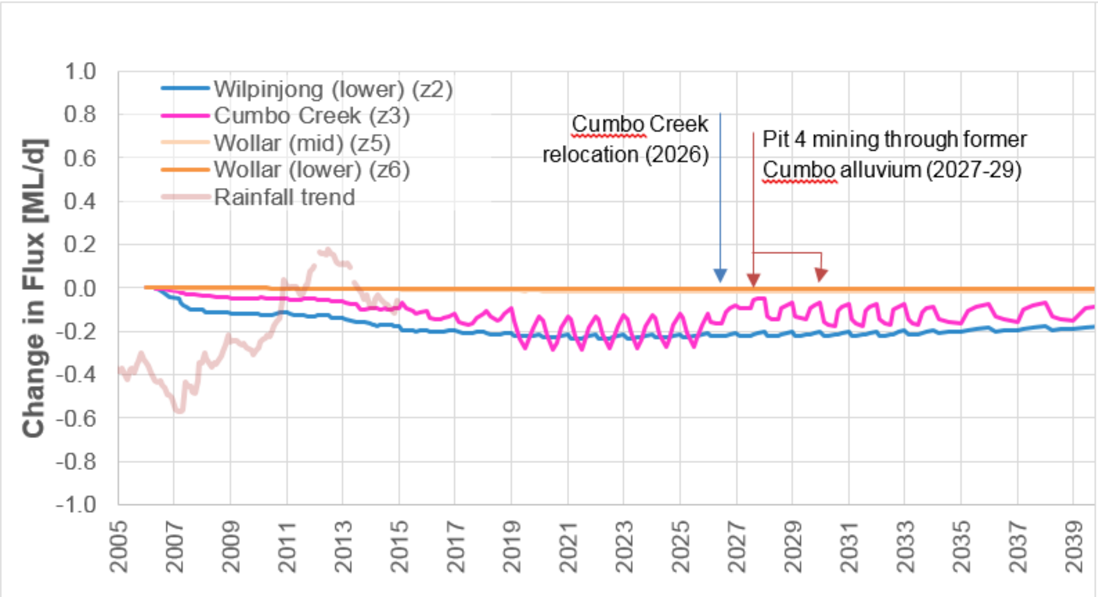

Figure 8 Modelled Take from Alluvium

5 DEWATERING BORES

Five production bores (GWs10, GWs11, GWs12, GWs14, GWs15) designed for dewatering are located at the foot of the escarpment on the northern side of Wilpinjong Creek (**Figure2**).

In all, there are seven licences covering the separate dewatering works: 20BL170147, 20BL170148, 20BL170149, 20BL170150, 20BL170151, 20BL170152 and 20BL170153. The combined authorised volume of groundwater extraction is 770 ML/year.

There have been no recorded uses of the dewatering bores during the 2016-17 water year. Nevertheless, compliance with the licence conditions is addressed in **Section 7**.

6 PIT EXTRACTION LICENSING COMPLIANCE

The following section contains information and analysis reporting against the licence conditions 2, 3, 4 and 8 for pit extraction for the water year 1 July 2016 to 30 June 2017.

6.1 Licence Condition (2)

'The licence holder must implement the methodology to estimate the annual volume of alluvial water inflow (water budget), the licence holder is likely to extract during the water year. This estimate must be reported annually in the AEMR.'

The alluvial water inflow (water budget) for the 2016-17 water year is 119ML/a (See **Section 4.4**).

6.2 Licence Condition (3)

'The licence holder must include in the AEMR a map which shows the licensed site and the current areas that mine works have interfered with alluvial sediment.'

Figure 1 shows the progression of mining in the last three years, and the extent of alluvium as mapped on the Western Coalfield 1:100000 geological sheet.

6.3 License Condition (4)

The licence holder must report in the AEMR:

I) the monitoring results of any groundwater monitoring with respect to this licence;
II) an assessment of compliance with this licence, regarding pit extraction,
III) a summary of new bores or pits constructed during the year;
IV) the trend graphs for monitoring data collected for each bore that is near to the licensed site;
V) a summary of any contingency event (event) that impacted on groundwater during the last report period, including actions taken to remedy the event and any additional monitoring carried out on the event.
VI) provide any recommendations for improvements for the next reporting period.

6.3.1 I) the monitoring results of any groundwater monitoring with respect to this licence;

Groundwater monitoring results are presented in the form of time-series charts in **Appendix A** for groundwater level data and **Appendix B** for groundwater level, EC and pH data in relation to trigger level compliance.

6.3.2 II) an assessment of compliance with this licence, regarding pit extraction,

See **Section 4.3, Figure 6 and Figure 7** for an assessment of compliance with this licence regarding pit extraction. The groundwater model estimate and the independent water balance estimate are both less than the authorised volume of 2,021 ML/a.

6.3.3 III) a summary of new bores or pits constructed during the year;

HydroSimulations has been advised that no new bores have been constructed during the 2016-17 water year.

All coal extraction has come from pits that were already operational prior to the 2016-17 water year.

6.3.4 IV) the trend graphs for monitoring data collected for each bore that is near to the licensed site

Annotated trend graphs for alluvial and coal bores at Wilpinjong are provided in **Appendix A**.

6.3.5 V) a summary of any contingency event (event) that impacted on groundwater during the last report period, including actions taken to remedy the event and any additional monitoring carried out on the event.

See **Section 2.1** and **Table 3** for an assessment of groundwater level and quality in relation to trigger levels from the most recent Groundwater Monitoring Program (Peabody, 2017).

Trigger exceedances for minimum groundwater level occurred at alluvium bores GWa3, GWa4, GWa5.

Trigger exceedances for groundwater EC occurred at alluvium bores GWa3, GWa4, GWa5, GWa6 and GWa7; and at coal bores GWc1, GWc3, GWc4 and GWc5.

No exceedance of groundwater pH occurred.

To the best of HydroSimulations' knowledge, no actions have yet been undertaken to remedy the events recorded in **Section 2**.

To the best of HydroSimulations' knowledge, no additional monitoring has been undertaken in response to the events in **Section 2**.

6.3.6 VI) provide any recommendations for improvements for the next reporting period.

- Drilling of deeper bores at alluvial locations that are frequently observed as dry (GWa1, GWa3, GWa6).
- Re-instatement of trigger level within Groundwater Management Plan for GWa6 now that correct bore depth can be used.

6.4 Licence Condition (8)

The volume of groundwater extracted from the works authorised by this license and by license(s) 20BL173514, 20BL173515, 20BL173516 and 20BL173517 shall not exceed 2021 megalitres in any 12-month period commencing 1st July.

Sections 4.1-4.3 identify that both the WRM (2017) inferred groundwater extraction at 1009 ML/year and HydroSimulations (2015b) modelled inflow at 1033 ML/year for the 2016-17 water year fall below the 2,021 megalitres allowed in any 12-month period as required by this licence condition.

7 BORE DEWATERING LICENCE COMPLIANCE

The following section contains information and analysis reporting against the licence conditions 7, 9 and 10 for dewatering bores for the water year from 1 July 2015 to 30 June 2017.

7.1 Licence Condition (7)

The licence holder must report in the AEMR:

I) the monitoring results of any groundwater monitoring with respect to this licence;
II) an assessment of compliance with this licence, regarding water extraction,
III) a summary of new bores or pits constructed during the year;
IV) the trend graphs for monitoring data collected for each bore that is near to the licensed site;
V) a summary of any contingency event (event) that impacted on groundwater during the last report period, including actions taken to remedy the event and any additional monitoring carried out on the event.
VI) provide any recommendations for improvements for the next reporting period.

The AEMR response relevant to these bore dewatering licence conditions is essentially the same as is addressed in **Section 6.3** for the pit extraction licence condition [4].

7.1.1 I) the monitoring results of any groundwater monitoring with respect to this licence;

Groundwater monitoring results are presented in the form of time-series charts in **Appendix A** for groundwater level data and **Appendix B** for groundwater level, EC and pH data in relation to trigger level compliance.

7.1.2 II) an assessment of compliance with this licence, regarding water extraction,

See **Section 5** where it is noted that there have been no recorded uses of the dewatering bores during the 2016-17 water year. Accordingly, groundwater extraction is less than the authorised volume of 770 ML/a.

7.1.3 III) a summary of new bores or pits constructed during the year;

HydroSimulations has been advised that no new bores have been constructed during the 2016-17 water year.

7.1.4 IV) the trend graphs for monitoring data collected for each bore that is near to the licensed site;

Annotated trend graphs for alluvial and coal bores at Wilpinjong, close to the dewatering bores, are provided in **Appendix A.**

7.1.5 V) a summary of any contingency event (event) that impacted on groundwater during the last report period, including actions taken to remedy the event and any additional monitoring carried out on the event.

No event occurred as no dewatering occurred.

7.1.6 VI) provide any recommendations for improvements for the next reporting period.

No recommendations are necessary while the bores remain unused.

7.2 Licence Condition (9)

The volume of groundwater extracted from the works authorised by this licence shall not exceed 110 megalitres in any 12-month period commencing 1st July.

HydroSimulations was advised by WCPL that no groundwater was extracted from the works authorised by this licence and as such, is compliant.

7.3 Licence Condition (10)

The volume of groundwater extracted from the works authorised by this license and by license(s) 20BLL70148, 20BLL70149, 20BLL70150, 20BLL7015 l, 20BLL70152, 20BLL70153 shall not exceed 770 megalitres in any 12-month period commencing 1st July.

HydroSimulations was advised by WCPL that no groundwater was extracted from the works authorised by this licence and licence(s) *20BLL70148, 20BLL70149, 20BLL70150, 20BLL7015 l, 20BLL70152, 20BLL70153,* and as such, is compliant. See **Section 5**.

8 REFERENCES

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